

The Harman Kardon Model hk 715

AM/FM Digital Tuner

Technical Manual

harman/kardon

ALIGNMENT PROCEDURES

STANDARD FREQUENCY ADJUSTMENT

INSTRUMENTS: Frequency Counter

88.1

98.8

STEP	CONNECT OUTPUT METER TO	ADJUST	ADJUST FOR - USA	ADJUST FOR - EUROPE
1	Set FM switch to ON position.			
2		Tuning Up or Down Button	90.1MHz on Frequency Display	87.5MHz on Frequency Display
3	Frequency Counter to TP1 and ground	TC601	100.8MHz \pm 1kHz reading on frequency counter	98.2MHz \pm kHz reading on frequency counter
4	Set AM switch to ON position.			
5		Tuning Up or Down Button	1000kHz on Frequency Display	999kHz on Frequency Display
6	Frequency Counter to TP2 and ground		Confirm that frequency reading on frequency counter is 1450kHz	Confirm that frequency reading on frequency counter is 1458 kHz

AM ALIGNMENT

INSTRUMENTS: AM RF Signal Generator modulated with 400 Hz at 30%.
DC Voltmeter
AC VTVM and Oscilloscope

NOTE: Set AM switch to ON position.
Connect signal source to a loop placed to radiate signals into AM antenna loop stick (L201).

STEP	SIGNAL SOURCE		CONNECT	DISPLAY SETTING		ADJUST	ADJUST FOR
	USA	EUROPE		USA	EUROPE		
1	530kHz AM Mod.	513kHz AM Mod.	DC voltmeter to TP3 and ground	530kHz	513kHz	L203	1V \pm 50mV on DC voltmeter
2	1610kHz AM Mod.	1620kHz AM Mod.	Same as above	1610kHz	1620kHz	TC202	22.5V \pm 1V on DC voltmeter
3	455kHz AM Mod.	459kHz AM Mod.	VTVM and oscilloscope to TP4 and ground	1610kHz	1620kHz	T201, T203	Maximum output on VTVM and at the same time clean wave on oscilloscope
4	600kHz AM Mod.	603kHz AM Mod.	Same as above	600kHz	603kHz	L201	Maximum output
5	1400kHz AM Mod.	1404kHz AM Mod.	Same as above	1400kHz	1404kHz	TC201	Same as above
6	Repeat steps 4 and 5 for optimum sensitivity.						

FM ALIGNMENT

INSTRUMENTS: FM RF Signal Generator modulated with 1000Hz at 100% (75kHz).
Oscilloscope
Distortion Meter

NOTE: Set FM switch to ON position.
Set FM Muting switch to ON position.
Connect signal source to FM antenna terminals.

STEP	SIGNAL SOURCE		CONNECT	DISPLAY SETTING		ADJUST	ADJUST FOR
	USA	EUROPE		USA	EUROPE		
1	98.145MHz 65dBf (970 μ V) FM Mod.	98.03MHz 65dBf (970 μ V) FM Mod.	Oscilloscope to output jack	98.1MHz	98.00MHz	T101(A)	Clean wave on oscilloscope
2	98.055MHz (970 μ V) FM Mod.	97.97MHz (970 μ V) FM Mod.	Same as above	98.1MHz	98.00MHz	T101(A)	Same as above
3	Repeat steps 1 and 2 for optimum sensitivity.						
4	98.1MHz 65dBf (970 μ V) FM Mod.	98.00MHz 65dBf (970 μ V) FM Mod.	Distortion meter to output jack	98.1MHz	98.00MHz	T101(B)	Minimum reading on distortion meter
5	Repeat steps 1, 2 and 4 for optimum alignment point of T101(A) and (B).						

MUTING SENSITIVITY ADJUSTMENT

INSTRUMENTS: FM Stereo Signal Generator modulated with 1000Hz at 100% (75kHz).
(L + R = 45% L - R = 45% 19kHz = 9%)
AC VTVM and Oscilloscope

NOTE: Set FM switch to ON position.
Set Mode switch to STEREO position.
Set FM Muting switch to OFF position.
Rotate VR 101 to maximum clockwise position.
Connect signal source to FM antenna terminals.

STEP	SIGNAL SOURCE		CONNECT	DISPLAY SETTING		ADJUST	ADJUST FOR
	USA	EUROPE		USA	EUROPE		
1	98.1MHz FM Mod.	98.00MHz FM Mod.	VTVM to output jack	98.1MHz	98.00MHz	Input level of signal source	50dB/SN on VTVM
2	Set FM Muting switch to ON position.						
3	Same as above		Oscilloscope to output jack	Same as above		VR101	Clean wave on oscilloscope

MPX ADJUSTMENT

INSTRUMENTS: FM RF Signal Generator.
Frequency Counter.

NOTE: Set FM switch to ON position.
Set Mode switch to STEREO position.
Connect signal source to FM antenna terminals.

SIGNAL SOURCE		CONNECT	DISPLAY SETTING		ADJUST	ADJUST FOR
USA	EUROPE		USA	EUROPE		
98.1MHz 65 dBf (970 μ V) (No Mod.)	98.00MHz 65 dBf (970 μ V) (No Mod.)	Frequency Counter to TP5 and ground	98.1MHz	98.00MHz	VR103	76kHz reading on frequency counter

SEPARATION ADJUSTMENT

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

NOTE: Set FM switch to ON position.
Set Mode switch to STEREO position.
Connect signal source to FM antenna terminals.

STEP	STEREO GENERATOR		CONNECT	DISPLAY SETTING		ADJUST	ADJUST FOR	
	SIGNAL SOURCE	FUNCTION		USA	EUROPE			
	USA	EUROPE		USA	EUROPE			
1			MAIN/SUB-OFF PILOT-ON	VTVM to output jack		VR104	Minimum output	
2	98.1MHz 65dBf (970 μ V) FM Mod.	98.00MHz 65dBf (970 μ V) FM Mod.	MAIN/SUB-ON PILOT-ON LEFT-ON	VTVM to R ch output jack	98.1MHz	98.00MHz	VR107	Same as above
3			MAIN/SUB-ON PILOT-ON RIGHT-ON	VTVM to L ch output jack			VR107	Same as above
4	Repeat steps 2 and 3 to obtain same level at left and right channels.							

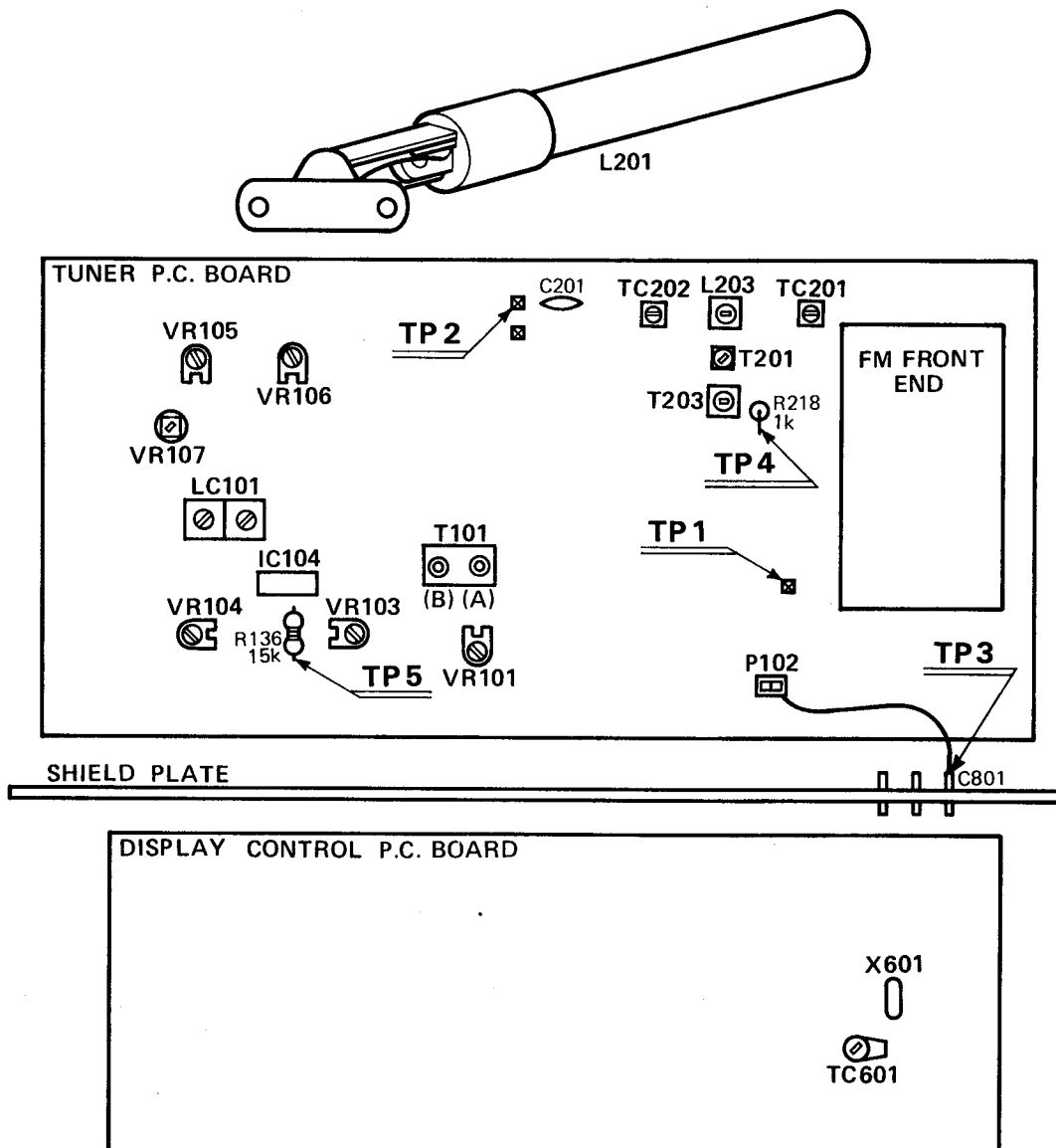
OUTPUT LEVEL ADJUSTMENT

INSTRUMENTS: FM RF Signal Generator modulated with 1000Hz at 100% (75kHz).
AC VTVM

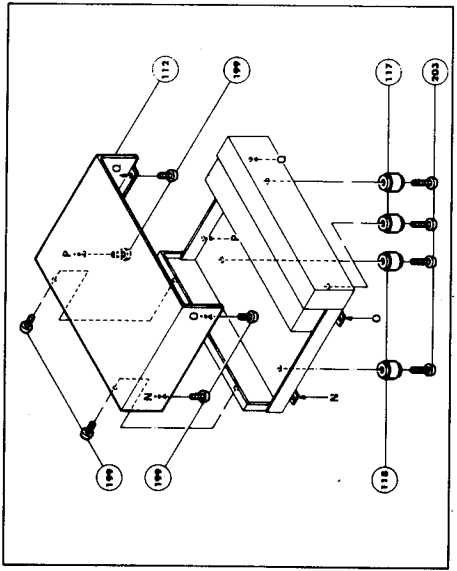
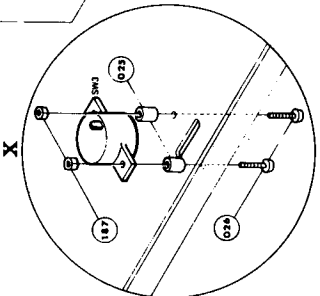
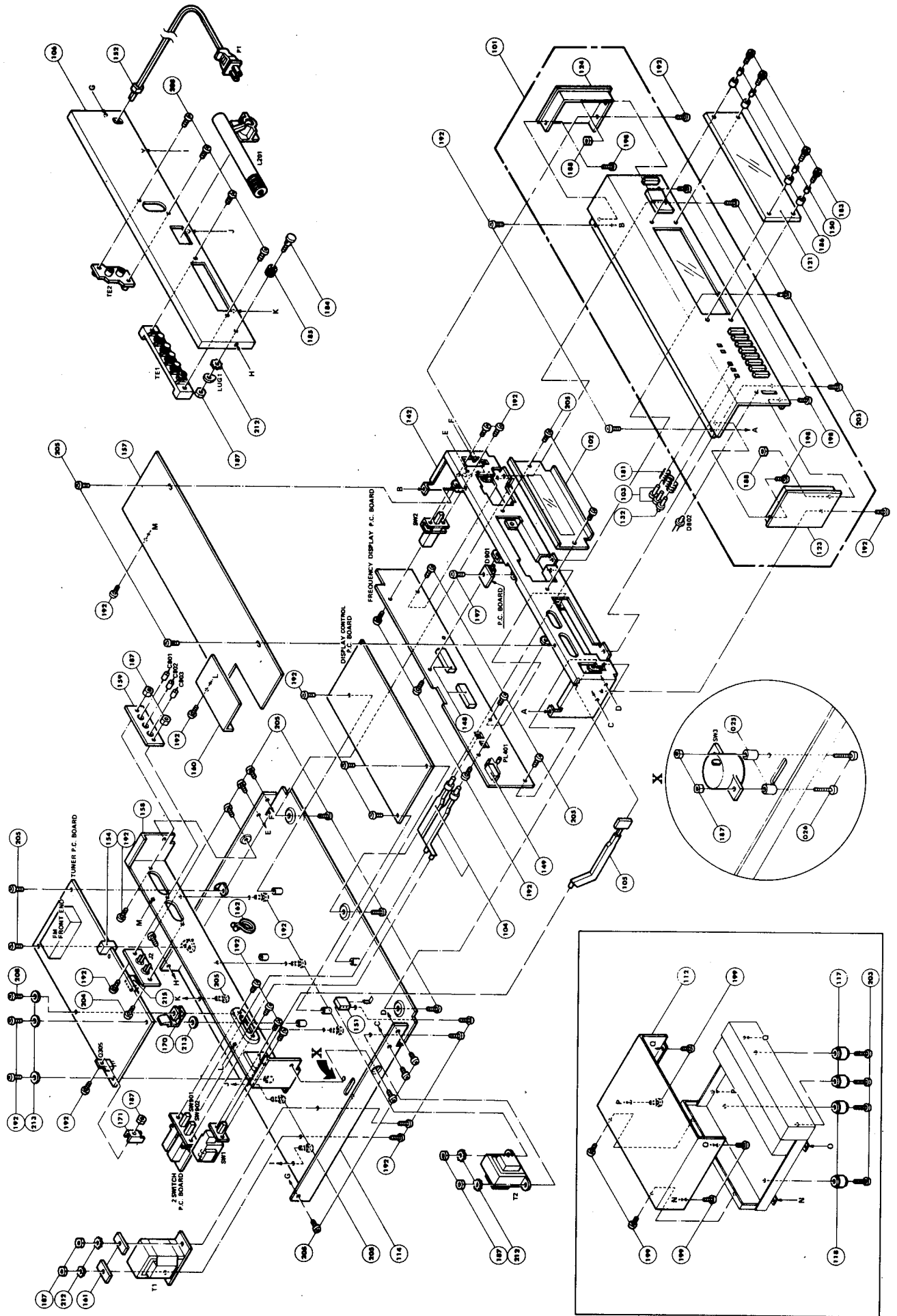
NOTE: Set FM switch to ON position.
Connect signal source to FM antenna terminals.

STEP	SIGNAL SOURCE		CONNECT OUTPUT METER TO	DISPLAY SETTING		ADJUST	ADJUST FOR
	USA	EUROPE		USA	EUROPE		
1	98.1MHz	98.00MHz	VTVM to Lch. output jack			VR106	0.775V reading on VTVM
2	65dBf (970μV) FM Mod.	65dBf (970μV) FM Mod.	VTVM to Rch. output jack	98.1MHz	98.00MHz	VR105	

TEST POINTS



GENERAL UNIT EXPLODED VIEW



GENERAL UNIT PARTS LIST

SER. NO.	REF. NO.	PART NO.	DESCRIPTION
AA	101	A443-HK715	Front Panel Assembly
AB	102	A514-HK715	Frequency Display Window Assembly
AC	103	A662-HK715-A	Push Button Assembly, FM, AM
AD	104	A662-HK715-B	Push Button Assembly, Mode, Hi Blend
AE	105	A662-HK715-C	Push Button Assembly, Power
AF	106	A424-HK715	Cabinet Back Assembly
112	112	1414-00302	Cabinet Top
114	114	1424-01401	Cabinet Bottom
117	117	1319-7330	Foot, Gold (x2)
118	118	1319-7230	Foot, Black (x2)
121	121	1531-01301	Clear Panel, Frequency Display Window
123	123	1562-00602	Left Panel, Front Panel
124	124	1562-00702	Right Panel, Front Panel
132	132	1662-01201	Push Button, Memory
142	142	2211-7199	Chassis, Front
148	148	2112-11180	Cushion, Frequency Display (x2)
149	149	2112-11755	Cushion, Memory Lamp
150	150	2114-71230	Spacer, Frequency Display Window Clear Panel (x4)
151	151	2114-415090	Holder, Frequency Display P.C. Board Holding
152	152	2114-415027	Bushing, AC Line Cord (P1)
154	154	2132-7078	Protector, Tuner P.C. Board
157	157	2216-7096	Shield Plate, Top
158	158	2216-7097	Shield Plate, Center
159	159	2216-7098	Shield Plate, Capacitor (C801/C802/C803)
160	160	2216-7100	Shield Plate, Top Shield Plate Window Cover
161	161	2219-7359	Bracket, Power Transformer (T1) (x2)
162	162	2240-7051	Holder, Lead Wire Settle (x3)
170	170	2240-7110	Holder, Tuner P.C. Board Retaining
171	171	2222-7081	Heat Sink, Voltage Regulator Transistor (Q305)
172	172	2240-7061	Holder, Lead Wire Settle
181	181	2651-210187	Coil Spring, Memory, FM and AM Push Buttons
183	183	2396-300869	Special Screw, Frequency Display Window Clear Panel (x4)
184	184	2310-7002	Special Screw, Ground Terminal
185	185	2440-7001	Special Nut, Ground Terminal
186	186	2363-501711	Bushing, Frequency Display Window Clear Panel (x4)
187	187	2446-301Z9	Hexagon Nut (M3) (x8)
188	188	2446-261Z9	Hexagon Nut (M2.6) (x2)
192	192	2327-300629	Screw (+) (3 x 6mm) (x30)
197	197	2327-300429	Screw (+) (3 x 4mm)
198	198	2327-260629	Screw (+) (2.6 x 6mm) (x4)
199	199	2327-300649	Screw (+) (3 x 6mm) (x6)

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SER. NO.	REF. NO.	PART NO.	DESCRIPTION
203	203	2347-301022	Self-Tapping Screw (+) (3 x 10mm) (x4)
204	204	2347-260822	Self-Tapping Screw (+) (2.6 x 8mm)
205	205	2347-300622	Self-Tapping Screw (+) (3 x 6mm) (x26)
208	208	2347-301041	Self-Tapping Screw (+) (3 x 10mm) (x5)
212	212	2414-302	Toothed Lock Washer (3.2 ϕ) (x5)
213	213	2401-0317	Metal Washer (3.3 ϕ x 10 ϕ x 1t)
215	215	2112-11756	Protector, Tuner P.C. Board

ELECTRICAL PARTS LISTMISCELLANEOUS

SER. NO.	REF. NO.	PART NO.	DESCRIPTION
801	T1	5584-701274	Power Transformer, Main
802	T2	5584-701275	Power Transformer, Back-Up
804	SW1	4431-01017358	Push Switch, Power
806	SW2	4431-01027472	Push Switch, FM Muting
809	TE1	4214-95	FM/AM External Antenna Terminal
811	TE2	4482-7113	2-Pin Jack, Tuner Output
825	P1	4161-0487	AC Line Cord
824	P2	4161-72106	Plug with Cord, FM/AM Osc. Output
812	J2	4482-727	2-Pin Jack, FM/AM Osc. Input
821	J101	4163-71727	Connector with Lead Wire, 14-Pin Female
822	J102	4163-71027	Connector with Lead Wire, 2-Pin Female
823	J601	4163-71127	Connector with Lead Wire, Power Indicator
831	D802	5637-GL2PR1	Light Emitting Diode, GL2PR1 Power Indicator
833	D901	5637-LN26RP	Light Emitting Diode, LN26RP FM Stereo Indicator
819	D902	5631-1S2076	Diode, 1S2076
829	L101	5995-702027	Coil, FM RF Balun
807	L201	5991-208	AM Ferrite Bar Antenna
560	L205	5995-470325	Coil, Choke
832	C310	5352-1030952	Capacitor, 0.01MF $\pm 20\%$ AC125V Metalized Polyester
827	C801,802, 803	5362-102099	Capacitor, 0.001MF $+200\%-0\%$ 500V Ceramic
841	R1	5135-335J50P	Resistor, 3.3 M ohm $+5\%$ 1/2W Carbon
818	R902	5134-473J25P	Resistor, 47 k ohm $+5\%$ 1/2W Carbon
838	C01,2	4443-017162	Connector
839	LUG1,2	4211-4	Lug Terminal
835		1397-6	"T" Type External Antenna
836		4161-7185	Plug with Cord, RCA

TUNER P.C. BOARD

SER. NO.	REF. NO.	PART NO.	DESCRIPTION
<u>RESISTORS</u> (All resistors 1/4W, <u>+5%</u> Carbon unless otherwise noted)			
637	R101,104, 110,111	5134-391J25P	390 ohm
635	R102,143	5134-121J25P	120 ohm
631	R103	5134-470J25P	47 ohm
634	R105,109, 126,211, 236,237	5134-101J25P	100 ohm
643	R106,108, 160,161, 218,225	5134-102J25P	1 k ohm
661	R112,206	5134-154J25P	150 k ohm
651	R113,116, 118,122, 127,130, 132,137, 139,145, 162,163, 216,217, 302,305	5134-103J25P	10 k ohm
626	R114	5154-153J25R	15 k ohm
664	R115	5174-272381	2.7 k ohm (+1% 1/4W Metal)
652	R117	5134-123J25P	12 k ohm
657	R119,120, 123,124, 125,144, 238	5134-473J25P	47 k ohm
654	R128,201	5134-223J25P	22 k ohm
621	R129	5154-680J25R	68 ohm
646	R131,133, 146	5134-222J25P	2.2 k ohm
656	R134,150, 152,156, 158,301	5134-333J25P	33 k ohm
617	R135,151	5102-8204713	82 ohm (+2% 1/4W Fuse)
653	R136,147, 164	5134-153J25P	15 k ohm
641	R138	5134-751J25P	750 ohm
638	R140	5134-471J25P	470 ohm
648	R141,142, 148,149	5134-472J25P	4.7 k ohm

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SER. NO.	REF. NO.	PART NO.	DESCRIPTION
640	R153,159	5134-681J25P	680 ohm
639	R154	5134-561J25P	560 ohm
645	R155,157, 303	5134-182J25P	1.8 k ohm
627	R171	5154-104J25R	100 k ohm
662	R202,207	5134-334J25P	330 k ohm
628	R203	5154-102J25R	1 k ohm
636	R204,215, 219	5134-331J25P	330 ohm
622	R205	5154-330J25R	33 ohm
629	R208	5154-152J25R	1.5 k ohm
630	R209	5134-100J25P	10 ohm
623	R210	5154-101J25R	100 ohm
655	R221	5134-273J25P	27 k ohm
666	R224	5134-225J25P	2.2 M ohm
649	R226	5134-562J25P	5.6 k ohm
647	R304	5134-272J25P	2.7 k ohm
618	R306	5102-4704713	47 ohm (+2% 1/4W Fuse)
616	R307	5102-2204713	22 ohm (+2% 1/4W Fuse)
624	R308,309	5154-221J25R	220 ohm
615	R310	5102-1005114	10 ohm (+5% 1/2W Fuse)
619	R311	5102-2214713	220 ohm (+2% 1/4W Fuse)
554	VR101	5101-50371913	Variable Resistor, 50 k ohm
552	VR103,105, 106	5101-50271913	Variable Resistor, 5 k ohm
553	VR104	5101-20371913	Variable Resistor, 20 k ohm
557	VR107	5101-1048574	Variable Resistor, 100 k ohm

CAPACITORS

566	C101,220	5345-476-16	47MF +50%-10% 16V Electrolytic
609	C102,103, 104,105, 106,107, 108,110, 111,112, 113,115, 119,148, 201,202, 205,209, 212,213, 214,216, 221,234, 307,308, 309	5361-223ZF	0.022MF +80%-20% 50V Ceramic

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SER. NO.	REF. NO.	PART NO.	DESCRIPTION
564	C109,127, 146,147, 302	5345-337C0211	330MF $\pm 20\%$ 16V Electrolytic
580	C114	5345-155F0212	1.5MF $\pm 20\%$ 50V Electrolytic
570	C116	5345-474-50	0.47MF $+75\%-10\%$ 50V Electrolytic
575	C117,118	5345-106D0212	10MF $\pm 20\%$ 25V Electrolytic
588	C120	5355-511J1HS	510PF $\pm 5\%$ 50V Stylor
595	C121,125, 126	5343-1050657	1MF $\pm 20\%$ 25V Tantalum Electrolytic
584	C122,224, 225	5354-473KLHM	0.047MF $\pm 10\%$ 50V Mylar
590	C123	5355-821J1HS	820PF $\pm 5\%$ 50V Stylor
594	C124	5343-6850655	6.8MF $\pm 20\%$ 16V Tantalum Electrolytic
579	C128,129, 218	5345-224F0212	0.22MF $\pm 20\%$ 50V Electrolytic
576	C130,131	5345-226B0212	22MF $\pm 20\%$ 10V Electrolytic
587	C132,133	5355-181J1HS	180PF $\pm 5\%$ 50V Stylor
591	C134,135	5355-222542	2200PF $\pm 5\%$ 50V Stylor
596	C136,137	5343-2250657	2.2MF $\pm 20\%$ 25V Tantalum Electrolytic
565	C138,304	5345-227-16	220MF $+50\%-10\%$ 16V Electrolytic
574	C139	5345-336C0212	33MF $\pm 20\%$ 16V Electrolytic
567	C140,141	5345-476-10	47MF $+50\%-10\%$ 10V Electrolytic
569	C142,228	5345-105-50	1MF $+75\%-10\%$ 50V Electrolytic
577	C143,144	5345-475D0212	4.7MF $\pm 20\%$ 25V Electrolytic
586	C145	5355-101J1HS	100PF $\pm 5\%$ 50V Stylor
611	C149	5361-473ZF	0.047MF $+80\%-20\%$ 50V Ceramic
605	C203	5361-101KSL	100PF $\pm 10\%$ 50V Ceramic
601	C204	5361-150JCH	15PF $\pm 5\%$ 50V Ceramic
600	C206	5361-010DCH	1PF ± 0.5 PF 50V Ceramic
602	C207	5361-390JCH	39PF $\pm 5\%$ 50V Ceramic
589	C208	5355-561J1HS	560PF $\pm 5\%$ 50V Stylor
568	C210,215, 219,301	5345-475-25	4.7MF $+50\%-10\%$ 25V Electrolytic
606	C211,222	5361-102KB	1000PF $\pm 10\%$ 50V Ceramic
583	C223	5354-183KLHM	0.018MF $\pm 10\%$ 50V Mylar
578	C226	5345-474F0212	0.47MF $\pm 20\%$ 50V Electrolytic
563	C303	5345-227-35	220MF $+50\%-10\%$ 35V Electrolytic
562	C305	5345-227-50	220MF $+50\%-10\%$ 50V Electrolytic
561	C306	5345-228-25	2200MF $+50\%-10\%$ 25V Electrolytic
550	TG201,202	5371-49	Trimmer Capacitor

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SER. NO.	REF. NO.	PART NO.	DESCRIPTION
<u>SEMICONDUCTORS</u>			
505	IC101,102	5652-BA401	Integrated Circuit, BA401 FM IF Amp.
502	IC103	5652-KB4441	Integrated Circuit, KB4441 FM IF Amp./ FM Det.
503	IC104	5652-KB4437	Integrated Circuit, KB4437 FM Multiplex
504	IC105	5652-KB4438	Integrated Circuit, KB4438 Muting/Post Amp.
501	IC106	5652-LA1240	Integrated Circuit, LA1240 AM IF Amp./ AM Det.
508	Q101,102, 103,104,105	5613-945(K)	Transistor, 2SC945(K) FM Muting
515	Q201	5616-2SK168(E)	Field Effect Transistor, 2SK168(E) Buffer Amp.
509	Q202	5613-1344(D)	Transistor, 2SC1344(D) AM Output Amp.
511	Q301	5611-733(K)	Transistor, 2SA733(K) FM Voltage Regulator
508	Q302,303	5613-945(K)	Transistor, 2SC945(K) AM Voltage Regulator, FM-AM Switching
510	Q304,306	5614-667(C)	Transistor, 2SD667(C) Voltage Regulator
507	Q305	5613-1419(C)	Transistor, 2SC1419(C) Voltage Regulator
516	Q307	5616-2SK163(N)	Field Effect Transistor, 2SK163(N) Constant Current
514	Q308	5616-2SK106(C)	Field Effect Transistor, 2SK106(C) Constant Current
527	D101,102, 103,105, 106,107, 108,203	5631-1S2076	Diode, 1S2076
522	D104	5635-HZ11B2	Zener Diode, HZ11B2 10.6V \pm 0.2V
517	D201/202	5633-KV1226	Capacitor Diode, KV1226
523	D301	5635-HZ9B2	Zener Diode, HZ9B2 8.7V \pm 0.2V
525	D302	5635-HZ27-3	Zener Diode, HZ27-3 27.9V \pm 0.7V
524	D303	5635-HZ16-2	Zener Diode, HZ16-2 16.1V \pm 0.4V
519	D304,305	5632-1SR35-10	Diode, 1SR35-10
520	D306	5632-1SR35-20	Diode, 1SR35-20

COILS AND TRANSFORMERS

558	L202	5995-100325	Coil, Choke
543	L203	5923-71020	Coil, AM Osc.
559	L204	5995-563250	Coil, Filter
539	T101	5574-7033	Transformer, Quadrature Det.
544	T201	5552-7027	Transformer, AM IF
545	T203	5553-70114	Transformer, AM IF

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SER. NO.	RER. NO.	PART NO.	DESCRIPTION
<u>MISCELLANEOUS</u>			
535		6114-7119	FM Front End Assembly
537	LC101	5214-12	LC Component, Low Pass Filter
540	CF101,102	5671-7117A	Ceramic Filter, FM IF
541	CF103,104	5671-7119A	Ceramic Filter, FM IF
547	CF201	5671-7128A	Ceramic Filter, AM IF
533	P101	4443-147114	Connector, 14-Pin Male
534	P102	4443-027114	Connector, 2-Pin Male
670		4214-7008	Terminal for Lead Wire (x15)
153		2132-5049	Spacer, Resistors and Diodes (x13)
531		4551-7478	P.C. Board

DISPLAY CONTROL P.C. BOARD

SER. NO.	REF. NO.	PART NO.	DESCRIPTION
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RESISTORS (All resistors 1/4W, +5% Carbon unless otherwise noted)

731	R601	5154-331J25R	330 ohm
746	R602,607	5134-682J25P	6.8 k ohm
735	R603	5134-151J25P	150 ohm
737	R604	5134-561J25P	560 ohm
745	R605	5134-182J25P	1.8 k ohm
732	R606	5154-182J25R	1.8 k ohm
728	R608	5174-913381	91 k ohm (+1% 1/4W Metal)
756	R609	5134-104J25P	100 k ohm
738	R610	5134-331J25P	330 ohm
752	R611,612, 613,614, 625	5134-473J25P	47 k ohm
750	R615,617, 618,630, 632	5134-103J25P	10 k ohm
729	R616	5135-331J50P	330 ohm (+5% 1/2W Carbon)
751	R624	5134-273J25P	27 k ohm
757	R626	5134-105J25P	1 M ohm
744	R627,628	5134-102J25P	1 k ohm
736	R629	5134-101J25P	100 ohm
739	R631	5134-471J25P	470 ohm
753	R633	5134-153J25P	15 k ohm

CAPACITORS

719	C601	5361-271KSL	270PF +10% 50V Ceramic
722	C602,606, 607,608, 615,616, 617,618, 619,620, 622,623, 624,625	5361-223ZF	0.022MF +80%-20% 50V Ceramic
716	C603,604	5361-151JCH	150PF +5% 50V Ceramic
721	C605	5361-103ZF	0.01MF +80%-20% 50V Ceramic
717	C609	5361-300JCH	30PF +5% 50V Ceramic
706	C610	5345-227-35	220MF +50%-10% 35V Electrolytic
725	C611	5343-1050658	1MF +20% 35V Tantalum Electrolytic

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SER. NO.	REF. NO.	PART NO.	DESCRIPTION
724	C612	5343-1540658	0.15MF $\pm 20\%$ 35V Tantalum Electrolytic
711	C613	5345-105-50	1MF $+75\%-10\%$ 50V Electrolytic
710	C614	5345-106-16	10MF $+50\%-10\%$ 16V Electrolytic
713	C621	5345-474F0212	0.47MF $\pm 20\%$ 50V Electrolytic
708	C626	5345-226-16	22MF $+50\%-10\%$ 16V Electrolytic
707	C627	5345-107-16	100MF $+50\%-10\%$ 16V Electrolytic
709	C628	5345-476-10	47MF $+50\%-10\%$ 10V Electrolytic
702	TC601	5371-59	Trimmer Capacitor

SEMICONDUCTORS

681	IC601	5654-HD10551	Integrated Circuit, HD10551 Pre-Scaler
682	IC602	5654-HD44015	Integrated Circuit, HD44015 PLL Synthesizer
683	IC603	5654-HD44753	Integrated Circuit, HD44753 Micro-Processor
684	IC604	5654-HA12009	Integrated Circuit, HA12009 Display Decoder
686	Q601	5613-945(K)	Transistor, 2SC945(K) Low Pass Filter
688	Q602	5616-2SK68(M)	Field Effect Transistor, 2SK68(M) Low Pass Filter
687	Q603	5611-733(K)	Transistor, 2SA733(K) Memory Lamp Driver
686	Q604	5613-945(K)	Transistor, 2SC945(K) Memory Lamp Driver
687	Q607	5611-733(K)	Transistor, 2SA733(K) Muting
686	Q608	5613-945(K)	Transistor, 2SC945(K) Voltage Regulator
691	D601,607	5635-HZ3B2	Zener Diode, HZ3B2 3.0V $\pm 0.1V$
694	D603,604, 605,606, 608	5631-1S2076	Diode, 1S2076
690	D609	5632-1SR35-10	Diode, 1SR35-10
692	D610	5635-HZ6B2	Zener Diode, HZ6B2 5.75V $\pm 0.15V$
693	D611	5635-HZ11B2	Zener Diode, HZ11B2 10.6V $\pm 0.2V$

COILS

705	L601	5995-0056	Coil, Line Choke
704	L602,603, 604,605, 606,607, 608,609	5995-100325	Coil, Line Choke

- to be continued -

SER. NO.	REF. NO.	PART NO.	DESCRIPTION
<u>MISCELLANEOUS</u>			
701	X601	5691-01152019	Crystal Osc., 11.52 MHz
697	P601	4443-027114	Connector, 2-Pin Male
698	J602,603, 604,605, 606	4443-107125	Connector, 10-Pin Female
761		4214-7008	Terminal for Lead Wire (x14)
695		4551-7548	P.C. Board

FREQUENCY DISPLAY P.C. BOARD

SER. NO.	REF. NO.	PART NO.	DESCRIPTION
776		5722-8	Frequency Display
771	IC401	5654-74LS42P	Integrated Circuit, HD74LS42P FM/AM Preset Memory LEDs Driver
772	IC402	5652-BA656	Integrated Circuit, BA656 Level Meter Driver
775	D401,402, 403,404, 405,406, 407,408	5637-SLD30GG	Light Emitting Diode, SLD30GG FM/AM Preset Memory Indicator
774	D409,410, 411,412, 413,414, 415,416, 417,418, 419,420, 421,422	5631-1S2076	Diode, 1S2076
785	R401	5134-22LJ25P	Resistor, 220 ohm $\pm 5\%$ 1/4W Carbon
779	SW401,402, 403,404, 405,406, 407,408, 409,410, 411,412, 413	4431-01017186	Push Switch, Memory, FM, AM, Tuning (Down, Up), FM/AM Preset Memory (1~8)
788	PL401	5731-0607142	Lamp, Memory Button Illuminate
781	P402,403, 404,405, 406	4443-107136	Connector, 10-Pin Male
790		4214-7008	Terminal, PL401 (x2)
777		4551-7580	P.C. Board

2 SWITCH P.C. BOARD

SER. NO.	REF. NO.	PART NO.	DESCRIPTION
805	SW901,902	4431-02047248	Push Switch, Hi Blend, Mode
815	C901	5354-682KLHM	Capacitor, 0.0068MF $\pm 10\%$ 50V Mylar
816	R901	5134-333J25P	Resistor, 33 k ohm $\pm 5\%$ 1/4W Carbon
817		4214-7008	Terminal for Lead Wire (x5)
814		4551-7582	P.C. Board

PARTS LIST OF MULTI VOLTAGE UNIT

AS TO ALL OTHER PARTS EXCEPT THE FOLLOWING PARTS IN REF. NO., PLEASE REFER TO THE SERVICE MANUAL OF REGULAR VOLTAGE UNIT.

SER. NO.	REF. NO.	PART NO.	DESCRIPTION
<u>PART NO. CHANGE</u>			
AFB	106	A424-HK715-A	Cabinet Back Assembly
114B	114	1424-03501	Cabinet Bottom
801B	T1	5584-702278	Power Transformer, Main
802B	T2	5584-702279	Power Transformer, Back-Up
804B	SW1	4431-01017658	Push Switch, Power
825B	P1	4161-7256	AC Line Cord
547B	CF201	5671-7123A	Ceramic Filter, AM IF
683B	IC603	5654-HD44752	Integrated Circuit, HD44752 Micro-Processor
653B	R116	5134-153J25P	Resistor, 15 k ohm $\pm 5\%$ 1/4W Carbon
045B	R143	5102-1214713	Resistor, 120 ohm $\pm 2\%$ 1/4W Fuse
044B	R237	5102-1014713	Resistor, 100 ohm $\pm 2\%$ 1/4W Fuse
591B	C134,135	5355-162542	Capacitor, 1600PF $\pm 5\%$ 50V Stylor
602B	C207	5361-330JCH	Capacitor, 33PF $\pm 5\%$ 50V Ceramic
832B	C310	5352-1030958	Capacitor, 0.01MF $\pm 20\%$ AC250V Metalized Polyester
707B	C627	5345-107-25	Capacitor, 100MF $\pm 50\%$ -10% 25V Electrolytic
695B		4551-7476	P.C. Board, Display Control
777B		4551-7601	P.C. Board, Frequency Display

ADDITIONAL USAGE

189B	187	2446-30129	Hexagon Nut (M3) (x2)
025B	025	2132-7016	Spacer, Voltage Selector Switch (SW3) (x2)
026B	026	2327-301229	Screw (+) (3 x 12mm) (x2)
043B	SW3	4411-104736	Rotary Switch, Power Source Voltage Selector
042B	P407	4443-037136	Connector, 3-Pin Male
041B	J607	4443-037125	Connector, 3-Pin Female
153B		2132-5049	Spacer, R143 and R237 (x3)

SCHEMATIC DIAGRAM NOTES

1. All resistors are 1/4 watt unless otherwise noted. Values are in ohms.
K = 1000 M = 1000K
2. All capacitance values are in MF unless otherwise noted. PF = MMF

VOLTAGE CHART

AC 120V, no signal, chassis ground.

FM POSITION

	BASE	EMITTER	COLLECTOR
Q101	0V	0.2V	9.6V
Q102	0.8V	0.2V	0.2V
Q103	0.2V	0V	11.0V
Q104	4.7V	0V	0V
Q105	0.7V	0V	0.1V
Q301	15.2V	14.0V	13.8V
Q303	0.7V	0V	0.1V
Q304	8.9V	8.2V	14.7V
Q305	16.6V	16.0V	20.7V
Q306	27.8V	27.2V	35.3V
Q601	0.6V	0V	3.1V
Q603	4.6V	0V	5.1V
Q604	0V	0V	16.0V
Q607	5.1V	5.1V	0V
Q608	5.7V	5.1V	11.0V

AM POSITION

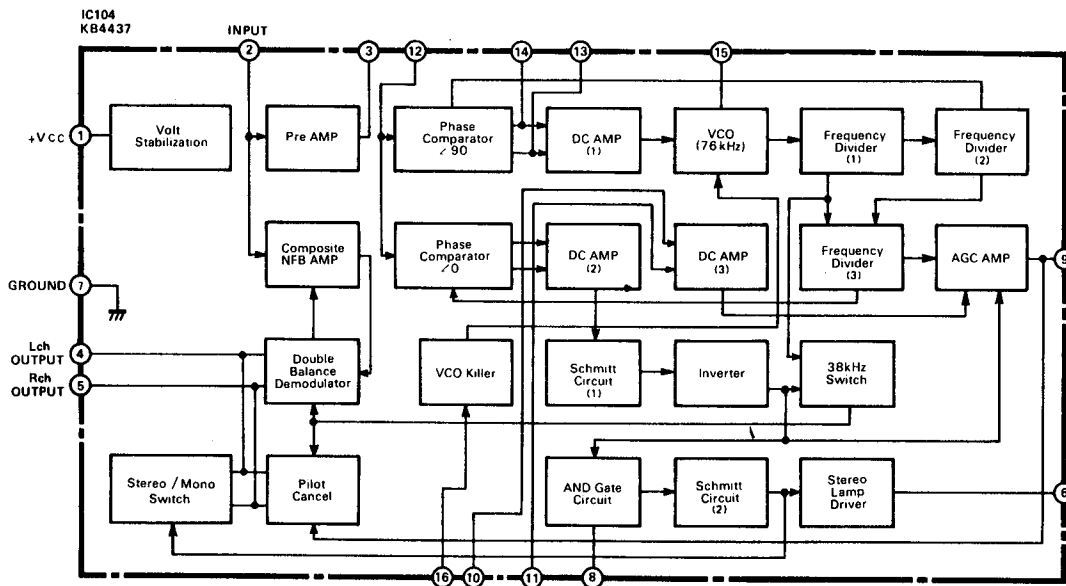
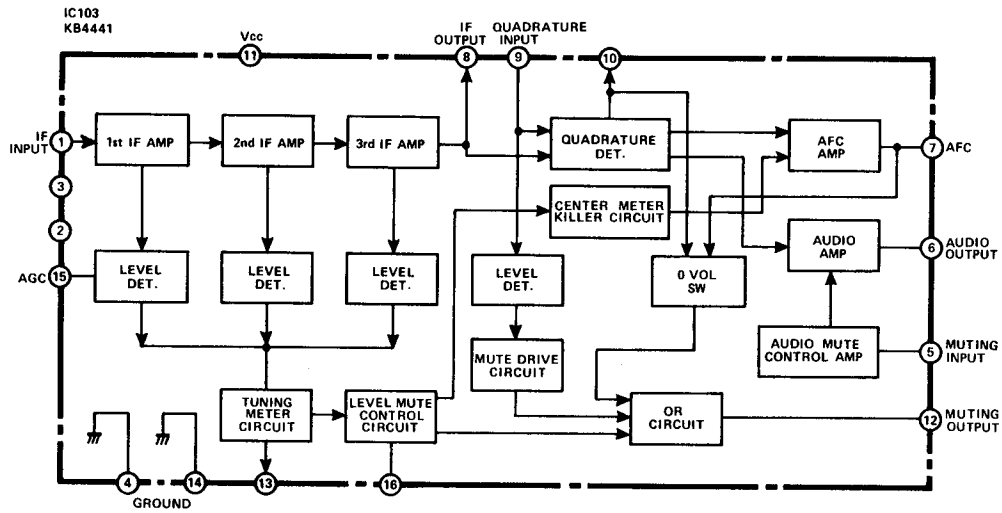
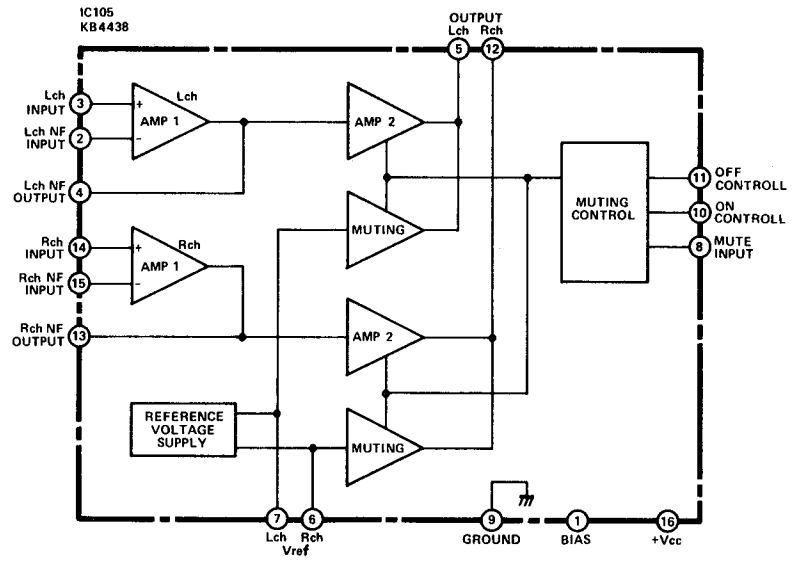
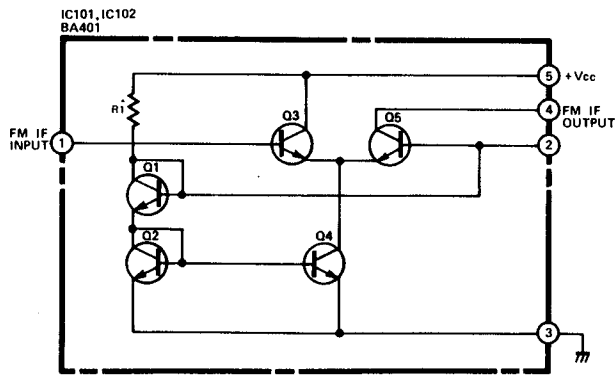
	GATE	SOURCE	DRAIN
Q201	0V	0.2V	5.8V
	BASE	EMITTER	COLLECTOR
Q202	1.7V	1.0V	7.7V
Q302	14.0V	13.4V	15.5V

	GATE	SOURCE	DRAIN
Q307	16.6V	16.6V	23.2V
Q308	27.8V	27.8V	35.3V
Q602	0.6V	0.6V	24.8V

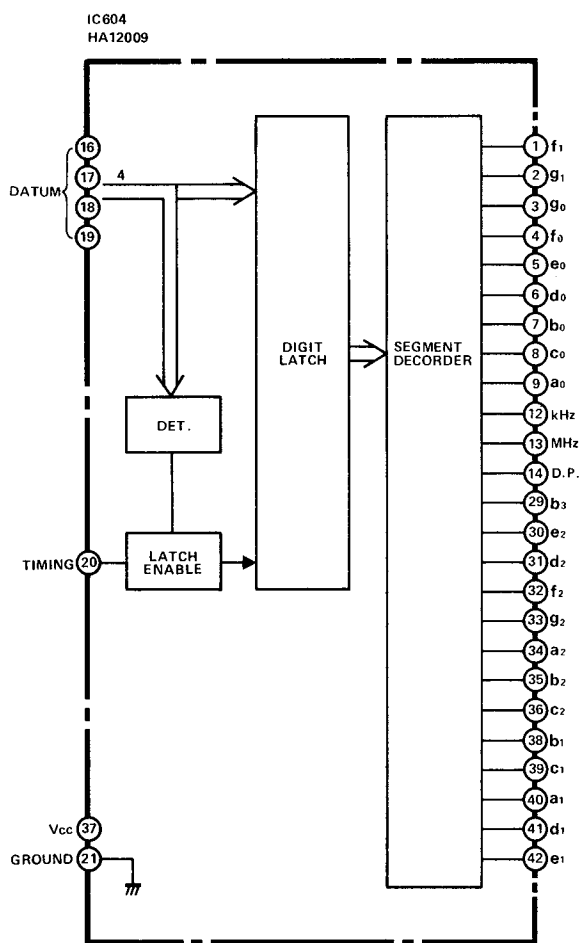
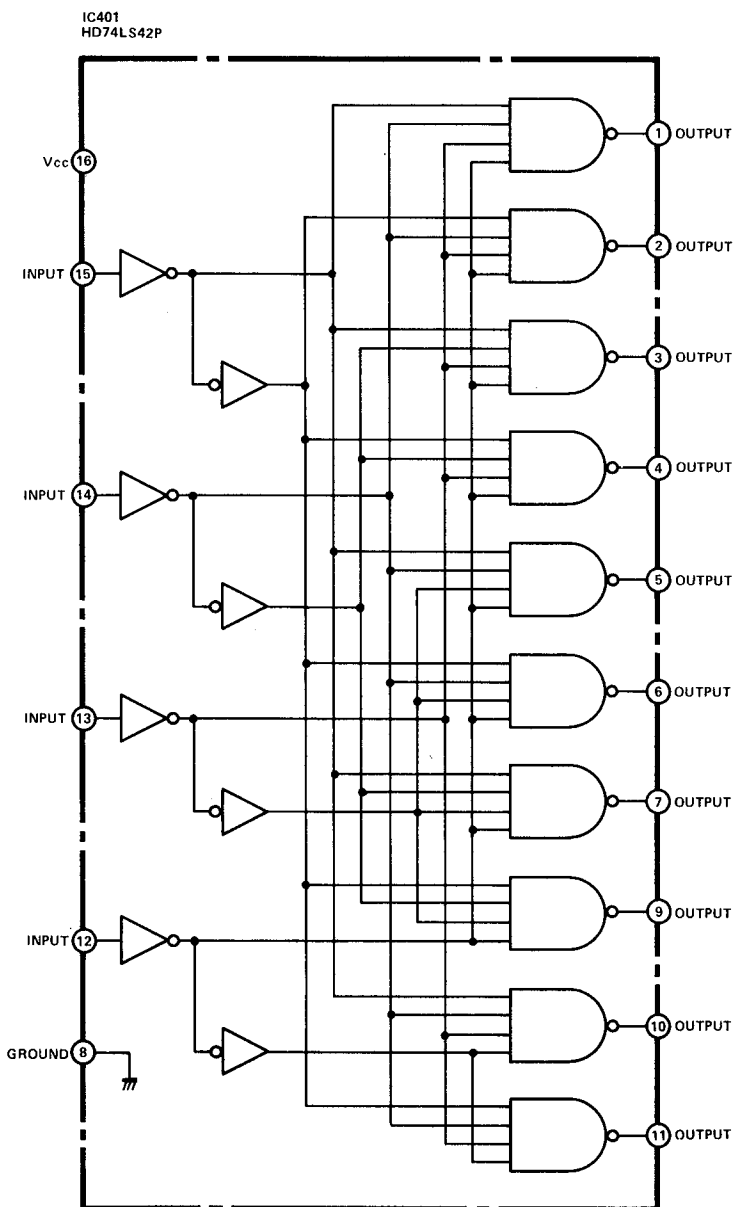
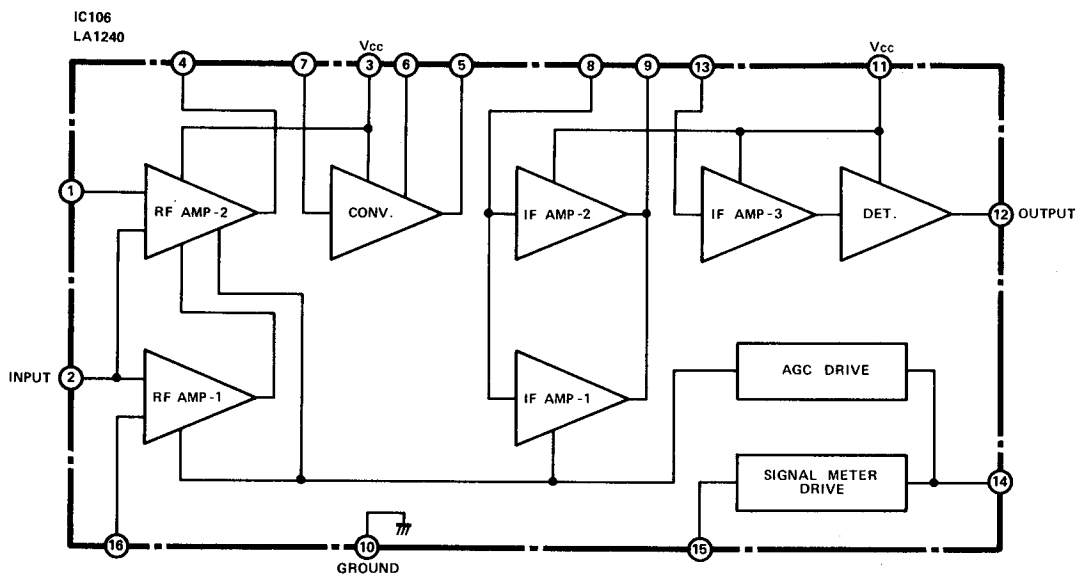
	IC101	IC102	IC103	IC104		IC105	IC106	IC401	IC402	IC601	
	FM	FM	FM	FM	AM	FM/AM	AM	FM/AM	FM/AM	FM	AM
1.	1.4V	1.4V	2.1V	13.0V	12.7V	14.4V	4.8V	4.5V	-0.5V	0V	0V
2.	1.4V	1.4V	2.1V	3.2V	3.2V	7.4V	1.7V	4.5V	-0.5V	0V	0V
3.	0V	0V	2.1V	6.5V	5.4V	7.4V	12.6V	4.5V	-0.4V	1.3V	2.3V
4.	9.9V	11.6V	0V	8.6V	8.3V	7.4V	10.5V	4.5V	-0.4V	0V	0V
5.	11.7V	12.4V	0V	8.6V	8.3V	7.5V	12.6V	4.5V	0V	4.5V	4.5V
6.			5.6V	4.1V	4.1V	7.4V	3.4V	4.5V	-0.4V	0V	0V
7.			5.4V	0V	0V	7.4V	1.3V	4.5V	0.2V	4.5V	4.5V
8.			5.4V	3.1V	0.1V	0.1V	2.7V	0V	0V	2.5V	2.5V
9.			5.5V	0.8V	0.8V	0V	9.8V	4.5V	15.1V		
10.			5.5V	2.5V	2.5V	6.3V	0V	4.5V			
11.			13.6V	2.5V	2.5V	14.4V	13.1V	4.5V			
12.			4.7V	2.5V	2.5V	7.5V	1.6V	1.3V			
13.			0V	2.5V	2.5V	7.5V	0.7V	1.3V			
14.			0V	2.5V	2.5V	7.4V	1.6V	1.3V			
15.			4.5V	3.6V	5.8V	7.5V	0V	1.3V			
16.			4.6V	0V	7.3V	14.9V	1.2V	5.1V			

	IC602		IC603		IC604		IC603		IC604		
	FM	AM	FM	AM	FM	AM	FM	AM	FM	AM	
1.	8.1V	8.1V	0V	0V	14.6V	0V	25.	5.1V	5.1V	0.1V	0.4V
2.	8.1V	8.1V	0.3V	0.4V	14.6V	14.6V	26.	1.3V	1.3V	0V	0.4V
3.	8.1V	8.1V	0V	0V	0.3V	0.3V	27.	1.3V	1.3V	0.1V	0.4V
4.	8.1V	8.1V	5.1V	4.3V	0.7V	14.6V	28.	1.3V	1.3V	0.1V	0.4V
5.	0.2V	0.3V	0V	0V	0.7V	14.6V	29.	1.3V	1.4V	0.1V	0.4V
6.	0.1V	0.2V	0.6V	0.5V	0.5V	14.6V	30.	2.5V	2.5V	0.1V	0.4V
7.	7.9V	4.4V	5.0V	5.0V	14.6V	14.6V	31.	5.1V	5.1V	14.6V	14.6V
8.	6.0V	4.5V	5.0V	5.0V	14.6V	14.6V	32.	0V	0V	14.6V	14.6V
9.	0V	0V	5.0V	5.0V	0.4V	14.6V	33.	0V	0V	14.6V	14.6V
10.	0V	0V	8.2V	8.2V	1.1V	2.4V	34.	0V	0V	14.6V	14.6V
11.	0V	0V	8.2V	8.2V	1.0V	0.6V	35.	4.1V	0V	14.6V	0.4V
12.	2.5V	2.5V	8.2V	8.2V	-0.2V	14.5V	36.	0.2V	0.3V	14.6V	14.6V
13.	8.2V	8.2V	8.2V	8.2V	14.5V	0V	37.	0.1V	0.2V	15.1V	15.2V
14.	3.8V	3.8V	0V	0V	14.6V	0.4V	38.	7.9V	4.4V	14.6V	14.6V
15.	3.8V	3.8V	0V	0V	0.1V	14.6V	39.	5.9V	4.5V	14.6V	14.6V
16.	0.6V	0.6V	0V	0V	0.6V	0.6V	40.	4.9V	4.9V	14.6V	14.6V
17.	0.3V	0.3V	2.4V	2.4V	0.6V	0.6V	41.	5.1V	5.1V	14.6V	14.6V
18.	0V	0V	2.4V	2.4V	1.5V	1.1V	42.	5.1V	5.1V	14.6V	0.3V
19.	5.1V	5.1V	5.1V	5.1V	0.1V	1.1V					
20.	3.7V	3.4V	5.1V	5.1V	0.1V	0V					
21.	3.2V	3.1V	5.1V	5.1V	0V	0V					
22.	8.2V	3.2V	5.1V	5.1V	14.7V	0.4V					
23.			5.1V	5.1V	0.2V	0.4V					
24.			5.1V	5.1V	0.1V	0.4V					

IC BLOCK DIAGRAM

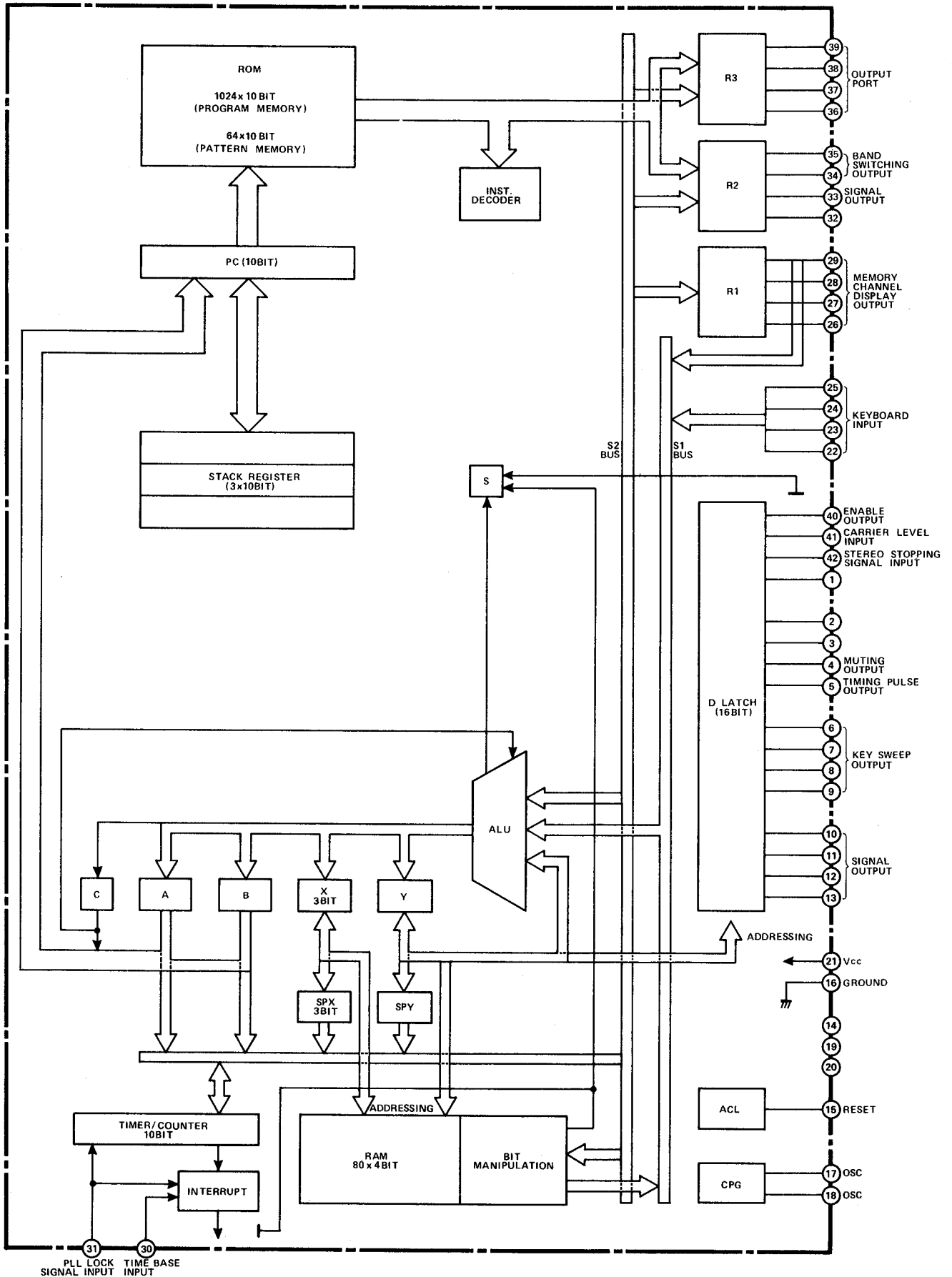


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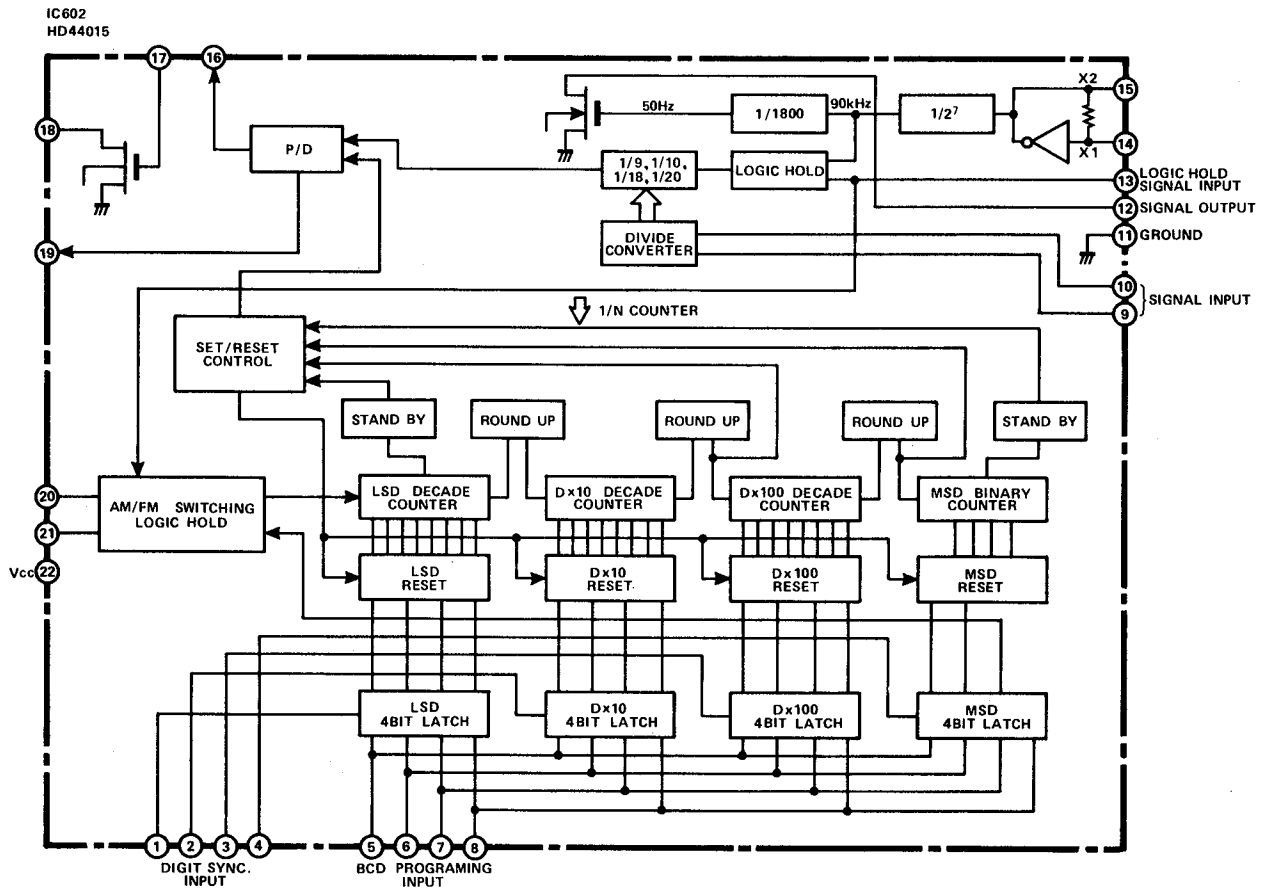
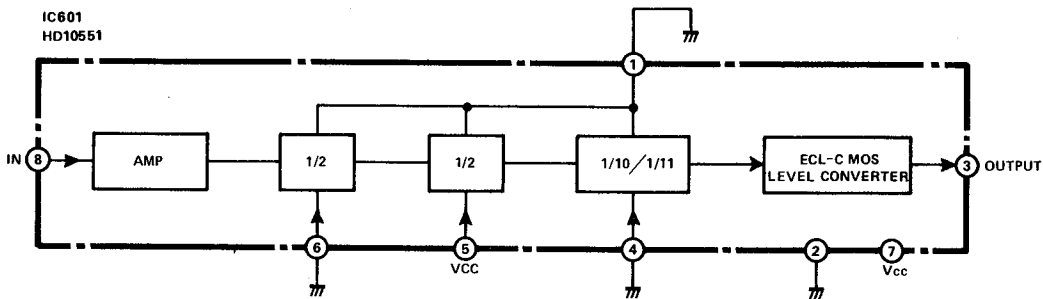
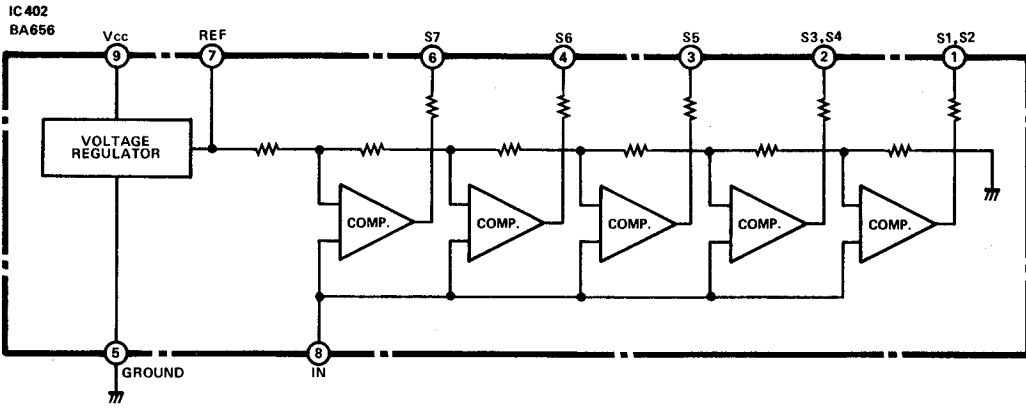


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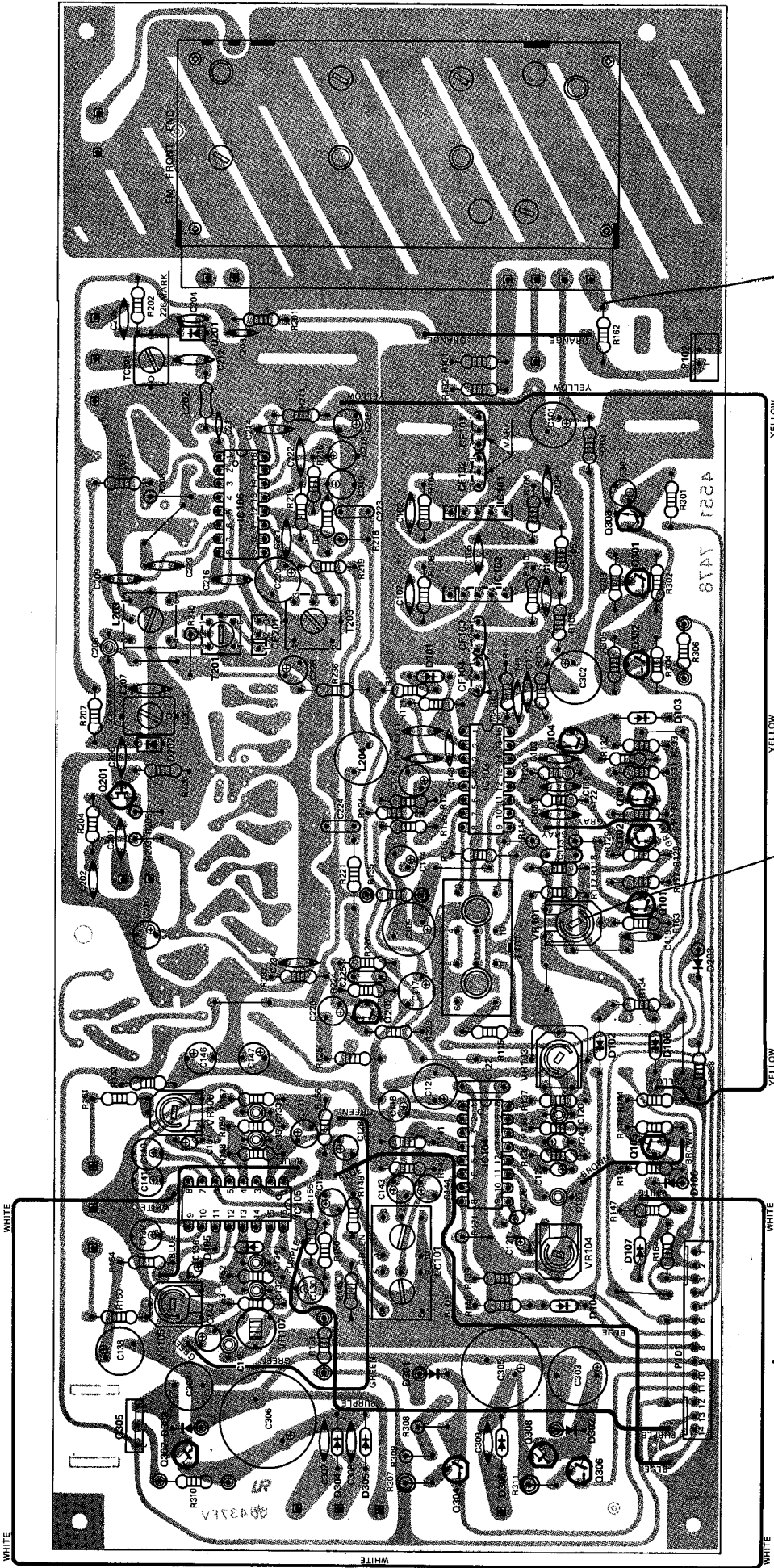
IC603
HD44753



IC BLOCK DIAGRAM



TUNER P.C. BOARD

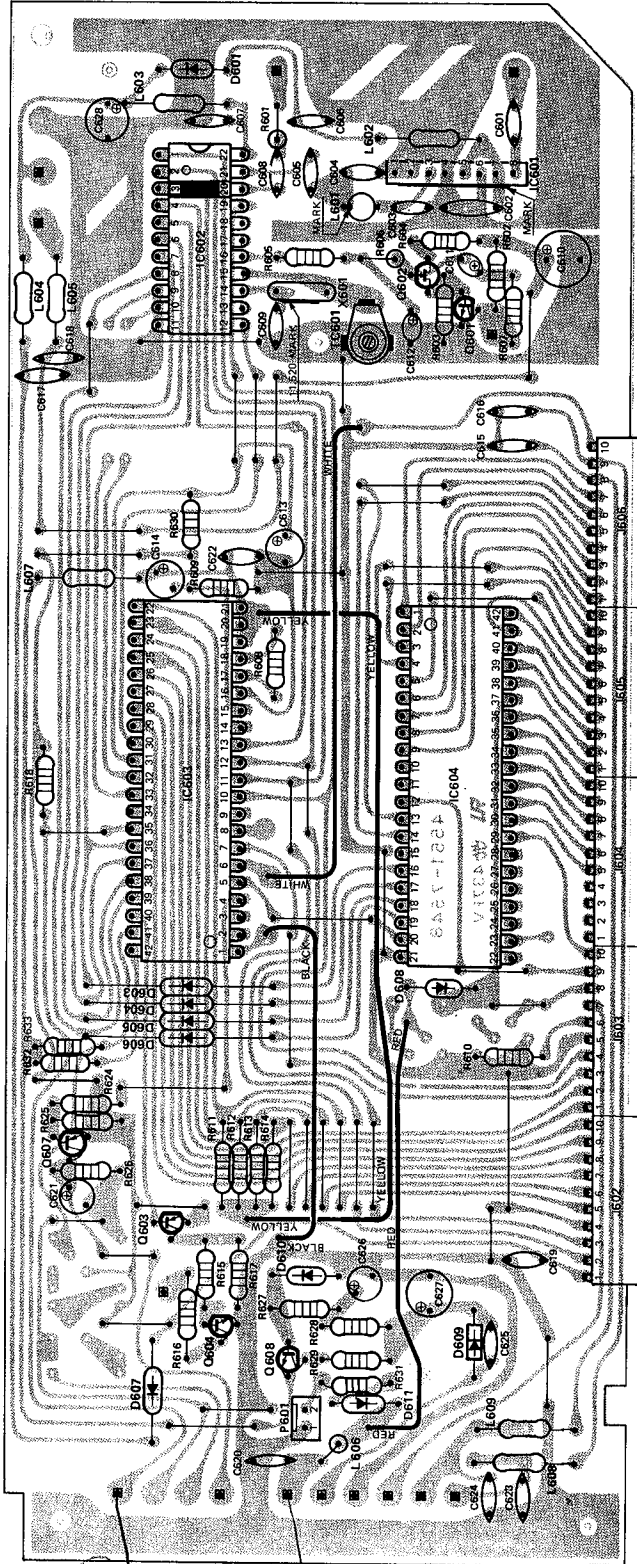


TUNING
VOLTAGE
3.4V DC
@ 89.3

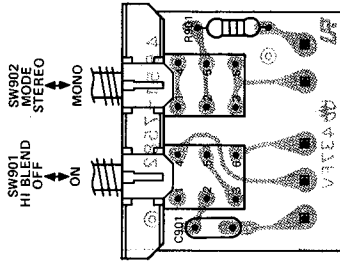
MUTING LEVEL
* STEREO THRESHOLD

14 13 12 11 10 9 8 7 6 5 4 3 2 1
 1 1 1 1 1 1 1 1 1 1 1 1 1
 7.4 7.4 / 8.3 / 0 / 5 / 0 / 0 / 16.04
 16 27.4 14.4 / 15.9 / 4.13

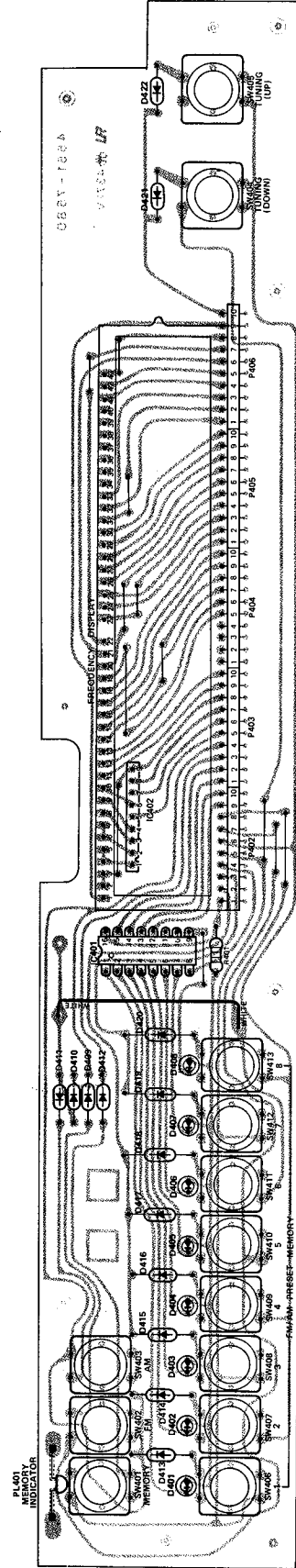
DISPLAY CONTROL P.C. BOARD — 120V ONLY



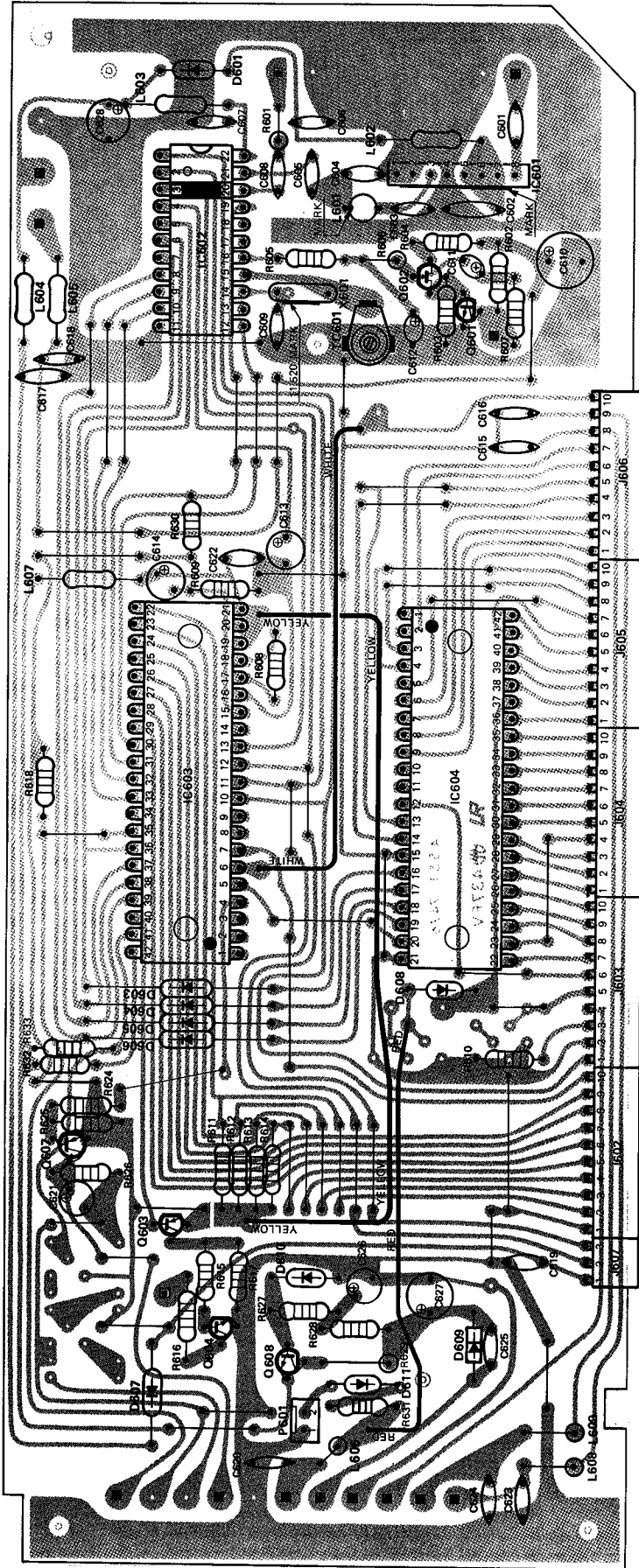
2 SWITCH P.C. BOARD



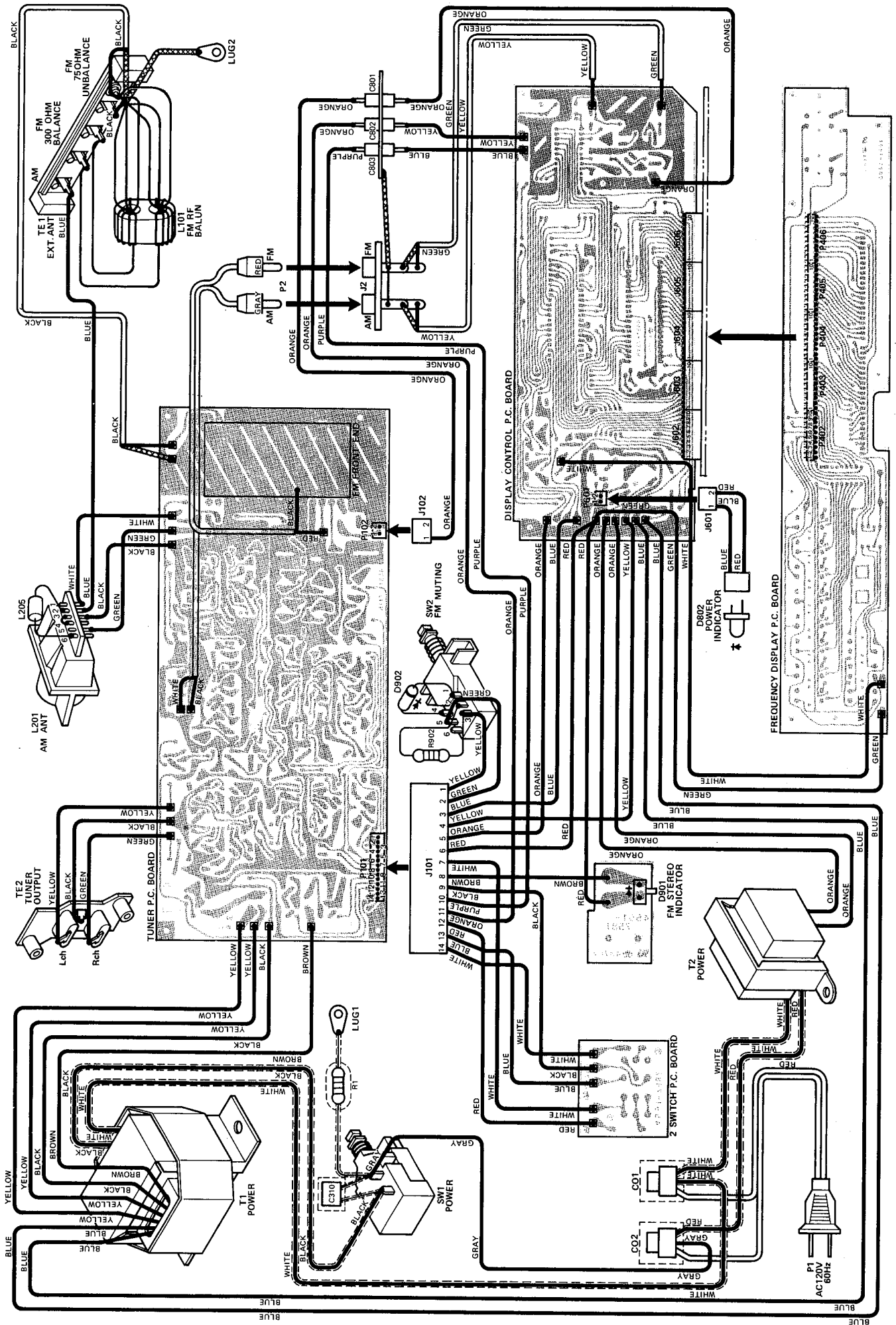
FREQUENCY DISPLAY P.C. BOARD



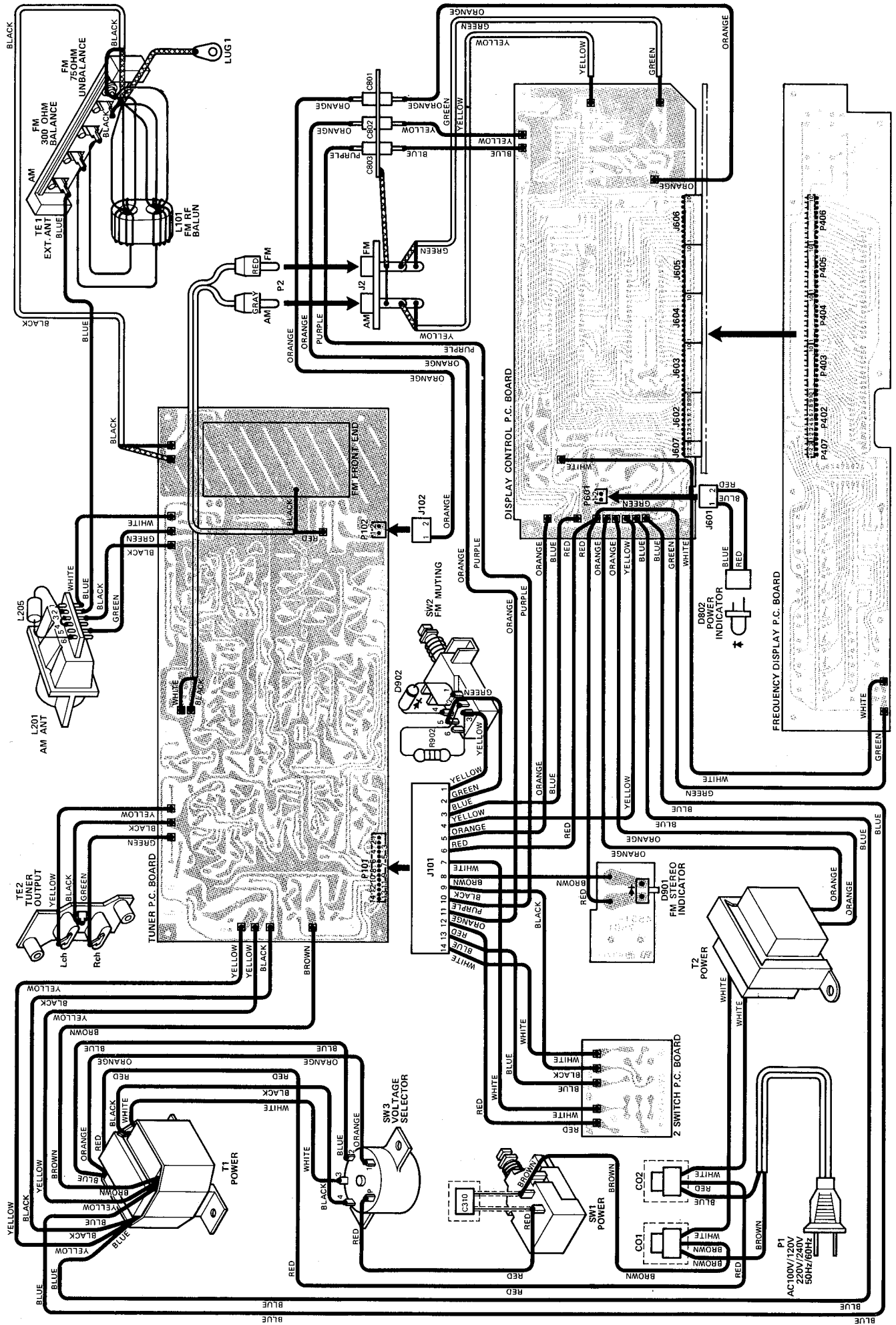
DISPLAY CONTROL P.C. BOARD — MULTI VOLTAGE



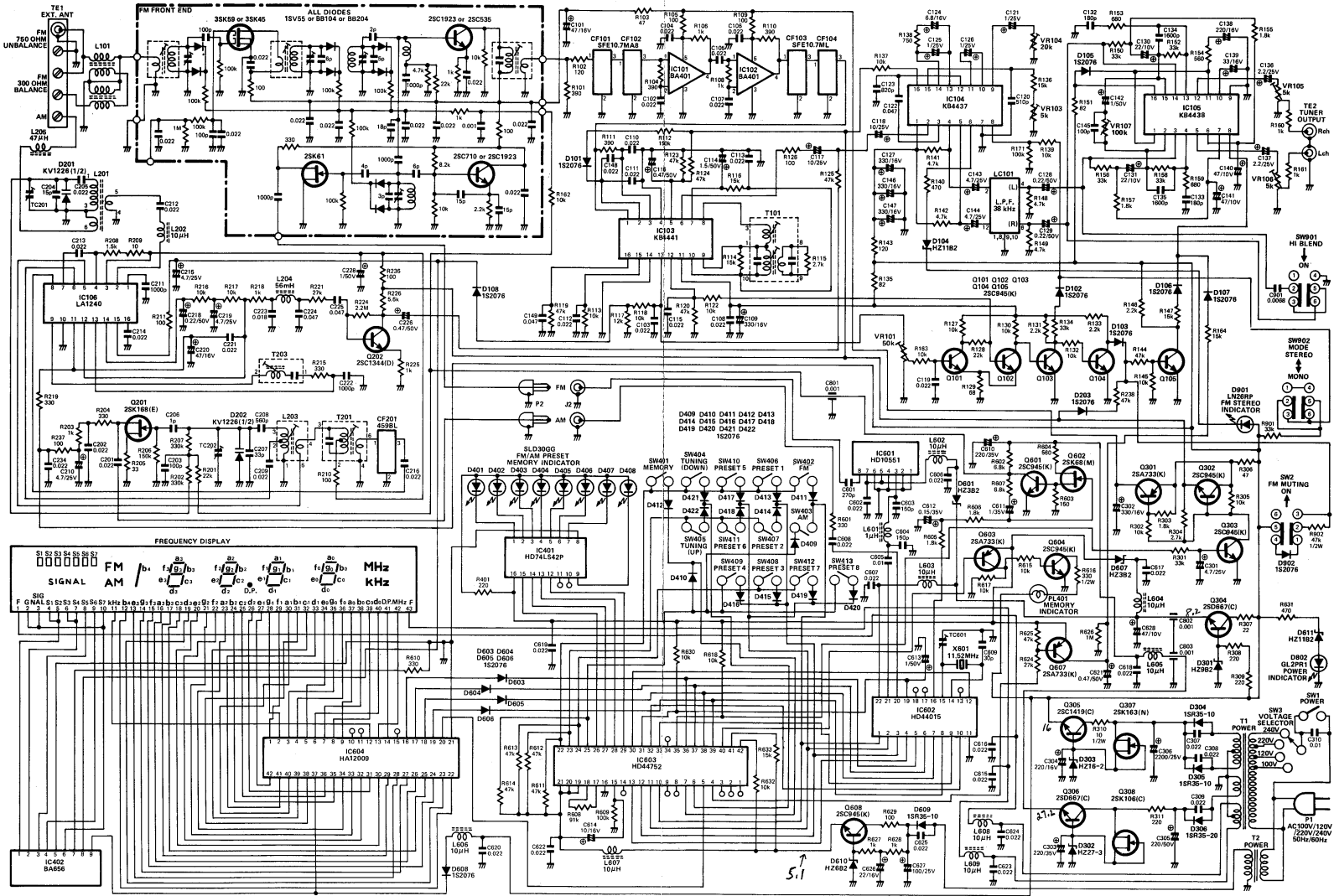
WIRING DIAGRAM — MODEL hk 715 — 120V ONLY



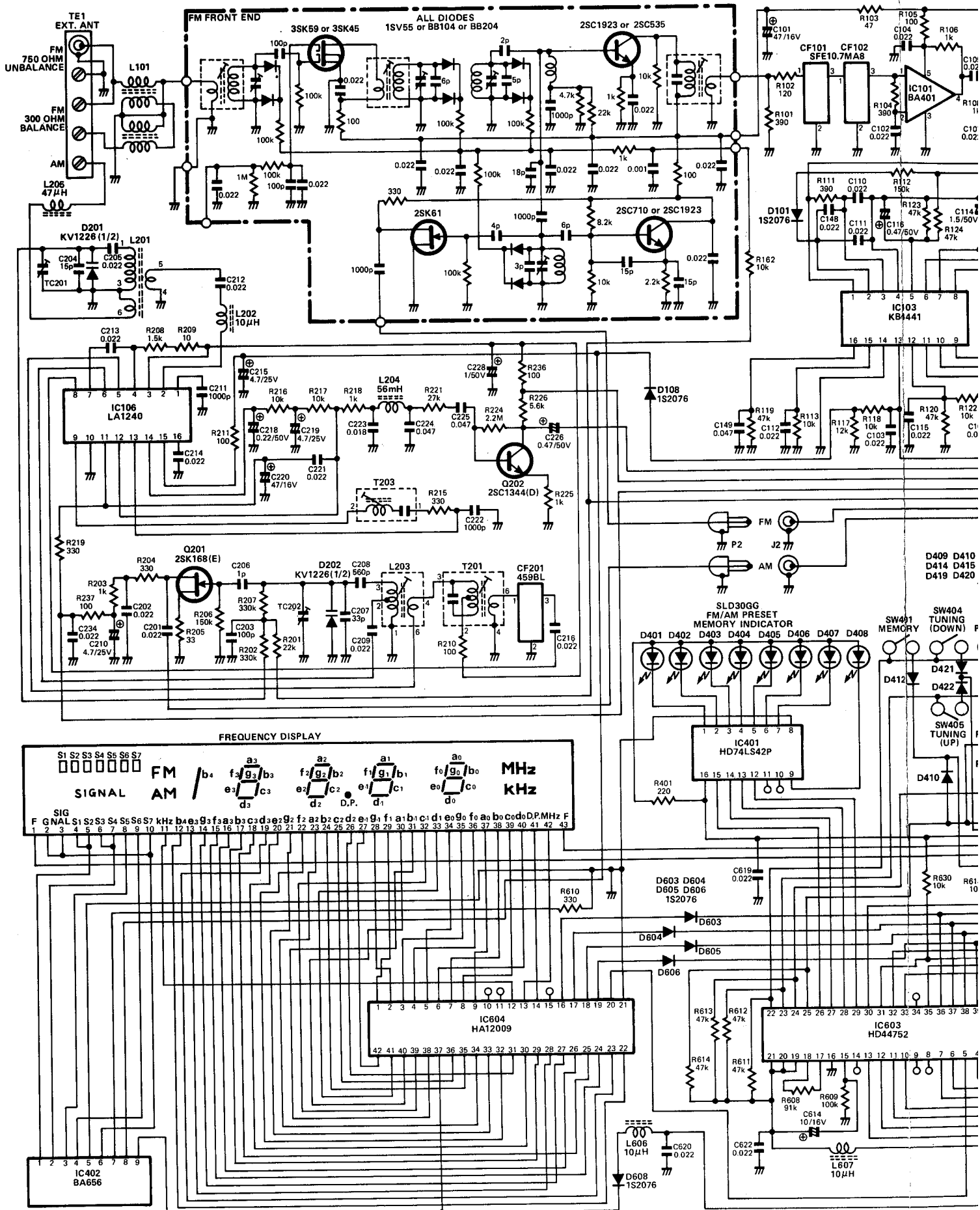
WIRING DIAGRAM — MODEL hk 715 — MULTI VOLTAGE

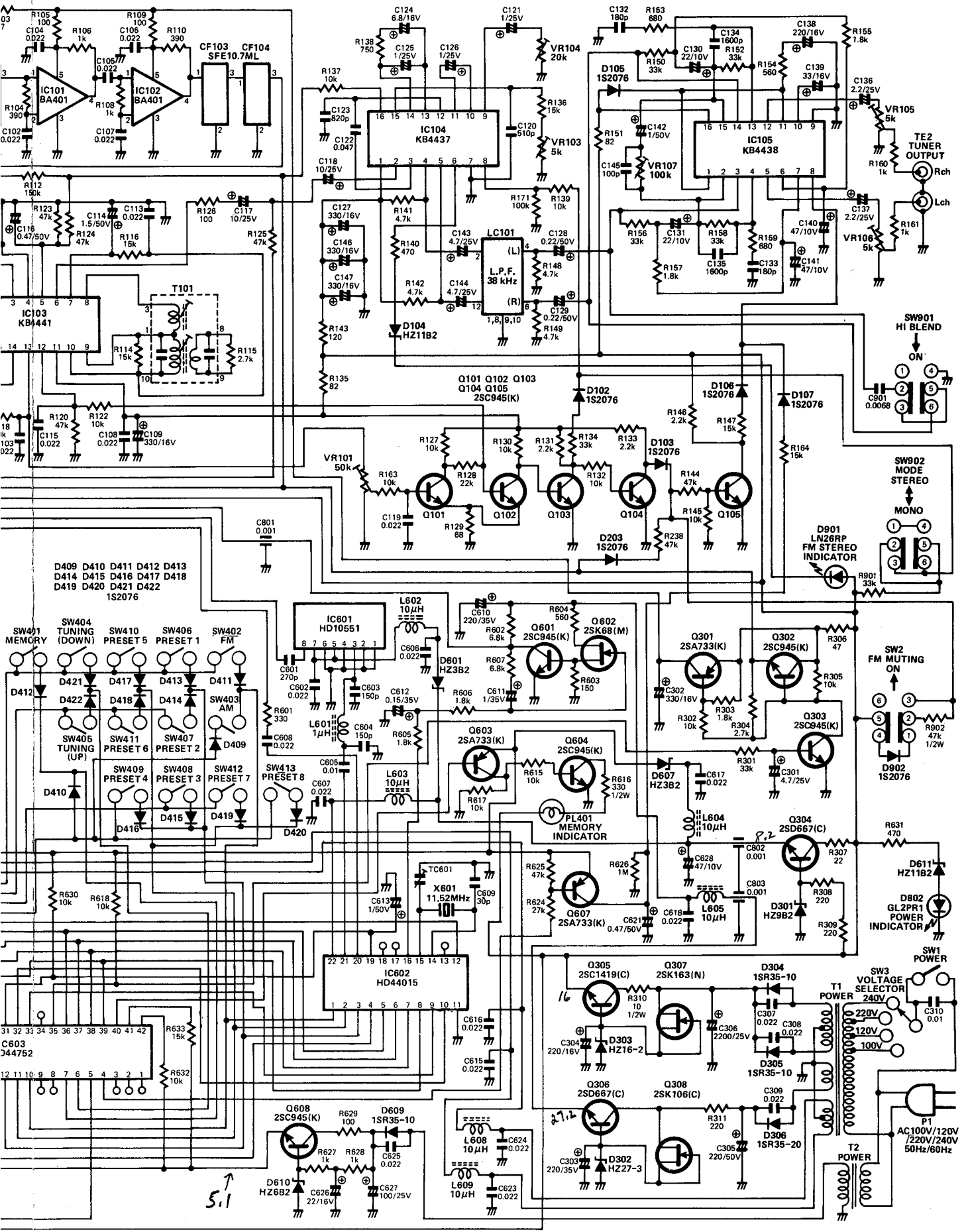


SCHEMATIC DIAGRAM — MODEL hk 715 — MULTI VOLTAGE



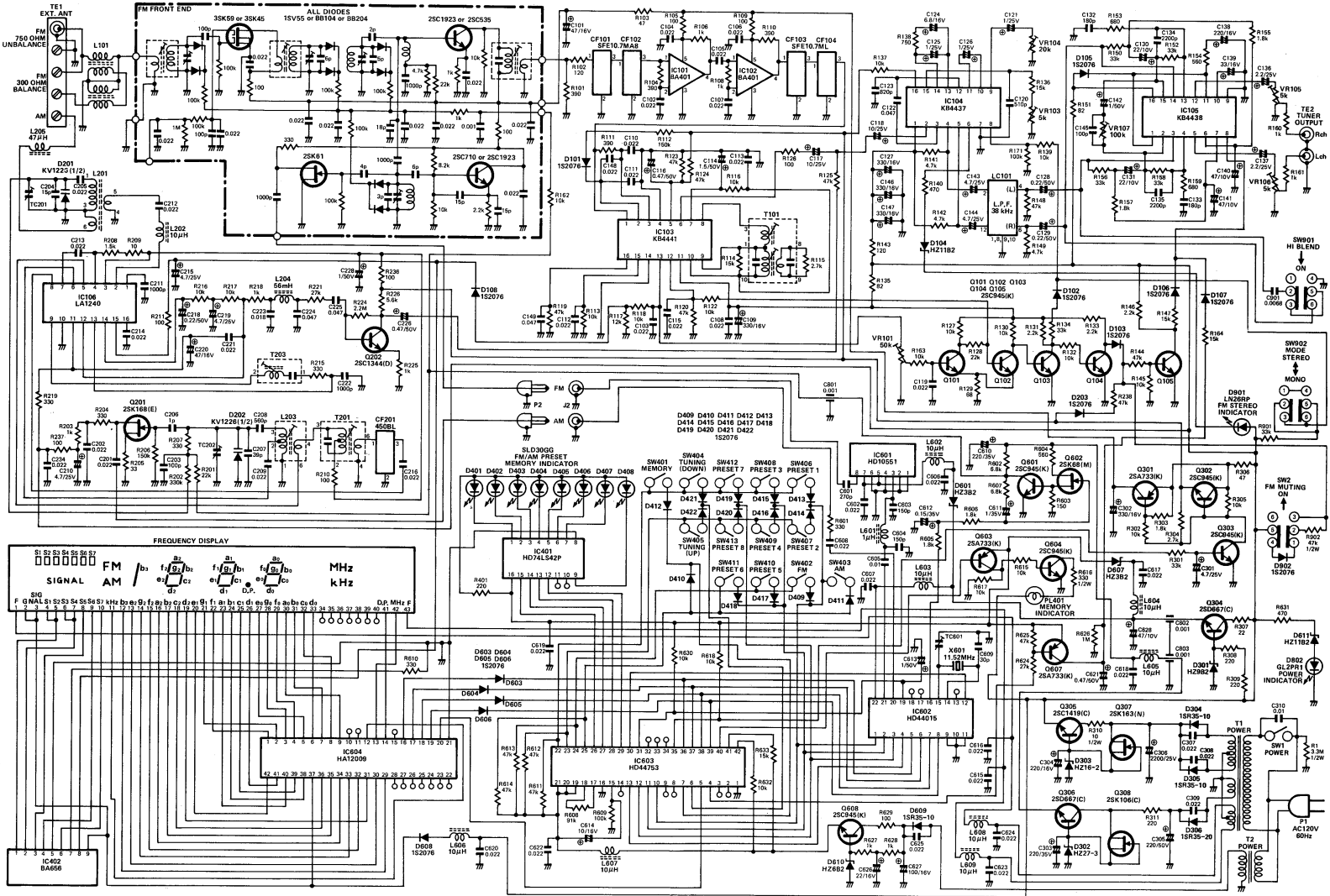
SCHEMATIC DIAGRAM — MODEL hk 715 — MULTI VOLTAGE



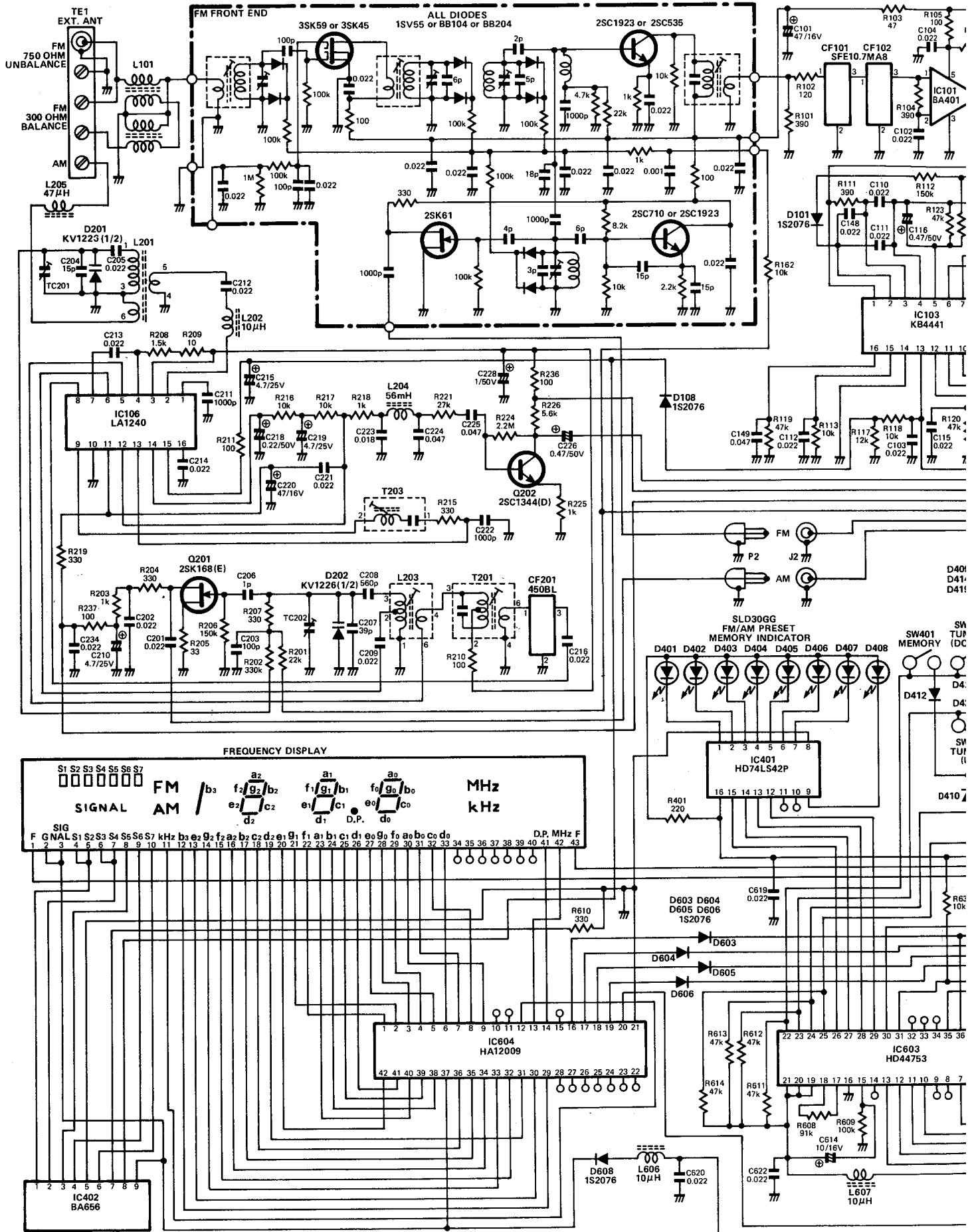


5.1

SCHEMATIC DIAGRAM — MODEL hk 715 — 120V ONLY



SCHEMATIC DIAGRAM — MODEL hk 715 — 120V ONLY



PARTS ORDERS WITHIN USA

To speed handling of your order be sure to include both the model and serial numbers, in addition to the quantity, part number and part description of the items ordered. Orders from independent dealers, independent servicemen, and retail customers will be shipped on a cash in advance basis. Harman Kardon reserves the right to substitute equivalent parts for those originally installed in this chassis. All parts should be ordered from Harman Kardon, Inc., 240 Crossways Park West, Woodbury, New York 11797, Att: Parts Department.

PARTS ORDERS OUTSIDE USA

To speed handling of your order be sure to include both the model and serial numbers, in addition to the quantity, part number and part description of the items ordered. Orders from independent dealers, independent servicemen, and retail customers will be shipped on a cash in advance basis. Harman Kardon reserves the right to substitute equivalent parts for those originally installed in this chassis. All parts should be ordered through your local distributor.

harman/kardon

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10/80

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