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Craig 4353, 4354 Service Manual

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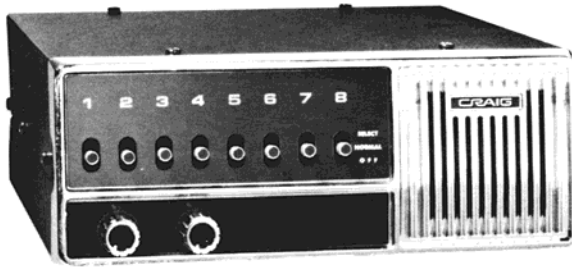
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SERVICE MANUAL

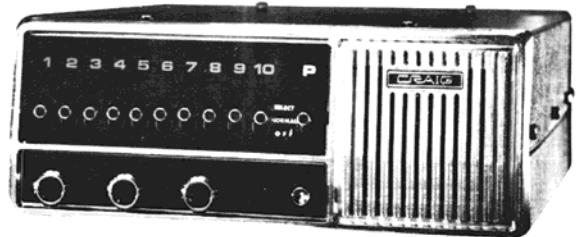
CRAIG®

4353 4354

HI/LO VHF AND UHF SCANNING MONITORS



4353 8-CHANNEL



4354 12-CHANNEL

SPECIFICATIONS

FREQUENCY RANGE.....Lo VHF: 30 - 50 MHz
 Hi VHF: 150 - 174 MHz
 UHF: 450 - 520 MHz

RF BAND WIDTH.....Lo VHF: 6 MHz
 (supplied 37 to 43MHz)
 Hi VHF: 8 MHz
 (supplied 152 to 160MHz)
 UHF: 10 MHz
 (supplied 455 to 465MHz)

SENSITIVITY.....0.5 uV for 20 dB quieting
 (center band)

IMAGE REJECTION.....50 dB

SQUELCH SENSITIVITY.....0.5 uV minimum

MODULATION ACCEPTANCE.....5 kHz

POWER OUTPUT.....2.0 W into 8 Ohms

SCAN MODES.....Automatic and manual

CRYSTAL DATA.....Resonance: Parallel
 Overtone: 3rd
 Load capacity: 20pF
 Maximum drive: 2 mW
 Maximum series resistance: 35 Ohms

CRYSTAL FREQUENCY (third overtone) CALCULATION.....Lo VHF: CH Freq'cy ± 10.7 MHz
 Hi VHF: (Channel Frequency -10.7 MHz)/3
 UHF: (Channel Frequency -10.7 MHz)/9

CRYSTAL TRIMMER RANGE..... $\pm 0.001\%$

INPUTS.....2 Motorola ANT. jacks one for Hi/Lo VHF and one for UHF

OUTPUTS.....External speaker (headphones) jack (8 Ohms)

POWER SOURCE.....12V, 0.4A DC; 120V, 50/60 Hz, 11 W AC

4353 CONTROLS.....Volume, Power, Squelch, Select/Scan/Bypass (8)

4353 INDICATORS.....8 Channel Lamps

4354 CONTROLS.....Volume, Power, Scan Delay, Squelch, Weather, Priority, Select/Scan/Bypass (10)

4354 INDICATORS.....11 Channel Lamps and one LED for Weather

ALIGNMENT PROCEDURES

Alignment is performed at factory with laboratory test equipment. Therefore, before alignment is attempted the unit should be thoroughly checked for circuit troubles.

EQUIPMENT REQUIRED

- | | |
|------------------------|----------------------------------------------------------|
| 1. Sweep Generator | 4. AC V.T.V.M. |
| 2. FM Signal Generator | 5. Power Source - 12V, 0.4A DC or 120V, 50/60 Hz, 11W AC |
| 3. Oscilloscope | |

STEP	FUCNTION	SIGNAL INPUT	FRQ'CY	OUTPUT	ADJUST	ADJUST FOR
1	IF	Connect sweep generator to base of Q4.	455kHz	Connect oscilloscope to C28.	T1,T2	Adj for sine-wave of maximum hight & best linearity. (See Fig. 1)
1	Lo VHF	Connect sweep generator to ANT. Connector	40MHz	Connect oscilloscope to base of Q302.	T301,T302, T303	Adj for wave in Fig. 2
1	Hi VHF	Connect sweep generator to ANT. Connector (NON-MODULATED SIGNAL)	156MHz	Connect oscilloscope to base of Q304.	T304,T305, T306,T307	Adj for wave in Fig. 3
2		Connect RF signal generator to ANT. Connector (NON-MODULATED SIGNAL)	156MHz	Connect AC V.T.V.M. across voice coil of speaker.	T308	Minimum noise level
1	UHF	Connect sweep generator to ANT. Connector (NON-MODUALTED SIGNAL)	460MHz	Connect oscilloscope to IF out terminal	TC401 TC402 TC403	Adj for wave in Fig. 4
2		Connect RF signal generator to ANT. Connector (NON-MODULATED SIGNAL)	460MHz	Connect AC V.T.V.M. across voice coil of speaker	TC404,T404, T405,T406	minimum noise level

CHANNEL LOCK

Channel lock gate Q16 is dependant on a noise signal of about 30 kHz at the output of the discriminator. The lock sensitivity will drop off as the 30 kHz noise level is reduced by a received signal.

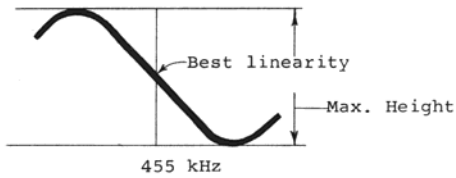


Fig. 1

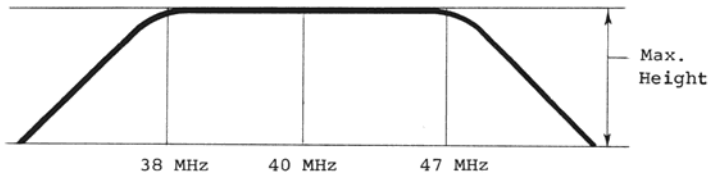


Fig. 2

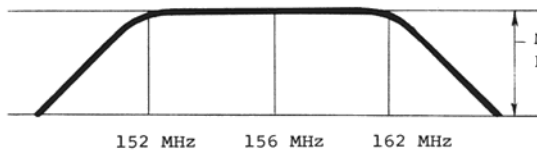


Fig. 3

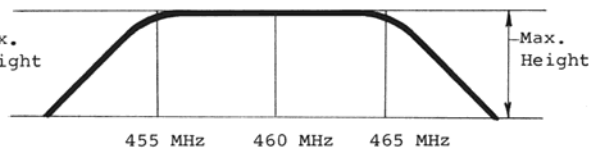


Fig. 4

P A R T S P R I C E L I S T

SUBJECT TO CHANGE WITHOUT NOTICE. USE ALL AVAILABLE NUMBERS AND COMPLETE DESCRIPTION WHEN ORDERING, INCLUDING MODEL NUMBER
 * * * "THESE NUMBERS HAVE BEEN REVISED AS OF 6-5-76" * * *

Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price
<u>P A C K A G I N G</u>							
	4353001	Individual Carton	1.60		4353005	Telescopic Antenna, VHF	4.95
	4354001	Individual Carton	1.60	*	4353006	Telescopic Antenna, UHF	2.95
*	4353002	Styrofoam Set	.90		4350080	AC Cord w/Plug	3.00
	4353003	Mtg Bracket	1.85		4350081	DC Cord Assembly	3.00
	4353004	Mtg Screw Kit	.95				

* SAME PART FOR BOTH MODELS

Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Craig Key No.	Description	Mfr's Sugg Ret. Price
<u>C A B I N E T & C H A S S I S</u>							
4353010		Knob, Vol/SQ/Scan Delay	.70		NSP	Upper Chassis, PCB Mtg	**
4350049		Rubber Feet	.25		NSP	Main Chassis	**
4353011		Rubber Bushing, Lamps	.25	4353015		Cabinet Top	4.50
	NSP	Bkt, Lamp Mtg	**	4353016		Cabinet Bottom	4.10
	NSP	Bkt, Main PCB Mtg	**	4353017		Sponge CH Select Sw's(4353)	.25
4354010		Front Escutcheon (4354)	5.15	4354013		Sponge CH Select Sw's(4354)	.25
4353012		Front Escutcheon (4353)	5.15	4353018		Lid W/Scr, Crystal Access	2.30
4353013		Acrylic Panel, Sw's(4353)	2.60	4353019		Craig Badge	.55
4354011		Acrylic Panel, Sw's(4354)	2.75	4353020		Label for Crystal Lid(4353)	.25
4353014		Vol & SQ Panel (4353)	.55	4354014		Label for Crystal Lid(4354)	.25
4354012		Vol, SQ, Scan Delay Panel(4354)	.55	4353021		Plastic Coupler, UHF ANT.	.85
	NSP	Metal Plate, Dummy Hole Cover	**	4353022		Plastic Coupler, VHF ANT.	.90
4354018		Push Button Knob, Weather	.70	4353023		Felt, Vol/SQ/Scan Delay Knobs	.35

M I S C E L L A N E O U S E L E C T R I C A L P A R T S

PL1~PL11	4350011	Lamp, CH Indicator	.85	S12	4353028	Push Sw, Weather	1.75
	4350051	Crystal Socket	1.20	VR1	4353029	Var Res 10k, Vol Cont W/Sw	1.95
SO1	4350078	AC Power Socket	1.60	VR2	4353030	Var Res 10k, Squelch Cont	1.45
SO2	4350079	DC Power Socket	1.55	VR3	4354017	Var Res 10k, Scan Delay(4354)	2.60
SO3,SO4	4353024	Antenna Socket	1.25	R35	4350007	Semi-Variable Resistor, 10k	.45
J1	4353025	Extension Speaker Jack	.65		4354016	PCB, Weather LED Mtg W/O Comp	.30
SP	4350015	Speaker	4.05		4353033	PCB, For Lamp Ground W/O Comp	.60
Sl~S11	4353026	Slide Sw, SELCT/SCAN/BYPASS	1.50		4353034	PCB, CH Select Sw Mtg(4353)	1.05
Sl4~S24	4353027	Slide Sw, Hi/Lo VHF/UHF	1.25		4354015	PCB, CH Select Sw Mtg(4354)	1.15
	4353048	Ass'y, UHF PCB W/Comp	****		4353049	Ass'y, Hi/Lo VHF PCB W/Comp	****

NOTE: Unless otherwise specefied all parts above are used on both models.

C H O K E S , C O I L S , T R I M M E R S , C R Y S T A L S , & T R A N S F O R M E R S

TC401,402	4350019	Trimmer Cap, 5pF (cylinder type)	1.15	T405	4350036	RF Coil, C	.95
TC403,404	4350019	Trimmer Cap, 5pF "	1.15	L404	4350029	RF Coil, J	1.10
VCl~VCl2	4350013	Trimmer Capacitor, 16pF	.45	T301	4353040	RF Coil, P	1.10
T404	4350037	IFT, 10.7 MHz (T101)	1.35	T5,7	4353041	RF Coil, Q	1.10
T1	4353035	IFT, Discriminator (T3166)	1.20	T303	4353042	RF Coil, R	1.10
T2	4353036	IFT, Discriminator (T3167)	1.20	L1~L12	4350034	RF Choke Coil, A	.95
T3	4350045	IFT, 40 kHz (T301)	1.40	L301,412	4350034	RF Choke Coil, A	.95
T4,6,406	4350020	RF Coil, A	1.10	L405	4353043	RF Choke Coil, C	.95
T304,305	4353037	RF Coil, D	1.10	CH1	4350010	AF Choke Coil	1.60
T306	4353038	RF Coil, E	1.10	PT	4350083	Power Transformer	9.40
T308	4353032	RF Coil, F	1.10	T302	4353045	RF Coil	1.10
T307	4353039	RF Coil, G	1.10	BPF1	4353046	Band Pass Filter, 10.7 MHz	5.60
L401,402	4350027	RF Coil, H	1.10	BPF2	4353047	Ceramic Band Pass Filter 455kHz	4.95
L403	4350027	RF Coil, H	1.10	X1	4350014	Crystal, 10.245 MHz	4.60

S E M I C O N D U C T O R S

Q301,302	2SC1674	Transistor	1.35	D11,12,	WG1010A	Diode	.40
Q303,304	2SC1674	"	"	D13,17,	WG1010A	Diode	.40
Q1~Q9	2SC1675	"	.95	D18,19,	WG1010A	"	"
Q50,51,	2SC710	"	1.15	D21,22,	WG1010A	"	"
Q404,405	2SC710	"	"	D23,24,	WG1010A	"	"
Q406	2SC710	"	"	D25	WG1010A	"	"
Q10~Q14	2SC711	"	"	D26~D55	WG1010A	"	"
Q16~Q26	2SC711	"	"	D68,69,	WG1010A	"	"
Q28,29,	2SC711	"	"	D72,73,	WG1010A	"	"
Q30,31	2SC711	"	"	D74,75	WG1010A	"	.40
Q32	2SC711	"	"	D1,2,3,9	1N60	"	.45
Q34~Q49	2SC711	"	"	D10,14,	1N60	"	"
Q52~Q57	2SC711	"	"	D15,16,	1N60	"	"
Q15	2SC1096	Transistor	3.40	D20,26,	1N60	"	"
Q401,402	2SC1180	"	2.30	D301,302	1N60	"	"
Q27,33	N13T1	P.U. Transistor	1.65	D401	1SS16	"	1.35
IC3	SN74145N	I.C.	6.50	D5~D8	SLB0102	"	.75
IC1	UPC575C2	I.C.	3.75	D4	RD6.8	Zener Diode	.90
IC4,5	M53200	I.C.	1.55	LD1	ME116	L.E.D.	1.25
IC2	M53293P	I.C.	5.25	TH1	TD5C225	Thermistor	.35

Ref No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Description	Mfr's Sugg Ret. Price
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C A P A C I T O R S

C79	Ceramic,	1pF/25V	±0.5%	.45	C326,327,328,329	Ceramic,	0.02uF/25V	±20%	.45
C322	"	1.5pF/25V	"	.45	C421,425,437	"	0.02uF/25V	"	.45
C309,407	"	2pF/25V	"	.45	C3,8,10,11,16,23	"	0.04uF/25V	"	.45
C325,424	"	4pF/25V	"	.45	C24,48,52,77,	"	0.04uF/25V	"	.45
C82,91,401,429	"	5pF/25V	"	.45	C84,85,86,93,94	"	0.04uF/25V	"	.45
C316,331	"	8pF/25V	"	.45	C419,420,422,430	"	0.04uF/25V	"	.45
C65,66,67,68,69	"	10pF/25V	±10%	.45	C39	"	0.1uF/25V	"	.45
C70,71,72,73,74,	"	10pF/25V	"	.45	C30	Mylar,	0.0022uF/50V	±10%	.45
C75,76,96,319	"	10pF/25V	"	.45	C29,31,34,36,53	"	0.0047uF/50V	"	.45
C303,315,330,	"	12pF/25V	"	.45	C28	"	0.033uF/50V	"	.45
C423,428	"	12pF/25V	"	.45	C45	"	0.22uF/50V	±20%	.45
C83,92	"	15pF/25V	"	.45	C27,58,62,95	Electrolytic,	33uF/10V	"	.75
C321,323	"	17pF/25V	"	.45	C9	"	47uF/10V	"	.75
C438	"	20pF/25V	"	.45	C55,57	"	220uF/10V	"	1.55
C308,318	"	33pF/25V	"	.45	C46	"	470uF/10V	"	1.95
C7,301,314,324	"	47pF/25V	"	.45	C49,38	"	100uF/16V	"	1.30

(CAPACITOR LIST CONTINUED)

Ref. No.	Description	Mfr's Sugg Ret. Price	Ref. No.	Description	Mfr's Sugg Ret. Price
C5	Ceramic 68pF/25V	±10% .45	C41,44	Ceramic 220uF/16V	1.85
C12,14,17,19,21	" 100pF/25V	" .45	C37	" 10uF/16V	.60
C81,302,307	" 100pF/25V	" .45	C40,42,54	" 4.7uF/25V	.75
C80,89	" 120pF/25V	" .45	C50,51	" 1000uF/25V	2.50
C13,43,98	" 200pF/25V	" .45	C47	" 47uF/25V	1.30
C90	" 82pF/25V	" .45	C56	" 0.47uF/50V	1.10
C4,6,18	" 500pF/25V	" .45	C61	" 1uF/50V	1.20
C304,305	" 150pF/25V	" .45	C15,20,32,35	Tantalum, 4.7uF/6.3V	.85
C63,432	" 0.001uF/25V	±20% .45	C60	" 10uF/10V	.85
C33	" 0.005uF/25V	" .45	C59	" 4.7uF/10V	.85
C2,25,26,78,87,	" 0.01uF/25V	" .45	C64	" 1uF/10V	.85
C97,426	" 0.01uF/25V	" .45	C402	Gnd type Cap, 1000pF	.45
C1,22,305,310	" 0.02uF/25V	" .45	C406	" " " 25pF	.45
C311,312,313,320	" 0.02uF/25V	" .45	C403,404,405,408	Feed Thru, 1000pF	.45

Ref. No.	Description	Ref. No.	Description	Ref. No.	Description	Ref. No.	Description
R E S I S T O R S , CARBON, OHMS, ± 10%, 1/4W, 0.25¢ OR NOTED							
R94,132, 47	Ohms, 1/4W	R111,112, 1k	Ohms, 1/4W	R142,143, 4.7k	Ohms, 1/4W	R21,23, 220k	Ohms, 1/4W
R436,150 47	" "	R113,114, 1k	" "	R146,147, 4.7k	" "	R47 220k	Ohms, 1/4W
R39 68	" "	R417 1k	" "	R153,154, 4.7k	" "	R41,79 3.9k	" "
R10,27, 100	" "	R70,140, 1.5k	" "	R155,415, 4.7k	" "	R92,151 1.8k	" "
R29,34, 100	" "	R148,144 1.5k	" "	R426 4.7k	" "	R66 5.6k	" "
R131,135, 100	" "	R15,16 2.2k	" "	R36,45, 10k	" "	R159 1M	" "
R156,420, 100	" "	R18,20, 2.7k	" "	R46,57, 10k	" "	R98,133 6.8k	" "
R421,424, 100	" "	R22,24, 2.7k	" "	R58,67, 10k	" "	R308,316, 100	Ohms, 1/8W
R425 100	" "	R93,152 2.7k	" "	R76,97, 10k	" "	R406 100	Ohms, 1/8W
R78,100 220	" "	R5,12,25, 3.3k	" "	R416 10k	" "	R401 330	" "
R104,115 330	" "	R32,33, 3.3k	" "	R1,7,42, 15k	" "	R405 3.3k	" "
R54,77 390	" "	R40,59, 3.3k	" "	R64,89, 15k	" "	R403 4.7k	" "
R28,49, 470	" "	R60,68, 3.3k	" "	R137,141, 15k	" "	R309,402 10k	" "
R116,117, 470	" "	R71,422 3.3k	" "	R145,423, 15k	" "	R404 15k	" "
R118,119, 470	" "	R2,4,6, 4.7k	" "	R427 15k	" "	R304 470	" "
R120,121, 470	" "	R9,44,61, 4.7k	" "	R62,73 18k	" "	R303,306, 1k	" "
R122,123, 470	" "	R63,65, 4.7k	" "	R26,48, 22k	" "	R307,311, 1k	" "
R124,125, 470	" "	R69,72, 4.7k	" "	R81,86, 22k	" "	R313,314 1k	" "
R126,127, 470	" "	R74,75, 4.7k	" "	R87,103 22k	" "	R301 1.5k	" "
R158 470	" "	R80,82, 4.7k	" "	R37 33k	" "	R305,312 220k	" "
R84,85 820	" "	R83,88, 4.7k	" "	R50 47k	" "	R310 150k	" "
R3,8,14, 1k	" "	R90,91, 4.7k	" "	R95,149 100k	" "	R302 180k	" "
R30,31, 1k	" "	R96,99, 4.7k	" "	R52 120k	" "	R55 220	Ohms, 1/2 W
R38,43, 1k	" "	R101,102, 4.7k	" "	R51 150k	" "	R53 22	Ohms, 2 W
R105,106, 1k	" "	R128,129, 4.7k	" "	R11,13, 220k	" "	R317 1M	Ohms, 1/2 W
R107,108, 1k	" "	R130,134, 4.7k	" "	R17,19 220k	" "	(Solid Res.)	
R109,110 1k	" "	R138,139, 4.7k	" "	R35 (See Misc. Elect.)		R56 2.2M	Ohms, 1/2 W

NOTE:

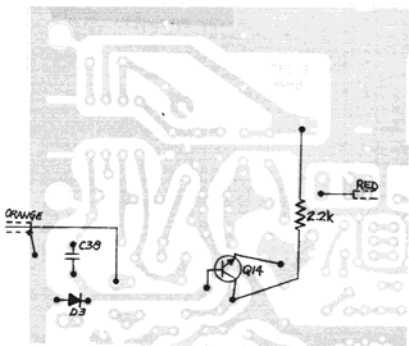
Modification for suppressing residual noise when unit is squelched and no signal is being received. Early production only.

MODIFY AS FOLLOWS:

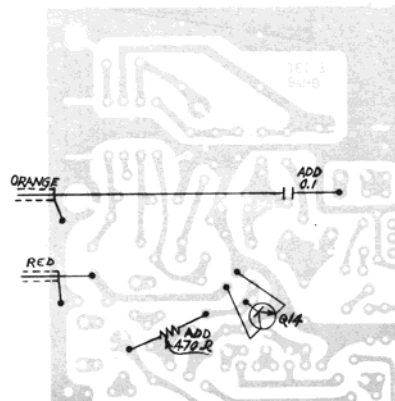
1. Move Q-14 emitter from 6V + line to ground. Hole is provided adjacent to Q-14 for emitter lead.
2. Remove capacitor C-38 and Diode D-3. Remove resistor R-49 (2.2k) from back side of P.C.B.
3. Add 470 ohm 1/4W resistor from Q-14 base 6V + line.
4. Move red audio lead to Q-14 collector. Remove orange audio lead from P.C.B.
5. Add capacitor .1 mfd, 50V from orange lead to point on P.C.B. from which red lead was removed.

SEE DRAWINGS BELOW

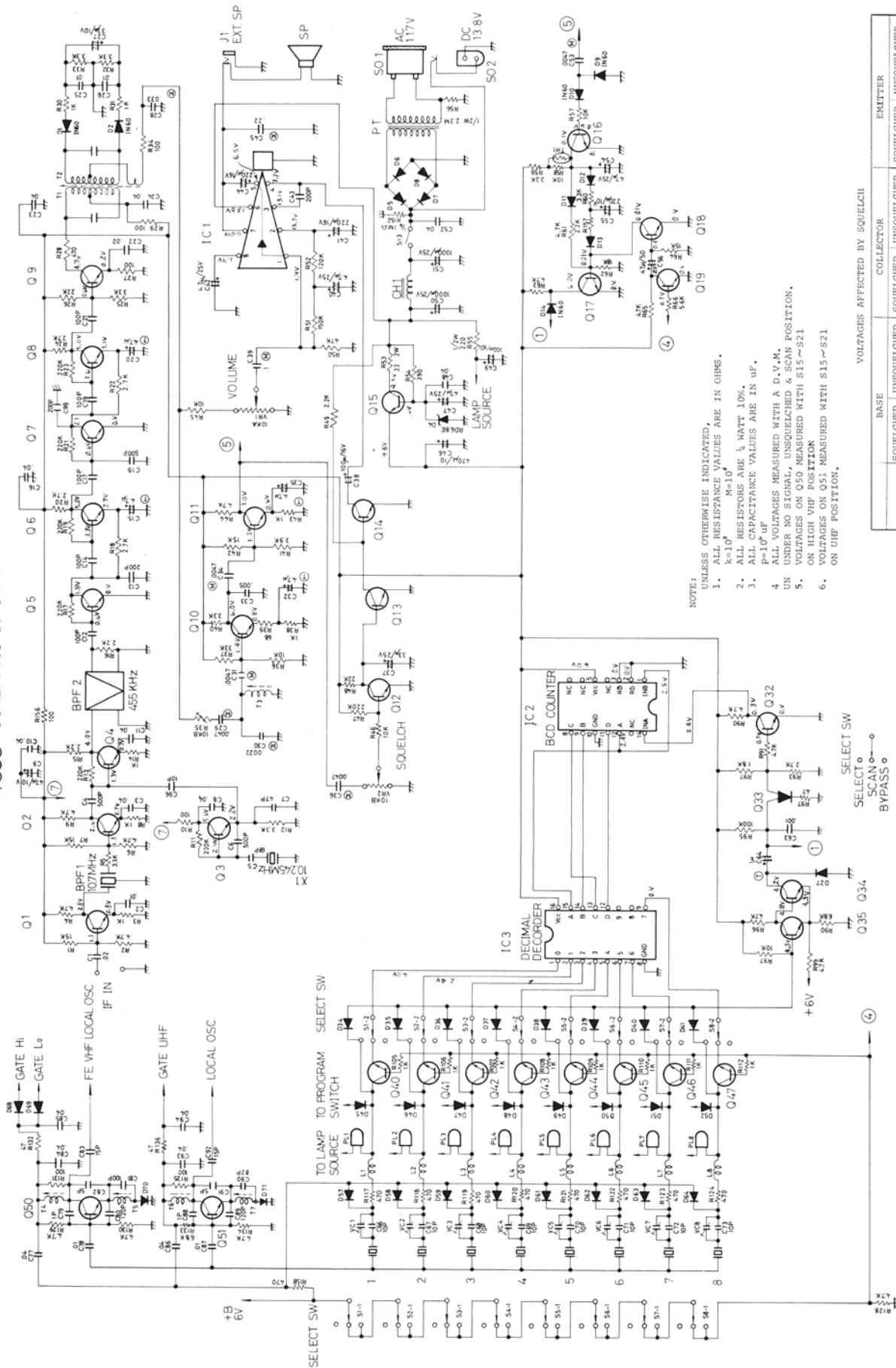
BEFORE MODIFICATION



AFTER MODIFICATION



4.353 SCHEMATIC DIAGRAM



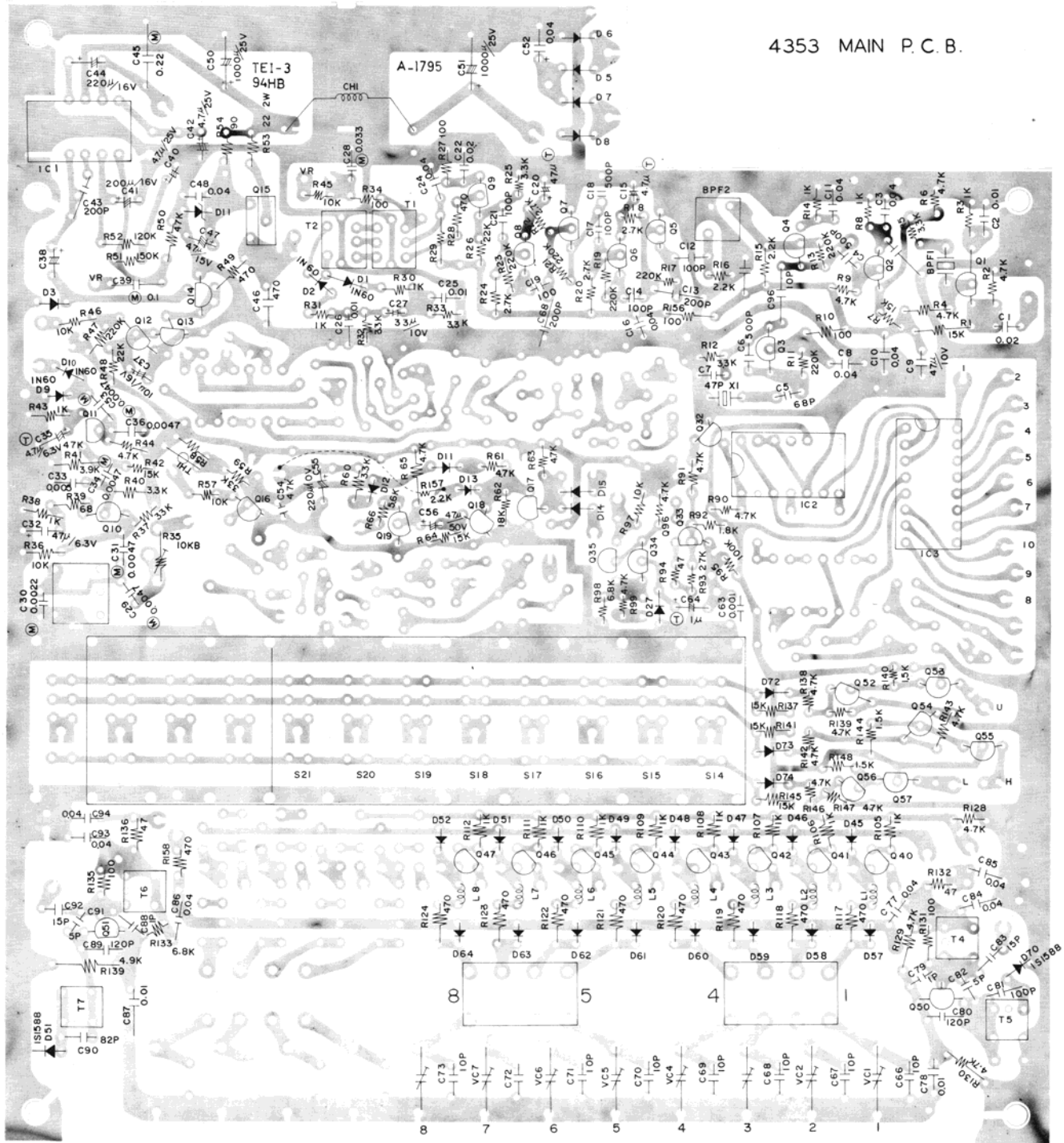
- NOTE:
 1. ALL RESISTANCE VALUES ARE IN OHMS.
 $k=10^3$ $M=10^6$
 2. ALL RESISTORS ARE 1/2 WATT 10%.
 3. ALL CAPACITANCE VALUES ARE IN μF .
 $P=10^8$ nF
 4. ALL VOLTAGES MEASURED WITH A D.V.M.
 UN UNDER NO SIGNAL, UNSQUELCHED & SCAN POSITION.
 5. VOLTAGES ON Q50 MEASURED WITH S15~S21
 ON HIGH VHF POSITION
 6. VOLTAGES ON Q51 MEASURED WITH S15~S21
 ON UHF POSITION.

VOLTAGES AFFECTED BY SQUELCH

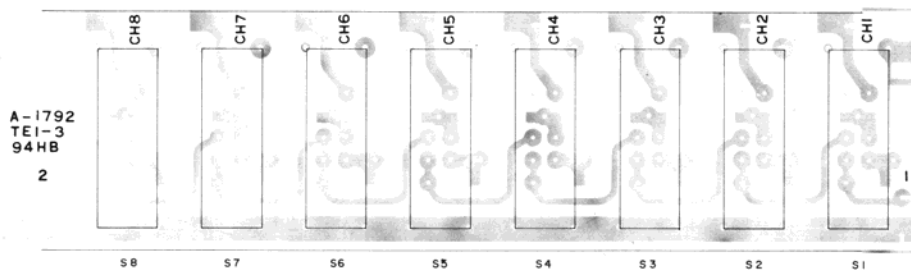
	BASE		COLLECTOR		EMITTER	
	SQUELCHED	UNSQUELCHED	SQUELCHED	UNSQUELCHED	SQUELCHED	UNSQUELCHED
Q12	0.4V	0.3V	0.1V	0.7V	0.0V	0.0V
Q13	0.1V	0.7V	0.8V	0.1V	0.0V	0.0V
Q14	0.8V	0.1V	0.03V	5.5V	0.0V	0.0V
Q40~Q47		5.6V				5.0V

SELECT SW
 SELECT
 SCAN
 BYPASS

4353 MAIN P.C.B.

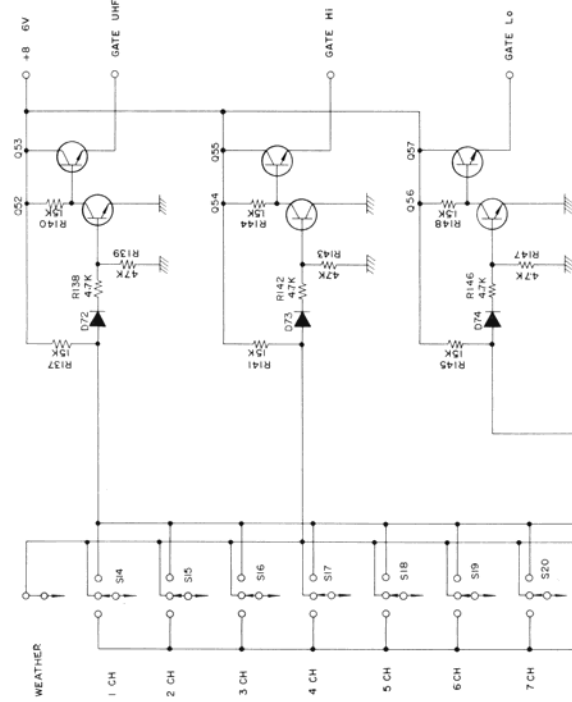


4353 PROGRAM SELECT SW P.C.B.



GATE CIRCUIT SCHEMATIC DIAGRAM

PROGRAM - SW



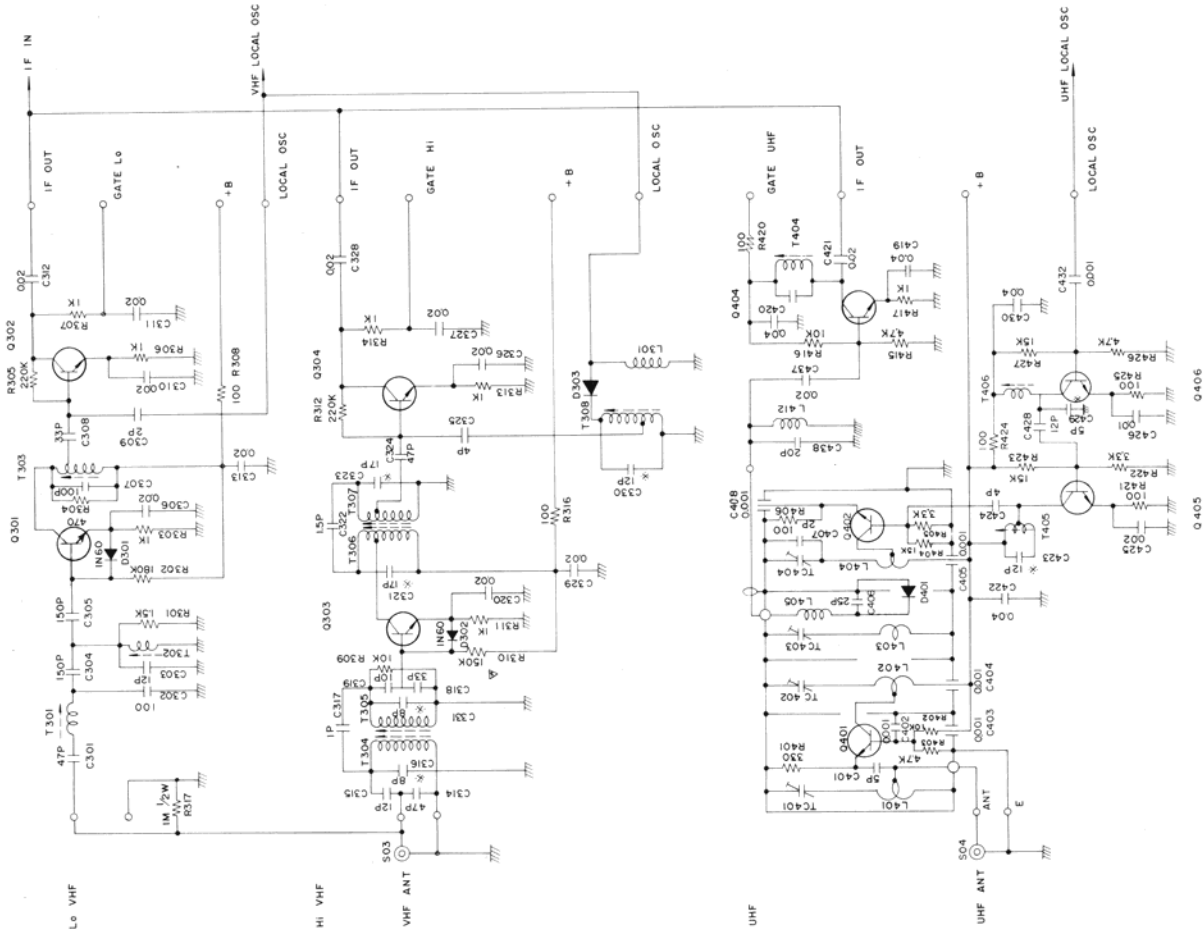
NOTES:

1. Voltages on Q56, Q57, Q301 & Q302 were measured with S14-S24 on Lo VHF position.
2. Voltages on Q54, Q55, Q303, & Q304 were measured with S14-S24 on Hi VHF position.
3. Voltages on Q52, Q53, Q401, Q402, Q404, Q405 & Q406 were measured with S14-S24 on UHF position.

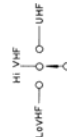
VOLTAGE CHART

	E	B	C
Q52	5.2V	0.2V	5.8V
Q53	5.2V	5.8V	6.0V
Q54	0.0V	0.2V	5.8V
Q55	5.2V	5.8V	6.0V
Q56	0.2V	0.2V	5.8V
Q57	5.2V	5.8V	6.0V
Q301	1.5V	2.2V	5.8V
Q302	1.0V	1.7V	4.2V
Q303	1.6V	2.4V	5.9V
Q304	1.0V	1.8V	4.2V
Q401	1.0V	1.8V	6.0V
Q402	6.0V	1.0V	0.2V
Q404	0.9V	1.6V	5.1V
Q405	0.3V	1.0V	6.0V
Q406	0.4V	1.1V	5.6V

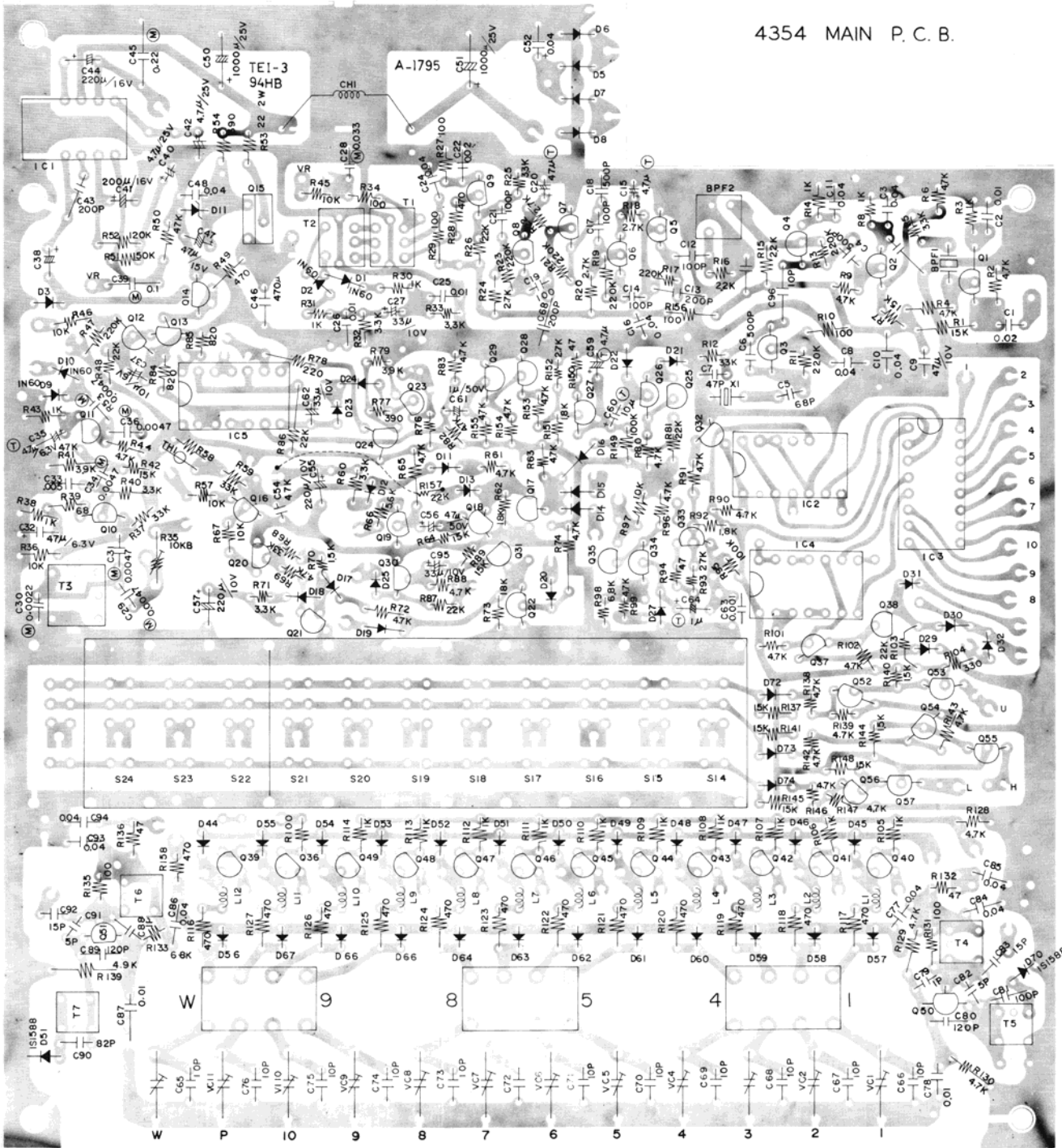
FRONT END SCHEMATIC DIAGRAM



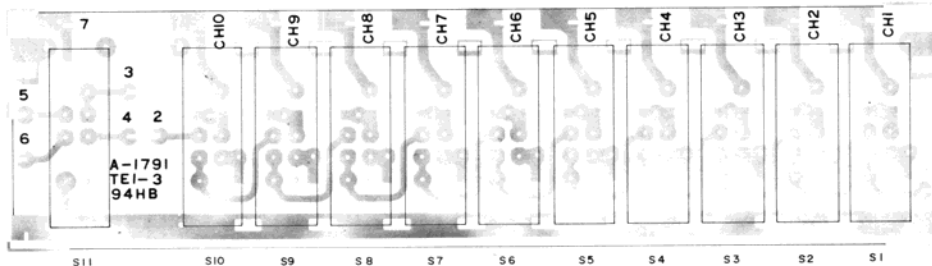
UHF



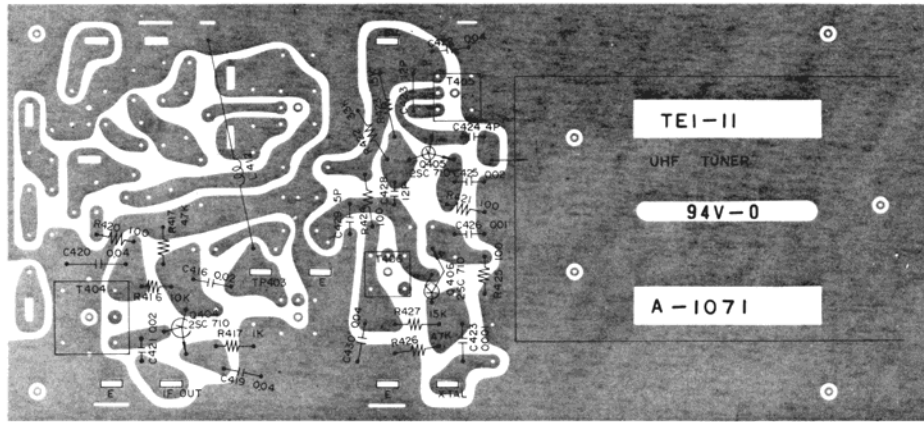
4354 MAIN P. C. B.



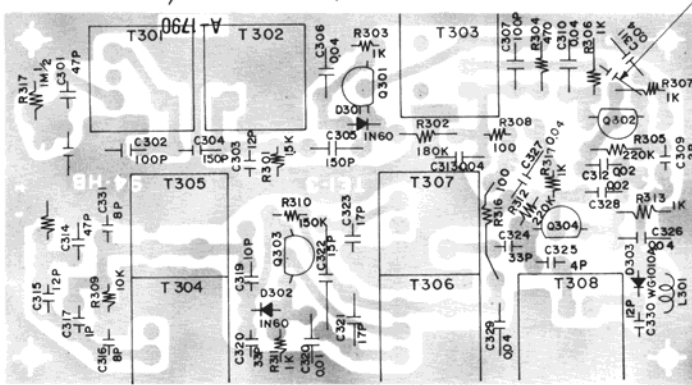
4354 PROGRAM SELECT SW P. C. B.



4353/4354 UHF P. C. B.

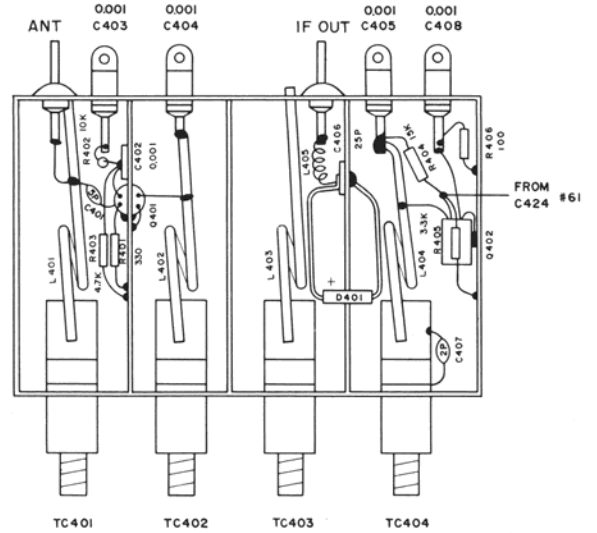


4353/4354 H_i/Lo VHF P. C. B.



C308
33P

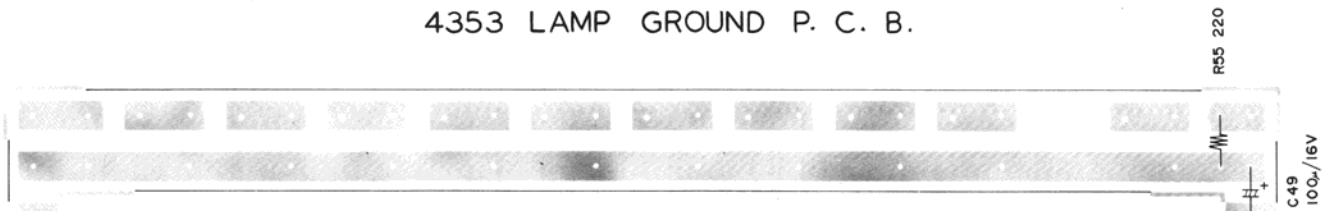
4353 4354 UHF TUNER



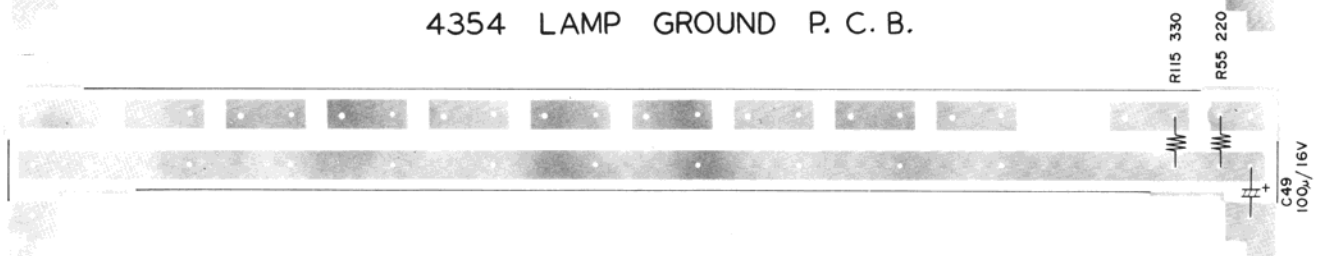
4354 WEATHER L.E.D. P. C. B.



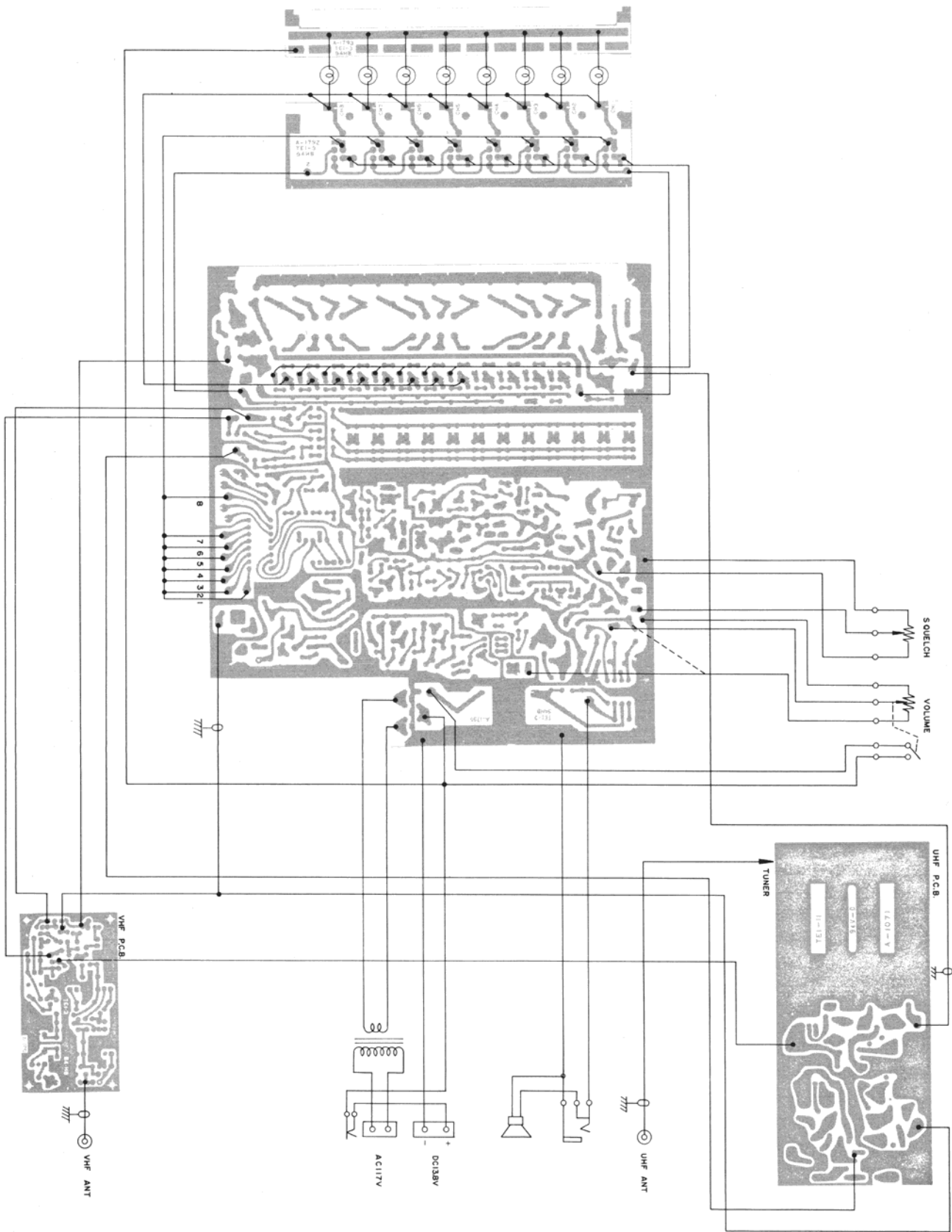
4353 LAMP GROUND P. C. B.



4354 LAMP GROUND P. C. B.



4353 WIRING DIAGRAM



4354 WIRING DIAGRAM

