

MaraTrac

service manual revision

NOTE: This supplement applies ONLY to Low-Band radios equipped with the Advanced (A7) Control Head that has a Squelch adjustment knob.

GENERAL:

This revision consists of changes that have occurred in the A7 Advanced Control Head with Adjustable Squelch Low Band Radios.

INSTRUCTION MANUAL AFFECTED:

68P80102W95-0

MaraTrac Low Band Service Manual

REVISION DETAILS:

This supplement contains theory of operation, performance specifications, model charts, option chart, schematics, circuit board details and parts lists necessary for servicing this radio.

THEORY OF OPERATION

1. Radio Features

1.1 INTERNAL STANDARD FEATURES

The *MaraTrac* radio has the following standard features:

- Remote mount configuration
- High RF power
- Wide bandwidth
- Advanced Control Head with Adjustable Carrier Squelch
- 99—mode
- Microprocessor control
- Fully synthesized
- Stat-Alert™ Decode, Quik Call™ Decode
- Talkaround mode
- 10—watt audio
- Field-programmable EEPROM



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FMR-1735A-1
June, 1996

1.2 CONTROL HEAD

1.2.1 Advanced Control Head

The Advanced Control Head with Adjustable Carrier Squelch control knob with Talk-Around 99 modes is a Standard Feature for the Low Band *MaraTrac* radio. The Adjustable Carrier Squelch knob on the Control Head allows the operator to adjust the squelch threshold. The operator may adjust the squelch knob to reduce interference when necessary. External alarms relay kit HLN3091A and Jumper option is included for configuring External Alarms for Horn and Lights. * Horn and Light cannot be selected independently.

2. Operation Instructions

Note

Refer to operator instructions card supplied with each radio for information on the general use of the radio.

2.1 CARRIER SQUELCH OPERATION

Rotate the squelch-control knob to the fully counterclockwise position. When the channel is clear, slowly rotate the squelch-control knob clockwise until the noise stops. This is the threshold squelch setting. The operator may adjust the squelch knob to reduce interference when necessary.

3. Detailed Theory of Operation

3.1 AUDIO/SQUELCH CIRCUIT

3.1.1 Squelch Operation

The output from the FM detector, a combination of noise and recovered audio, is shaped and amplified by the squelch circuitry. These stages consist of the noise amplifier (U1102A), electronic attenuator (U1103), squelch control potentiometer (R1132), and the noise-filtering/detection/integration circuit.

The amount of attenuation is controlled from the squelch control line (pin 12 of J21). The position of the squelch control potentiometer on the control head, which is a DC voltage to pin 2 of U1103, controls what RF level the carrier squelch will open. Squelch control potentiometer R1132 controls the range of squelch operation.

The resistance at pin 2 of U1103 will be approximately 3k with the radio off and the squelch control on the control head set to the clockwise (CW) rotation. With the squelch control on the control head to the counterclockwise (CCW) rotation, the resistance at pin 2 of U1103 will be approximately 5k.

With the radio on, the voltage will be 1.9VDC CW and 2.7VDC CCW.

Pin 1 of U1102A will have 1200mVAC with no RF carrier present. With the squelch control on the control head CW, pin 7 of U1103 will be 4VAC. Pin 7 of U1103 will be 800mVAC with the squelch control full CCW.

3.2 SQUELCH OPERATION

3.2.1 Adjustable Squelch Alignment Procedure

From the Factory, the Threshold or Lower limit for the Adjustable Squelch is approximately .1uV or 2 to 4 dB SINAD. The tight Squelch or upper limit is approximately .3uV or 20 dB SINAD.

R1132 sets the upper limit for tight squelch. If a higher or lower squelch opening range is desired, R1132 can be adjusted. A maximum tight squelch opening is approximately .5uV.

*** The low band adjustable squelch radio must be connected to an antenna or RF generator if testing of the squelch operation is performed on the test bench. When the squelch control is set to the minimum position CCW, and no antenna is connected, the radio will sometime not unmute. The threshold, or lower limit for the adjustable squelch, is approximately .1uV. Sometime, there is not enough signal for the squelch to open. In a typical vehicle installation, the radio will unmute when the squelch control is turned to minimum.

Rotate the squelch control on the control head full CW. Apply RF generator 1KHz tone with 3KHz of modulation to the desired tight squelch level required. Turn R1132 looking from the top on the audio squelch board to the CCW direction. The squelch will open. Turn R1132 CW until the radio mutes. Slowly turn CCW until radio unmutes. This set the upper limit for the adjustable squelch. The operation of the adjustable squelch can be checked by applying a .1uV from the RF generator. Turn the squelch control on the control head full CCW. The radio will unsquelch. Slowly turn the squelch control CW. Stop when the radio mute. Increase generator RF level until the radio unsquelches. Slowly increase the squelch control on the control head until the radio unmutes. Continue this sequence until the squelch control is at its most CW position.

3.3 INTERCONNECT BOARD

The squelch control line is routed through the control cable (pin 9 of J1 to JU1510, to pin 12 of J21) to the audio squelch board.

3.4 CONTROL HEAD

The squelch control line is routed from the 10k potentiometer (R1101) to pin 14 of the flex cable (J1050) to R1102 (6.8k) and R1101 (3.9k) to pin 32 of J1001. From J1001, the control line goes out through the control cable to pin 9 of J1 interconnect board. JU1108 is out for adjustable squelch. JU1007 is used for External Alarms for operating the horn and lights together.

ATTACHMENTS

Performance Specifications	4
Model Chart Low Band	5
Model Chart Unified Chassis	6
Option Chart	7
General Safety Information	8
Intercabling Diagram for Control Head	9
Circuit Board Diagrams for HCN1090A Advanced Control Head	10
Schematic for HCN1090A Advanced Control Head	11
Intercabling and Circuit Board Diagrams for HCN1090A Advanced Control Head	12
Schematic for HCN1090A Advanced Control Head Display Board	13
Intercabling and Circuit Board Diagrams for HLN5343ESP01 Interconnect Board	14
Schematic for HLN5343ESP01 Interconnect Board	15
Schematic for HLN5342ESP01 Audio Squelch Board	16
Circuit Board Diagrams for HLN5342ESP01 Audio Squelch Board	17

Performance Specifications for Conventional Low Band *MaraTrac* Radio

GENERAL

Channel Capability	99 Modes (A7 Model)
Primary Power	12 VDC <i>negative ground only</i>
Dimensions	10.0" H x 14.5" W x 2.5" L
Weight	16lb. (7.26 kg)
Metering	All adjustments and alignments are performed electronically using an IBM Personal Computer, a Radio Interface Box (RIB) and Field Maintenance Software.
Environmental	Meets MIL-STD 810D environmental specifications for vibration, shock, rain, dust, and salt fog.

Maximum Battery Current Drain

Model	Frequency (MHz)			Minimum RF Power Output	Off @13.8V	Standby @ 13.8V	Receiver @13.8V	Transmit @ Rated Power
	Range1	Range2	Range3					
T81XTA7DA7-K	29.7—36	36—42	42—50	110 watts	60mA	.7A	3.0 A	27 A

TRANSMITTER

Output Impedance	50 ohms
Spurious and Harmonic Emissions	More than 70 dB below carrier (for EIA spec. RS152B) except Fc \pm 14.4 MHz @ FCC
Frequency Stability	\pm .0005% of assigned center frequency
Modulation	0 to \pm 5 kHz
Audio Sensitivity	0.080 V \pm 4 dB for 60% maximum deviation @ 1000 MHz
Audio Response	EIA
Audio Distortion	Less than 3% @ 100 MHz, 60% maximum deviation
Maximum Freq. Separation (MHz)	Range 1—6.3; Range 2—6; Range 3—6
FM Hum and Noise: EIA Method	—45 dB

RECEIVER

Channel Spacing	20 kHz
Sensitivity: 12 dB EIA SINAD	(per EIA spec. RS204C).30 uV
Adjustable Squelch	Minimum 0.1 uV; maximum 0.32 uV (adjustable to 0.5 uV)
Selectivity: EIA SINAD	—80 dB
Spurious & Image Rejection	—80 dB
Intermodulation: EIA SINAD	—80 dB
Input Impedance	50 ohms
Audio Output	10 watts @ less than 5% distortion (into 3.2 ohm load @ 1000 Hz)
Maximum Freq. Separation (MHz)	Range 1—6.3; Range 2—6; Range 3—8
Frequency Stability	\pm .0005% of assigned center frequency

SPEAKER

Dimensions	5.5" x 2.5" (Excluding Mounting Bracket)
Weight	1.5 lbs. (0.7 kg)

CONTROL HEAD

Dimensions (Excluding Mounting Bracket)	A7 Advanced Control Head—6.5" H x 3.4" W x 1.7" L
Weight	.75 lb (0.4 kg)

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

FCC TRANSCEIVER DESIGNATION

ABZ89FT1619

Model Chart for **29.7—36, 36—42, 42—50 MHz** **Low Band *MaraTrac* Radio** **External Adjustable Squelch Control** **110 Watt**

CODE:

● = ONE ITEM SUPPLIED

Ø = INDICATES BREAKDOWN IN SEPARATE CHART

MODEL	DESCRIPTION		
		Advanced 99-Frequency Adjustable Squelch	T81XTA7TA7TA7BK
	ITEM	DESCRIPTION	
Ø		Unified Chassis	
●	RAB4002ARA	Antenna 29.7-36MHz or	
	RAB4003ARA	36-42 MHz, or	
	RAB4004ARA	42-50 MHz	
●	HKN4051A	Cable and Fuse	
●	HKN4321A	Control Cable	
●	HLN5372A	R. O. M. Kit	
●	HLN4022E	Installation Kit	
●	HLN4023A	Tuning Tool Kit	
●	HHN4032A	Top Cover	
●	HLN4034C	Mounting Tray	
●	HSN4021B	External Speaker	
●	HCN1090A	Advanced Control Head 99-Mode Adjustable Squelch	
●	HMN1061A	Microphone	
●	HLN4921A	Trunnion	
		Operator Card	

Model Chart for 29.7—36, 36—42, 42—50 MHz Unified Chassis Low Band *MaraTrac* Radio External Adjustable Squelch Control 110 Watt

CODE:

● = ONE ITEM SUPPLIED

MODEL	DESCRIPTION			ITEM	DESCRIPTION
	HUB1135A	HUB1136A	HUB1137A		
	Unified Chassis, 29.7-36 MHz	Unified Chassis, 36-42 MHz	Unified Chassis, 42-50 MHz		
●				HLB4099B	RF Board 29.7-35.999 MHz
		●		HLB4100A	RF Board 36-41.999 MHz
			●	HLB4101B	RF Board 42-50 MHz
●	●	●		HLN5402C	Logic Board
●	●	●		HLN5342ESPOI	Audio/Squelch Board
●	●	●		HLN5343ESPOI	Interconnect Board
●	●	●		HLN5443A	Feed thru Plate
●	●	●		HLN4047A	Black/Red Power Cable
●	●	●		HLN5541A	Bottom Cover
●	●	●		HLB4116A	Exciter and Power Control Board 29.7-50 MHz
●	●	●		HLN5426A	Antenna Relay
●	●	●		HLN5544A	Hardware Kit
●				HLB4117A	PA Board (R1) 29.7-36 MHz
	●			HLB4118A	PA Board (R2) 36-42 MHz
		●		HLB4115A	PA Board (R3) 42-50 MHz
●	●	●		HLB4077A	Power Transistor 29.7-50 MHz

MaraTrac Low Band Two-Way Radio Options Chart

Option	Description	Kit Added	Kit Deleted
B20DH B01AL G28AK	Non-Backlit DTMF Microphone Backlit DTMF Microphone Backlit DTMF Mic with Last No. Redial	HMN1032A TDN8309A TMN6172A	HMN1061A
B70DE	Omit Low Band Antenna	—	Antennas: RAB400XARA (x = 2, 3, or 4) TAB6071A
B71EA	Omit Microphone	HMN1032A TDN8309A TMN6172A Or: TMN6047A Handset	HMN1061A
B87CA	Omit Speaker	—	HSN4021A
B90KN B90KQ B90KP	Omit All Accessories, LB Unit Only Omit All Accessories, VHF Unit Only Omit All Accessories, UHF Unit Only	—	Control Head (HCN1090A) Control Cable (HKN4321A) Control Cable & Fuse (HKN4051A) Microphone (HMN1061A) Speaker (HSN4021A) Antenna (RAB400XARA [x = 2, 3, or 4] TAB6071A)
B109DR	Handset	TMN6047A	HMN1061A
B116BA	External Alarms, Low Band	HKN6106A Cable All Bands HLN9368A Relay, Low Band	
B161FC	Omit Main Radio Cable	—	Control Cable (HKN4321A) Cable & Fuse (HKN4051A)
B470BH	Emergency Foot Switch	HLN6555A	

GENERAL SAFETY INFORMATION

The United States Department of Labor, through the provisions of the Occupational Safety and Health Act of 1970 (OSHA), has established an electromagnetic energy safety standard that applies to the use of this equipment. Proper use of this radio will result in exposure below the OSHA limit. The following precautions are recommended:

DO NOT operate the transmitter of a mobile radio when someone outside the vehicle is within two feet (0.6 meter) of the antenna.

DO NOT operate the transmitter of a fixed radio (base station, microwave, and rural telephone RF equipment) or marine radio when someone is within two feet (0.6 meter) of the antenna.

DO NOT operate the transmitter of any radio unless all RF connectors are secure and any open connectors are properly terminated.

In addition,

DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere. All equipment must be properly grounded according to Motorola installation instructions for safe operation.

All equipment should be serviced only by a qualified technician.

Refer to the appropriate section of the product service manual for additional pertinent safety information.

INSTALLATION SAFETY WARNING

Consider the occupants' safety when you choose a location for the radio. **DO NOT** mount the radio overhead or on a sidewall unless you take special precautions.

If someone were to remove the radio and fail to replace it properly, road shock could bump the radio loose, and the falling radio could in some circumstances cause serious injury to the driver or a passenger.

If you must mount the radio overhead or on a sidewall, give it the added protection of a retaining strap. Custom-made straps are available from Motorola Americas Parts Division. Order kit number HLN4698A (for *MaraTrac*).

WARNING

For vehicles equipped with electronic anti-skid braking systems, see "ANTI-SKID BRAKING PRECAUTIONS" Publication, Motorola Number 68P81109E34.

WARNING

For vehicles equipped with electronic ignition systems, check the service manual for warnings about the use of two-way radio equipment in the vehicle.

WARNING

It is mandatory that radio installations in vehicles fueled by liquefied petroleum gas conform to the following standard.

National Fire Protection standard NFPA 58 applies to radio installations in vehicles fueled by liquefied petroleum (LP) gas with the LP-gas container in the trunk or other sealed-off space within the interior of the vehicles. This standard requires that:

1. Any space containing radio equipment shall be isolated by a seal from the space in which the LP-gas container and its fittings are located.
2. Remote (outside) filling connections shall be used.
3. The container space shall be vented to the outside.

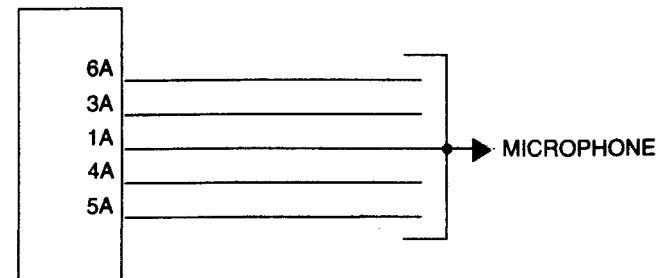
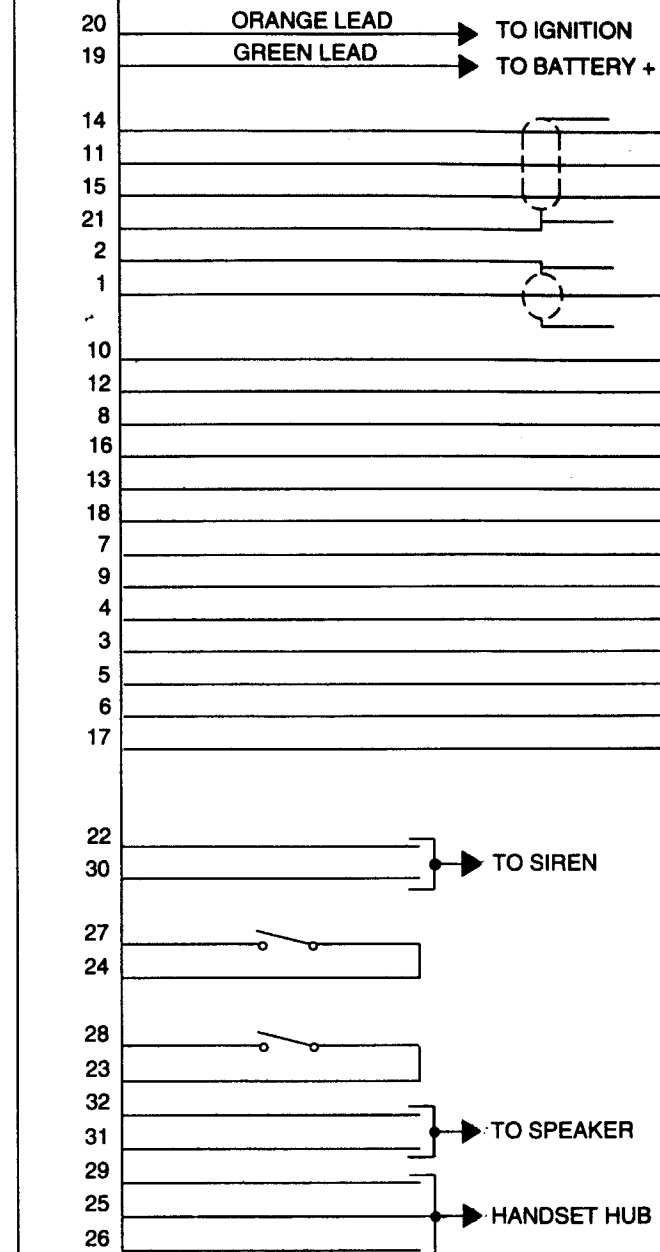
BASIC CONTROL HEAD

J1001

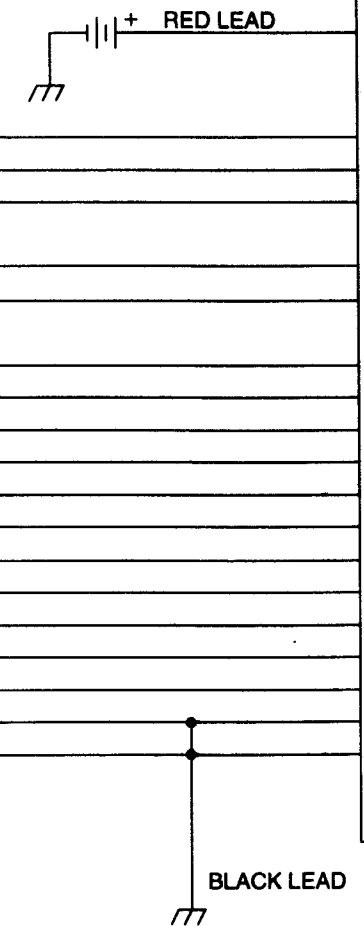
IGNITION	20
B+	19
MIC HI	14
RX AUDIO	11
VOLUME	15
ANALOG GND	21
N.C.	2
CLOCK	1
+5V	10
PTT	12
DATA IN	8
XMIT LIGHT	16
ON/OFF	13
EMERGENCY	18
DISPLAY ENABLE	7
BUSY LIGHT	9
B+	4
SPKR HI	3
SPKR LO	5
REM. SQ./DATA OUT-DIG GND	6
CHASSIS	17
ON/OFF	22
ANALOG GND	30
HUB REF	27
HUB	24
EMERGENCY REF	28
EMERGENCY	23
SPKR LO	32
SPKR HI	31
SPKR AUDIO HI	29
HUB SWITCH	25
HANDSET AUDIO	26

PTT	6A
PTT REF	3A
AUDIO	1A
GND	4A
MIC HI	5A

P1001



P1



RADIO

J1

19	A+
14	MIC HI
11	VOLUME TOP
15	VOLUME WIPER
2	ANALOG GND
1	CLOCK
10	+5V
12	PTT
8	DATA IN
16	XMIT LIGHT
13	ON/OFF
18	EMERGENCY
7	DISPLAY ENABLE
9	BUSY LIGHT
4	B+
3	SPKR HI
5	SPKR LO
6	DATA OUT/REM. SQ.
17	A-

63MC07993D49-O

parts list

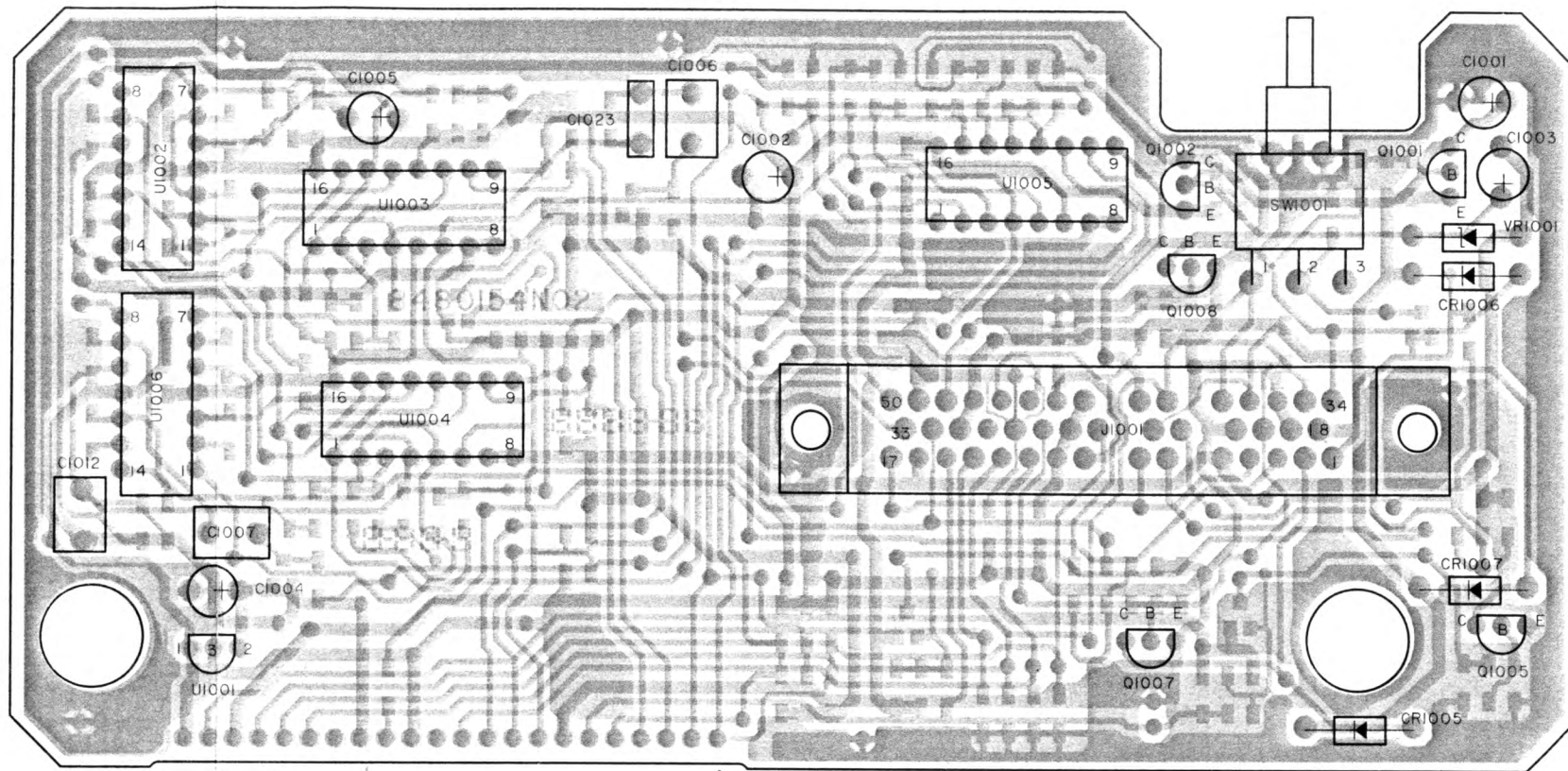
HCN1090A Advanced Control Head, 99F Low Band Adjustable Squelch

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, uF, ±5%, 50V (unless otherwise stated)		
C1001	23-11048C11	10, ±20%, 35V, electrolytic
C1003-1005	23-11048C11	10, +20%, 35V, electrolytic
C1006,1007	08-11051A17	0.47, 63V
C1008-1011	21-13740B57	220 pF
C1012	08-11051A17	0.47, 63V
C1013, 1014	21-13741N21	.001
C1015-1021	21-13741N45	0.01, ±10%
C1022	21-13741N21	.001
C1023	08-11051A11	0.047, 63V
C1024	21-11032A09	.001
C1025-1028	21-11031A47	220
C1029-1045	21-11032A21	0.01, +10%
diode (see note)		
CR1001,1002	48-80236E08	rectifier, silicon
CR1004	48-80236E08	rectifier, silicon
CR1005-1007	48-82466H18	rectifier, silicon
CR1010	48-80060M01	rectifier, silicon
connector receptacle		
J1001	28-80228J01	connector, 50 position
jumper		
JU1003	06-11077A01	0-ohm resistor
JU1005	06-11077A01	0-ohm resistor
transistor (see note)		
Q1001	48-11043C08	PNP
Q1002	48-11043C07	NPN
Q1004	48-80141L03	PNP, type 41L03
Q1005	48-11043C07	NPN
Q1006	48-80141L04	NPN, type 41 L04
Q1007, 1008	48-11043C07	NPN
Q1009	48-80141L04	NPN
resistor, fixed, ohm, ±5%, 1/8 watt (unless otherwise stated)		
R1001	06-11077A98	10k
R1002	06-11077A90	4.7k
R1003	06-11077A74	1 k
R1004, 1005	06-11077A98	10k
R1006-1012	06-11077B11	33k
R1013	06-11077A98	10k
R1014,1015	06-11077A98	10k
R1017	06-11 077B07	22k
R1018	06-11077A82	2.2k
R1019	06-11077A62	330
R1020	06-11077A42	47
R1021	06-11077A82	2.2k
R1022	06-11077A86	3.3k
R1023	06-11077A74	1k
R1024	06-11077A54	150
R1025,1026	06-11 077A78	1.5k
R1027	06-11077A74	1k
R1028	06-11077A70	680
R1029	06-11 077A74	1k
R1030	06-11077A68	560
R1031,1032	06-11077A74	1k
R1033	06-11077A58	220
R1034	06-11077A98	10k
R1035	06-11077A62	330
R1036-1038	06-11077A98	10k
R1039	06-11077A28	12
R1040	06-11077A74	1k
R1041	06-11077A82	2.2k
R1042	06-11 077A74	1k
R1043	06-11077A62	330
R1044	06-11077A86	3.3k
R1045,1046	06-11077A74	1k
R1047	06-11077A68	560
R1048	06-11077A58	220
R1049	06-11077A68	560
R1050	06-11077B07	22k
R1051	06-11077A58	220
R1052	06-11077A28	12
R1053	06-11077A58	220
R1054	06-11077A98	10k
R1101	06-11027A98	10k
R1102	06-11077B07	22k
switch		
SW1001	40-80033K01	toggle
integrated circuit (see note)		
U1001	51-84621K27	voltage regulator
U1002	51-84621K32	quad op amp
U1003,1004	51-80073C06	analog multiplexer, CMOS
U1005	51-84887K26	analog multiplexer/demulti-plexer
U1006	51-84621K32	quad op amp
voltage regular (see note)		
VR1001	48-11034A19	zener, 10V, 25 mA
VR1002,1003	48-80140L15	zener, 10V, 5 mA

6/17/96

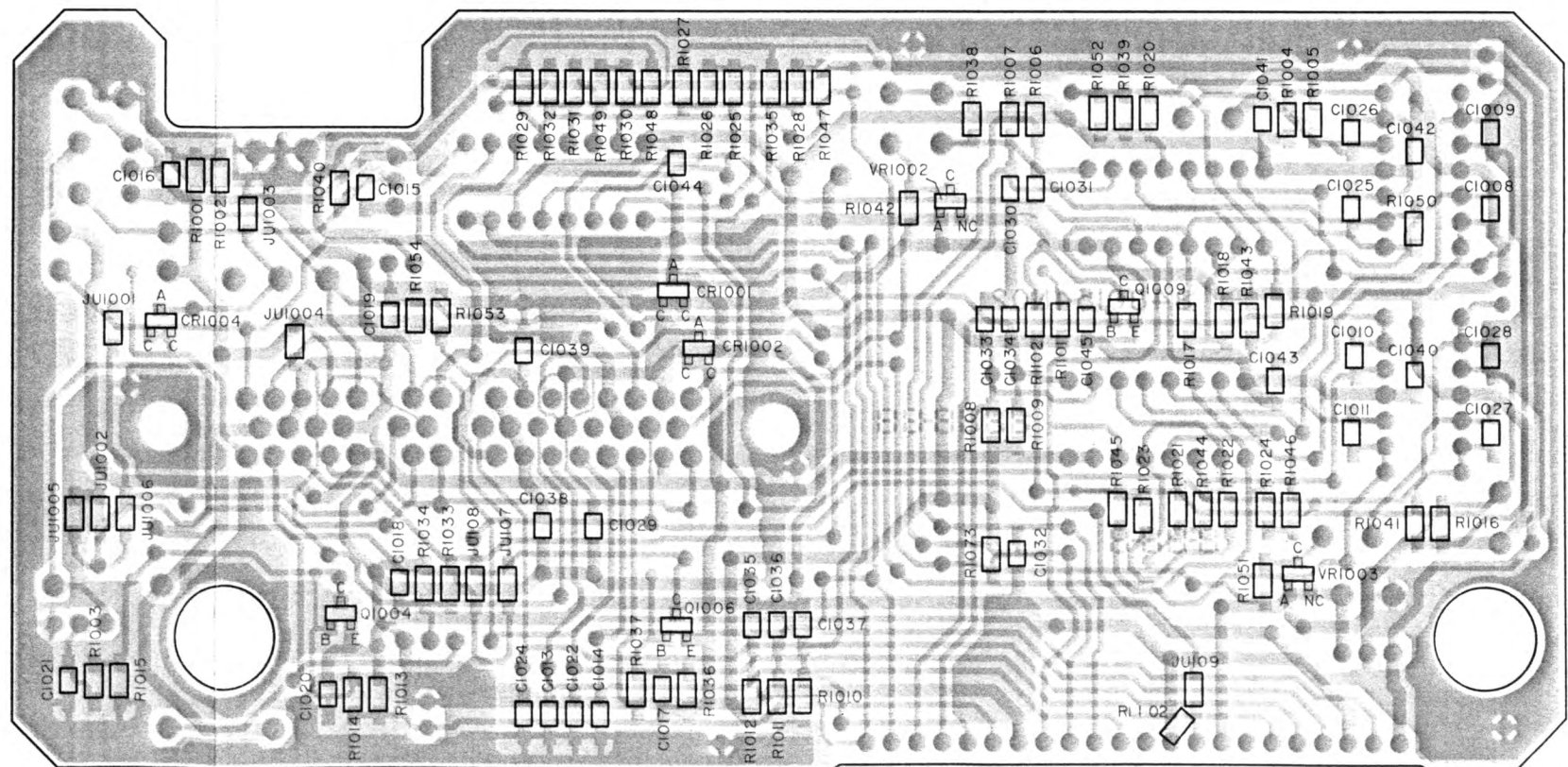
note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.

VIEWED FROM SIDE 1



OL-BEPF-22882-0
L1-BEPF-22881-0
L2-BEPF-22880-0

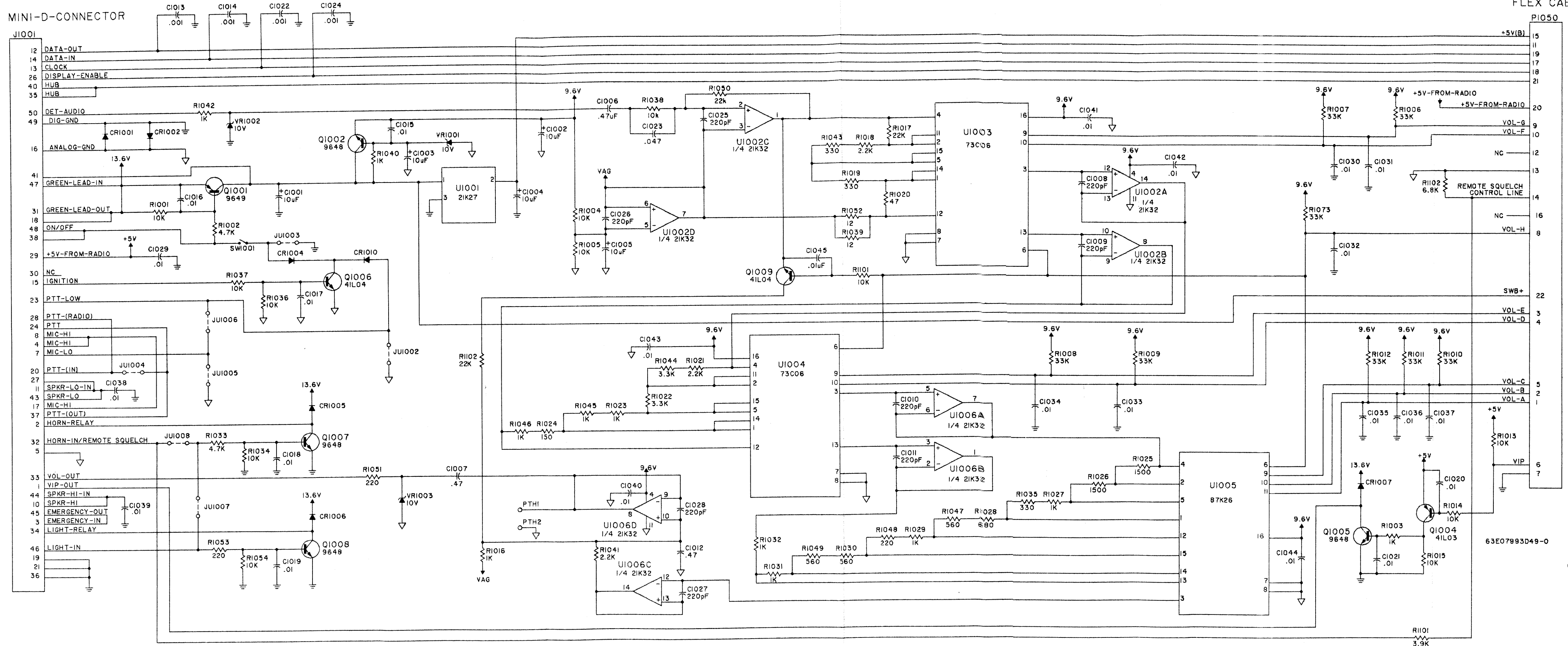
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OL-BEPF-22885-0

MINI-D-CONNECTOR

FLEX CABLE

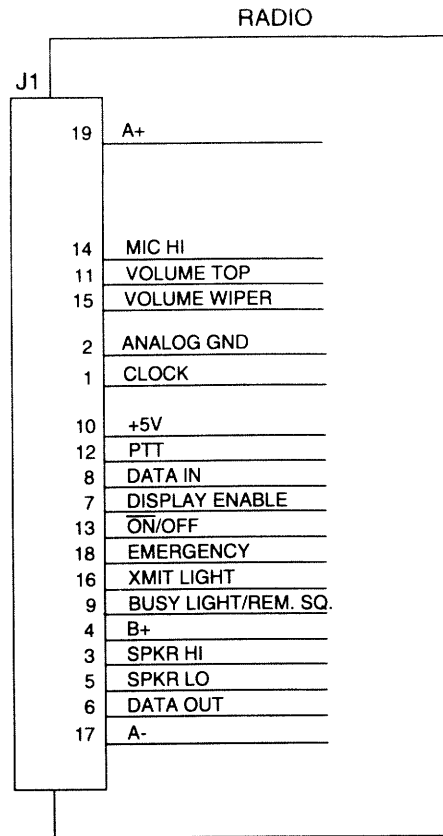
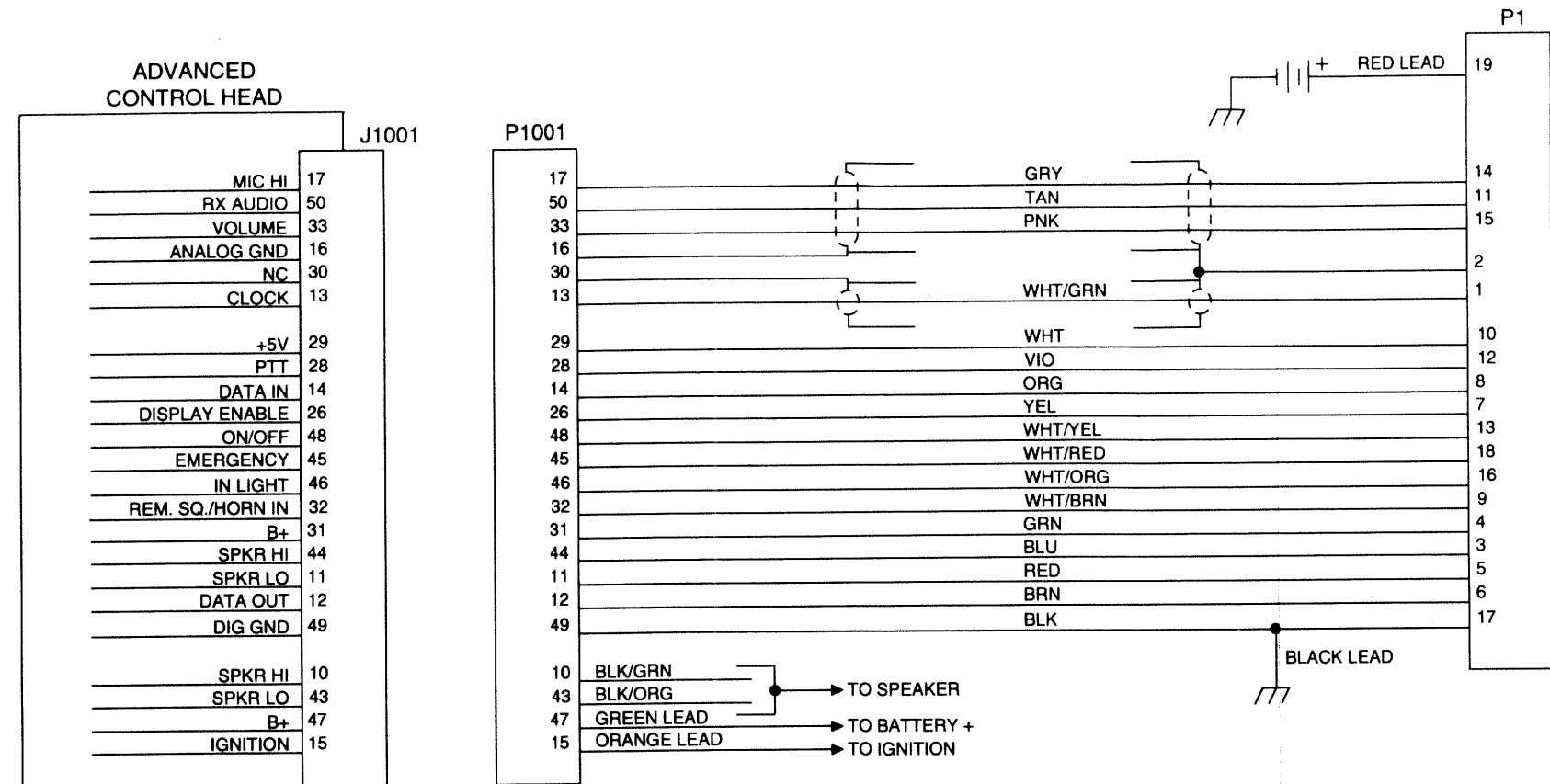


REMOTE SQUELCH JUMPER TABLE

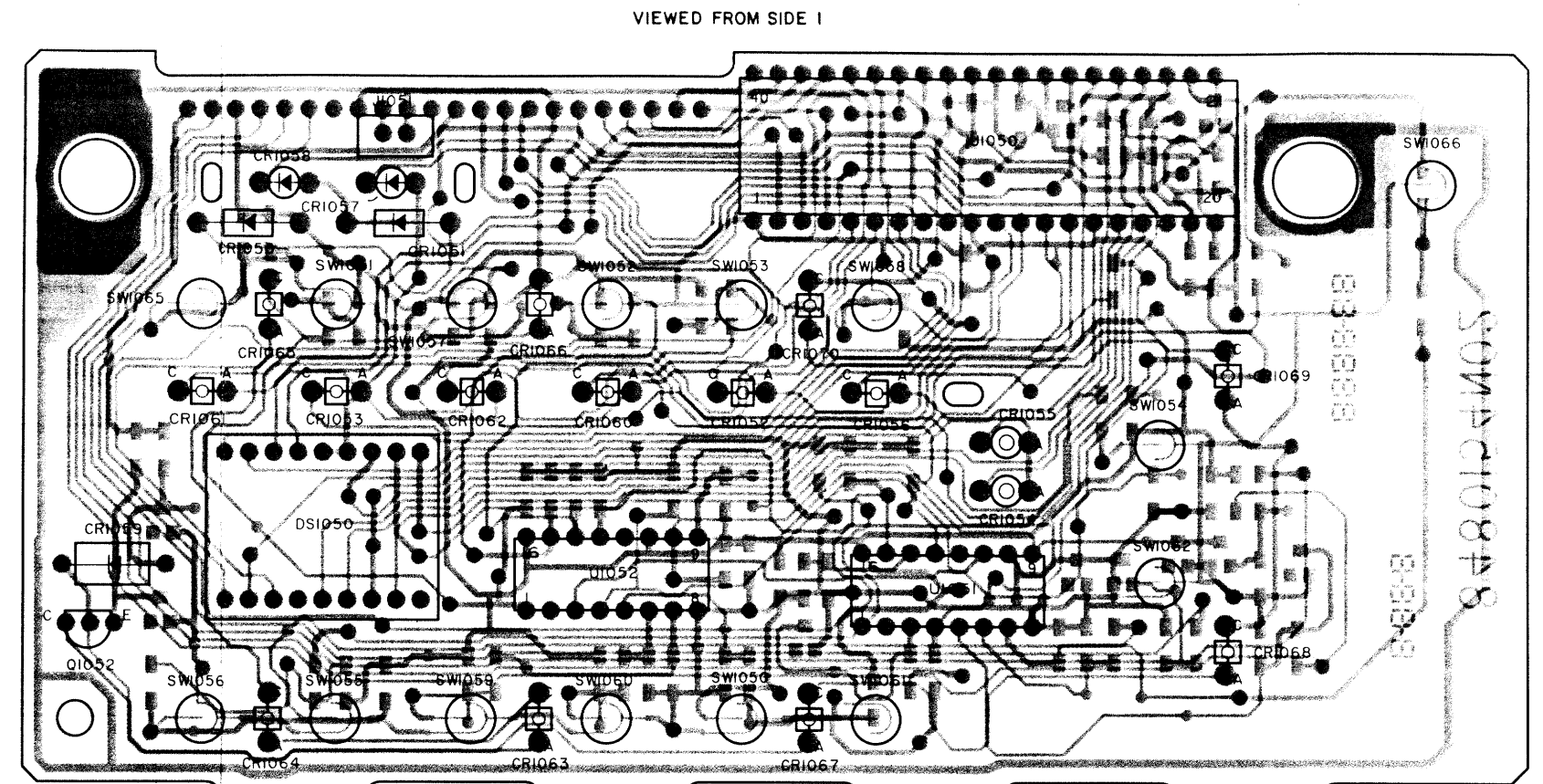
	REMOTE SQUELCH	NORMAL
JUI007*	OUT	OUT
JUI008	OUT	IN
RII01	IN	OUT
RII02	IN	OUT

* - JUI007 IS ONLY USED WHEN SIGNALLING AND EXTERNAL ALARM OPTION IS REQUESTED TO CONTROL BOTH HORN AND LIGHTS.

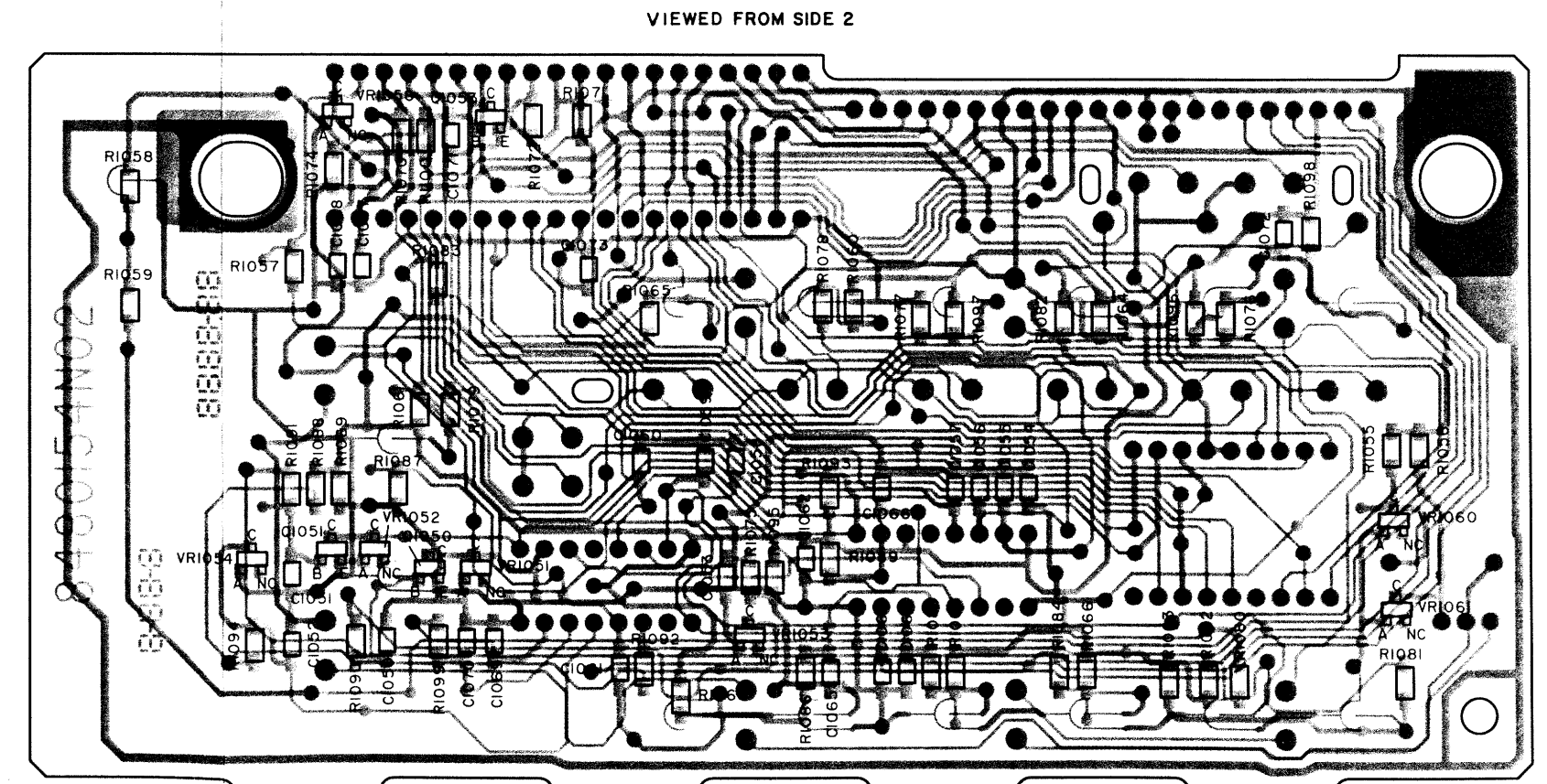
Schematic for HCN1090A
Advanced Control Head



63MF07993D49-O



OL-BEPF-22892-0
L1-BEPF-22893-0
L2-BEPF-22894-0



OL-BEPF-22895-0
L1-BEPF-22896-0
L2-BEPF-22897-0

parts list

HLN1090A Display Control Head, 99F (Display Board)

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, uF, ±10%, 50V (unless otherwise stated)		
C1050,1051	21-13741N21	0.001
C1052-1070	21-13741N69	0.1
C1072-1073	21-13741N45	0.01
diode (see note)		
CR1050,1051	48-82466H18	rectifier, silicon
CR1052,1053	48-80026P03	LED, red
CR1054	48-80026P04	LED, yellow
CR1055,1056	48-80026P03	LED, red
CR1057	48-80026P04	LED, yellow
CR1058	48-80026P03	LED, red
CR1059	48-11034A01	rectifier, silicon
CR1060-1062	48-80026P03	LED, red
CR1063-1070	48-80246K04	LED, green
Indicator		
DS1050	48-80055M01	LED, 7-segment, 2-digit, green
transistor (see note)		
Q1050,1051	48-80141L04	NPN, type 41L04
Q1052	48-11043C08	PNP
Q1053	48-80141L04	NPN, type 41L04

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
resistor, fixed, ohm, ±5%, 1/8 watt (unless otherwise stated)		
R1055,1056	06-11077A54	150
R1057	06-11077A74	1k
R1058-1069	06-11077A98	10k
R1070	06-11077A90	4.7k
R1071	06-11077A68	560
R1072	06-11077A74	1k
R1073	06-11077B11	33k
R1074-1089	06-11077A98	10k
R1090	06-11077A74	1k
R1091	06-11077A98	10k
R1092	06-11077A74	1k
R1093-1100	06-11077A98	10k
Integrated circuit (see note)		
U1050	51-80236C01	driver, LED display
U1051,1052	51-84887K36	shift register, CMOS
voltage regulator (see note)		
VR1051,1052	48-80140L06	zener, 5.1V
VR1053	48-80140L07	zener, 5.6V
VR1054	48-80140L06	zener, 5.1V
VR1058	48-80140L06	zener, 5.1V

6/17/96
note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.

parts list

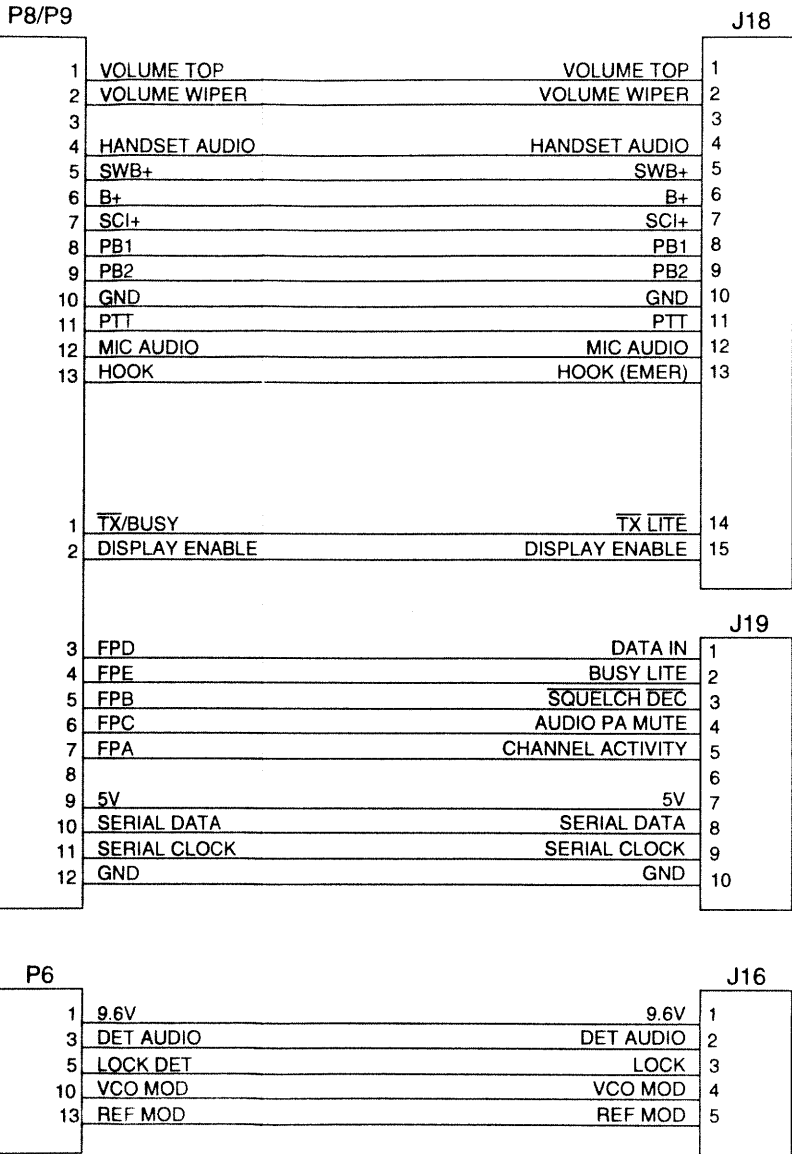
HLN5343ESP01 MaraTrac Interconnect Board

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, pF, ±10%, 50V (unless otherwise stated)		
C11-28	21-84874K01	470 pF, ±20%, 250V
C1501	23-80167C03	1000 uF, ±20%, 25V, electrolytic
C1502	21-13741N69	0.1
C1503-1508	21-13741N21	0.001
diode (see note)		
CR3	48-80153A01	silicon
CR1501,1502	48-80236E08	silicon
CR1504	48-80236E08	silicon
connector receptacle		
J1	28-80011A01	male, 19-pin
J20	09-80132M01	telco, 8-pin
J21,22	09-80103M05	female, 18-contact
jumper		
JU1501,1502	06-11077A01	0-ohm resistor
JU1508	06-11077A01	0-ohm resistor
relay		
K1501	80-80075G03	220V, 2 amps
transistor (see note)		
Q1501-1503	48-80141L04	NPN
Q1504,1505	48-80141L03	PNP
Q1506,1507	48-80141L04	NPN
resistor, fixed, ohm, ±5%, 1/8 watt (unless otherwise stated)		
R1501-1503	06-11077A98	10k
R1504	06-11077A74	1k
R1505,1506	06-11077A98	10k
R1507	06-11077A74	1k
R1508,1509	06-11077A98	10k
R1510	06-11077A74	1k
R1511	06-11077B15	47k
R1512	06-11077A98	10k
R1513-1515	06-11077A74	1k
R1516	06-11077B15	47k
R1517	06-11077A86	3.3k
R1518	06-11077A74	1k
voltage regulator (see note)		
VR1502	48-80140L07	zener, 5.6V
VR1503-1505	48-80140L06	zener, 5.1V
VR1506	48-80236E07	zener, 28V
VR1507	48-80140L06	zener, 5.1V
non-referenced parts		
MP101	26-80191P01	heatsink (2 used)
	64-80264A01	cable plug
	03-10904A02	screw, machine M3.5 x 0.6 x 6 (2 used)

6/17/96
note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.

TO LOGIC BOARD

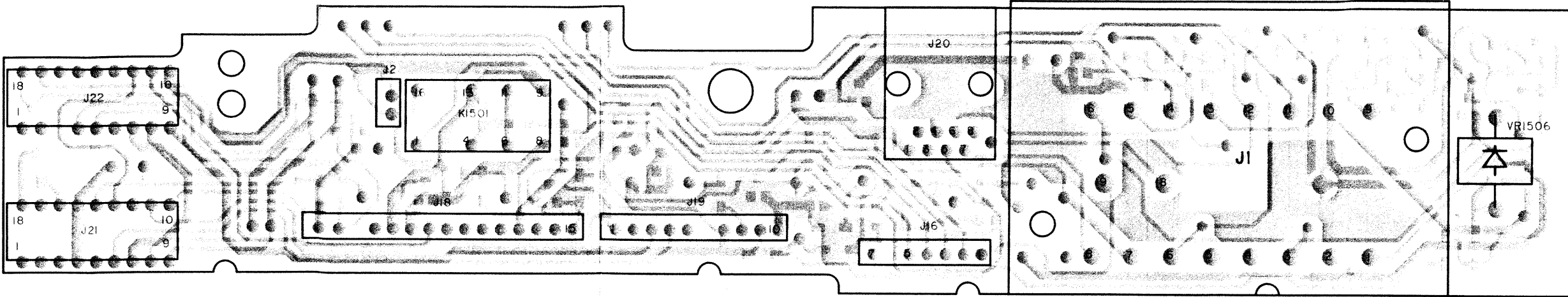
63H07993D49-O



INTERCONNECT RIBBON DIAGRAM

TO INTERCONNECT BOARD

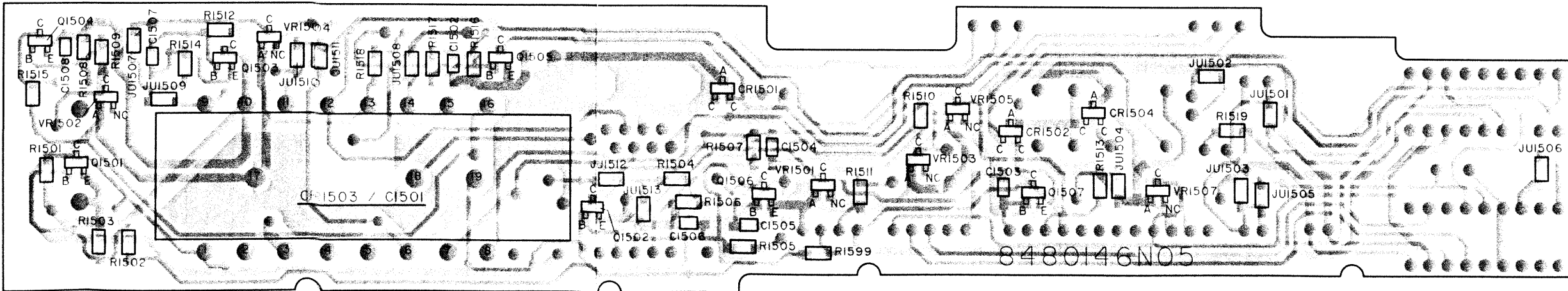
VIEWED FROM SIDE 1



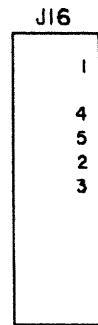
OL-BEPF-22898-O

11-6011-022405-O
11-6011-022405-O

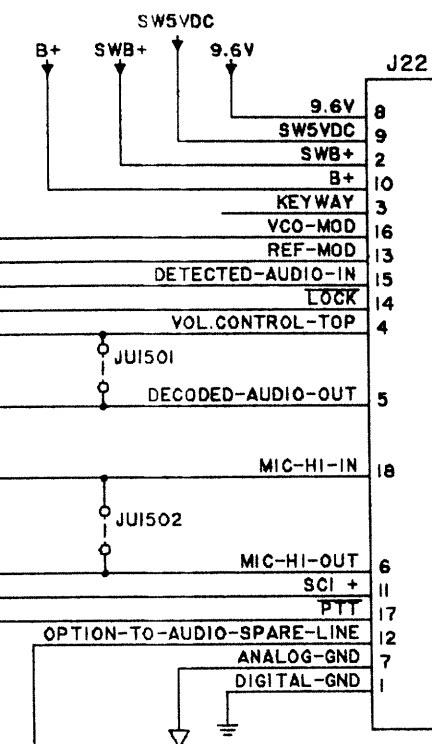
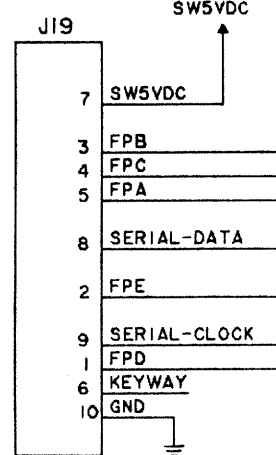
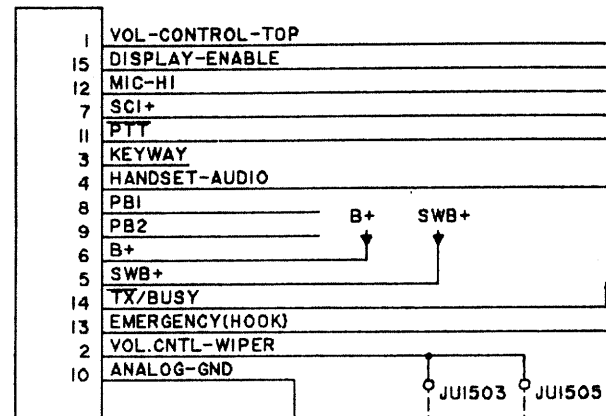
VIEWED FROM SIDE 2



RIBBON CONNECTOR
TO RF BOARD J6



RIBBON CONNECTOR
TO LOGIC BOARD
J8 & J9
J18



OPTION BOARD
CONNECTOR

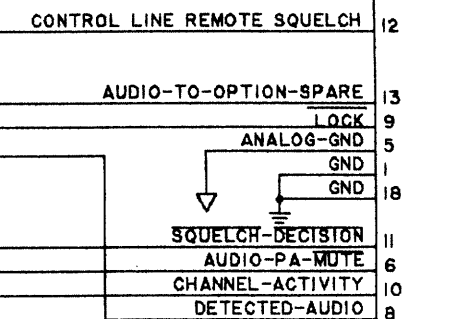
JUMPER TABLE	
JUI501 AND JUI502	OPERATION
IN	NO OPTION BD. INSTALLED IN RADIO
OUT	OPTION BD. INSTALLED IN RADIO

JUI503-JUI507 ARE NORMALLY OUT AND NOT USED

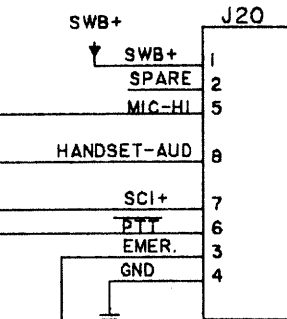
REMOTE SQUELCH
JUMPER TABLE

	REMOTE SQUELCH	NORMAL
JUI509	OUT	IN
JUI510	IN	OUT
JUI511	OUT	OUT
JUI512	IN	IN
JUI513	OUT	OUT

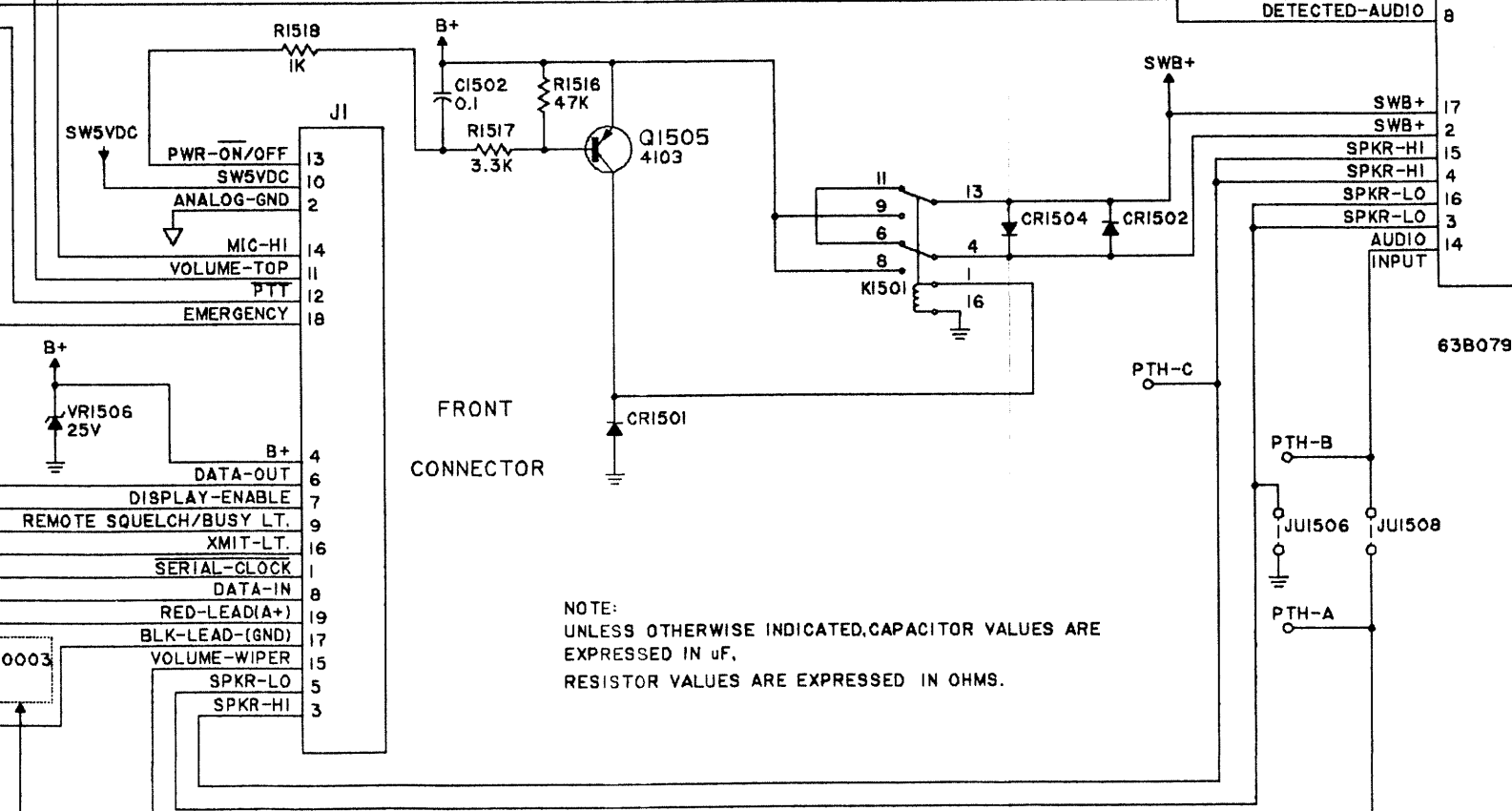
AUDIO BOARD
CONNECTOR
J21



TELCO
PROGRAMMING
JACK

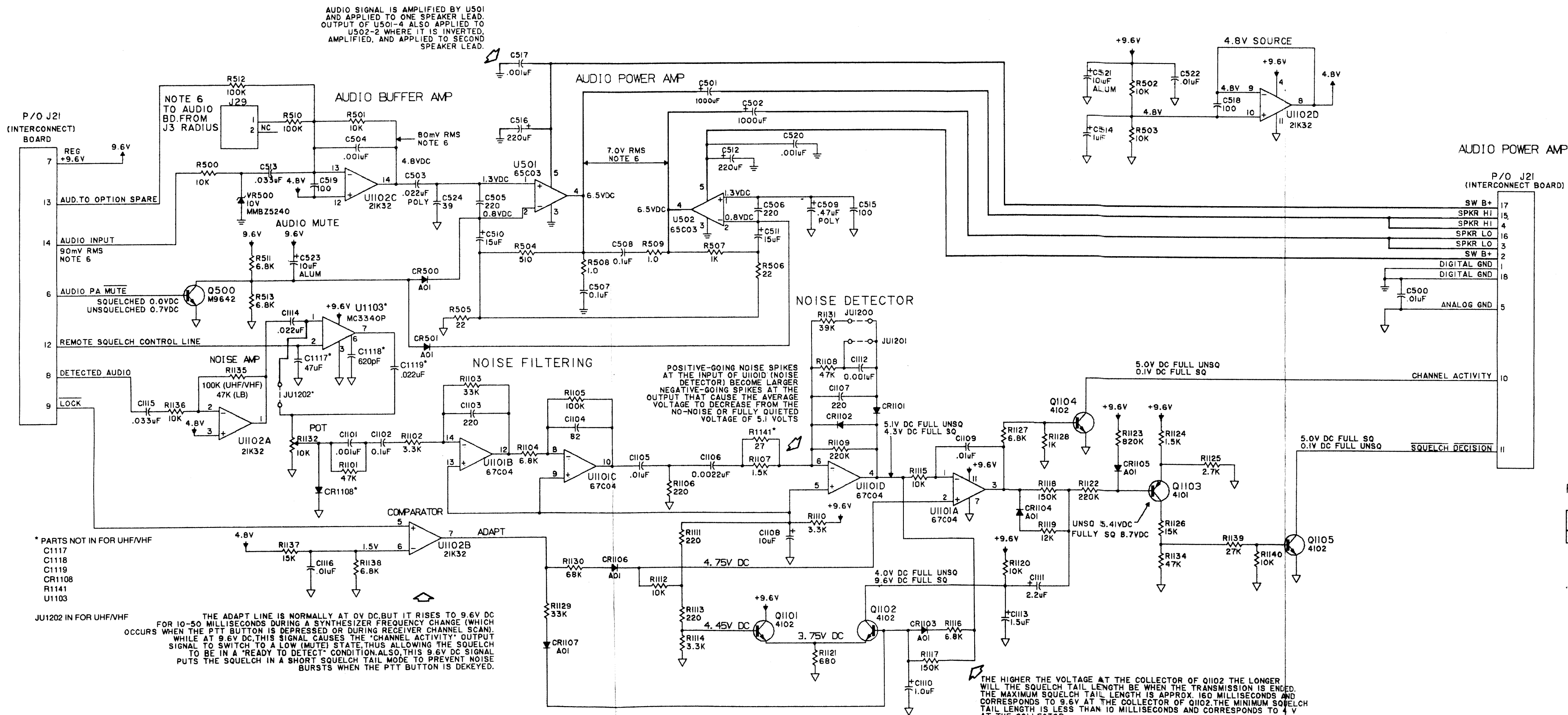


FRONT
CONNECTOR



NOTE:
UNLESS OTHERWISE INDICATED,CAPACITOR VALUES ARE
EXPRESSED IN uF.
RESISTOR VALUES ARE EXPRESSED IN OHMS.

Schematic for HLN5343ESP01
Interconnect Board



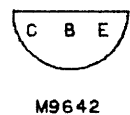
NOTES:

- UNLESS OTHERWISE INDICATED RESISTOR VALUES ARE IN OHMS; CAPACITOR VALUES ARE IN PICOFARADS, INDUCTOR VALUES ARE IN MICROHENRIES.
- TYPES AND CONNECTORS FOR THE INTEGRATED CIRCUITS USED ON THIS BOARD ARE AS FOLLOWS:

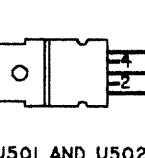
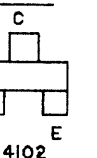
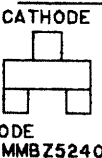
REF DESIG	TYPE	VCC(PIN)	GND(PIN)	DESC.
U1101	67C04	+9.6V (11)	(7)	QUAD OPAMP
U1102	21K32	+9.6V (4)	(11)	QUAD OPAMP

- NON-POLARIZED CAPACITORS ARE CHIP TYPE UNLESS OTHERWISE INDICATED.
- POLARIZED CAPACITORS ARE TANTALUM ELECTROLYTIC TYPE UNLESS OTHERWISE INDICATED.
- DC VOLTAGES ARE MEASURED WITH A HIGH IMPEDANCE (10 MEGOHM) DC VOLTMMETER
- MEASURED IN THE RECEIVE MODE WITH AN ON CHANNEL SQUELCH SIGNAL AT A LEVEL OF -20dBm MODULATED WITH 1KHZ AT 3KHZ DEVIATION, MEASURED WITH AN AC RMS VOLTMMETER, VOLUME SET TO GIVE 10 ACROSS 3.2 OHM LOAD.

SOLDER SIDE VIEW



COMPONENT SIDE VIEW



REMOTE SQUELCH JUMPER TABLE

	REMOTE SQUELCH	NORMAL
JUI202	OUT	IN

JUMPER TABLE

	JUI200	JUI201
CONVENTIONAL	OUT	IN
SECURENET	IN	OUT

* ASTERISK PARTS NOT USED ON LATER VERSION BOARDS: C1112 REPLACED WITH 0-OHM CHIP JUMPER P/N 06-11077A01.

parts list

HLN5342ESP01 MaraTrac Audio Squelch Board

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
capacitor, fixed, uF, $\pm 10\%$, 50V (unless otherwise stated)		
C500	21-13741N45	0.01
C501,502	23-80167C02	1000, $\pm 20\%$, 35V, electrolytic
C503	08-11051A09	0.022, $\pm 5\%$, 63V
C504	21-13741N21	0.001
C505,506	21-13740B57	220 pF, $\pm 5\%$
C507	08-11051A13	0.1, $\pm 5\%$, 63V
C508	21-13741N69	0.1
C509	08-11051A17	0.47, $\pm 5\%$, 63V
C510,511	23-13749L27	15, tantalum
C512	23-84665F06	220, -10+150%, 25V, electrolytic
C513	21-13741N57	0.033
C514	23-13749D51	1, 35V, tantalum
C515	21-13740B49	100 pF, $\pm 5\%$
C516	23-84665F06	220, -10+150%, 25V, electrolytic
C517	21-13741N21	0.001
C518,519	21-13740B49	100 pF, $\pm 5\%$
C520	21-13741N21	0.001
C521	23-11048C11	10, $\pm 20\%$, 44V, electrolytic
C522	21-13741N45	0.01
C523	23-11048C11	10, $\pm 20\%$, 44V, electrolytic
C524	21-13740B39	39 pF, $\pm 5\%$
C1101	21-13741N21	0.001
C1102	21-13741N69	0.1
C1103	21-13740B57	220 pF, $\pm 5\%$
C1104	21-13740B47	82 pF, $\pm 5\%$
C1105	21-13741N45	0.01
C1106	21-13741N29	0.0022
C1107	21-13740B57	220 pF, $\pm 5\%$
C1108	23-13749L23	10, 25V, tantalum
C1109	21-13741N45	0.01
C1110	23-13749D51	1, 35V, tantalum
C1111	23-13749M35	2.2, tantalum
C1112	06-11077A01	0-ohm jumper resistor
C1113	23-13749M31	1.5, 35V, tantalum
C1114	21-13741N53	0.022
C1115	21-13741N57	0.033

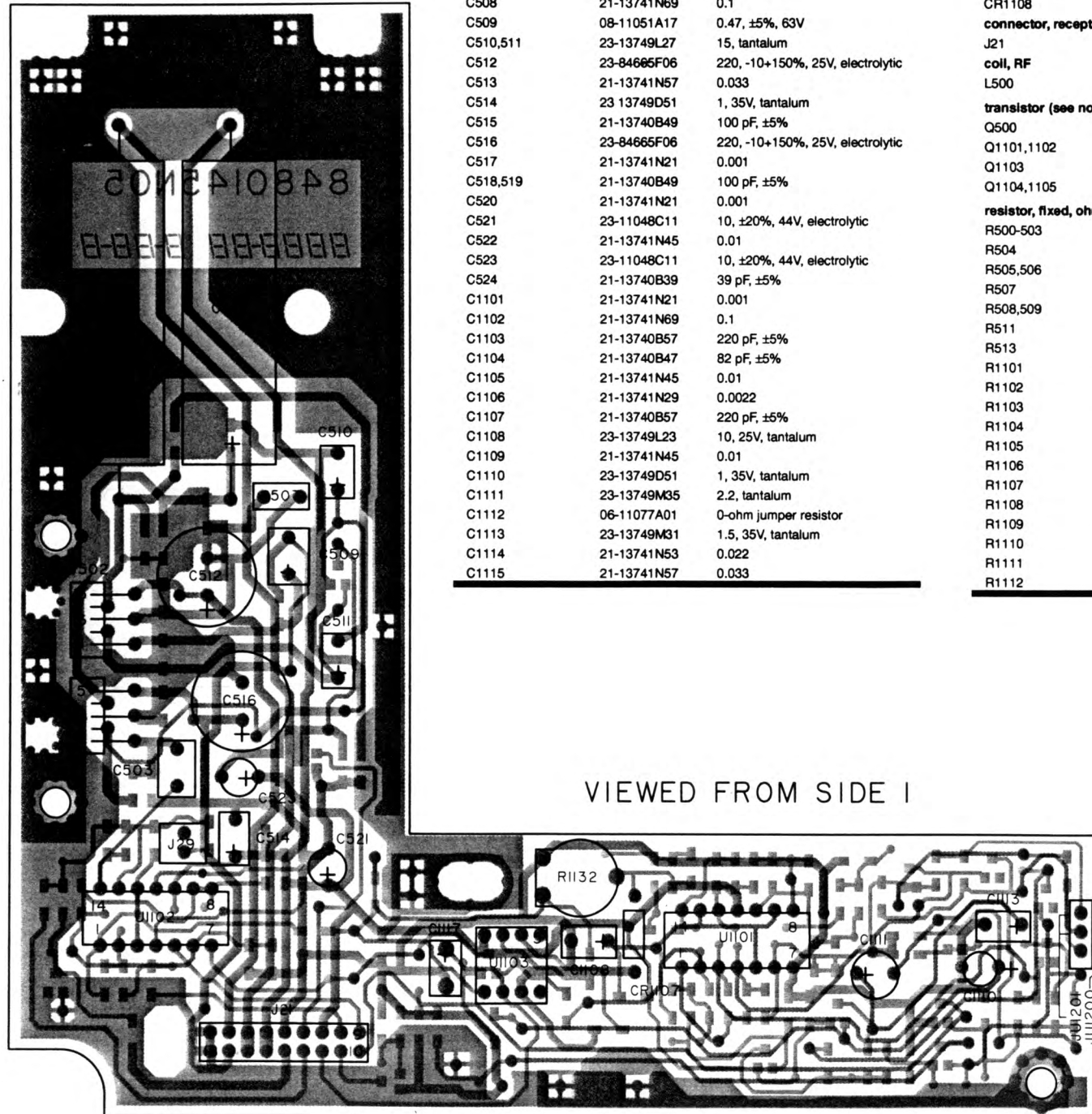
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C1116	21-13741N45	0.01
C1117	23-11054A09	47
C1118	21-13740B68	620 pF
C1119	21-13741N53	0.022
diode (see note)		
CR500,501	48-11034A01	silicon
CR1101-1107	48-11034A01	silicon
CR1108	48-13833D14	1N5819
connector, receptacle		
J21	28-80085E31	male, 12 pin
coil, RF		
L500	24-82723H36	0.41 uH
transistor (see note)		
Q500	48-11043C05	NPN
Q1101,1102	48-80141L02	NPN
Q1103	48-80141L01	PNP
Q1104,1105	48-80141L02	NPN
resistor, fixed, ohm, $\pm 5\%$, 1/8 watt (unless otherwise stated)		
R500-503	06-11077A98	10k
R504	06-11077A67	510
R505,506	06-11077A34	22
R507	06-11077A74	1k
R508,509	06-11077A02	1.0
R511	06-11077A94	6.8k
R513	06-11077A94	6.8k
R1101	08-11077B15	47k
R1102	06-11077A86	3.3k
R1103	06-11077B11	33k
R1104	06-11077A91	5.1k
R1105	06-11077B23	100k
R1106	06-11077A58	220
R1107	06-11077A78	1.5k
R1108	06-11077B15	47k
R1109	06-11077B31	220k
R1110	06-11077A86	3.3k
R1111	06-11077A58	220
R1112	06-11077A98	10k

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
R1113	06-11077A58	220
R1114	06-11077A86	3.3k
R1115	06-11077A98	10k
R1116	06-11077A94	6.8k
R1117,1118	06-11077B27	150k
R1119	06-11077B01	12k
R1120	06-11077A98	10k
R1121	06-11077A70	680
R1122	06-11077B31	220k
R1123	06-11077B45	820k
R1124	06-11077A78	1.5k
R1125	06-11077A84	2.7k
R1126	06-11077B03	15k
R1127	06-11077A94	6.8k
R1128	06-11077A74	1k
R1129	06-11077B11	33k
R1130	06-11077B19	68k
R1132	18-84944C03	variable, 10k, $\pm 20\%$, .10W
R1134	06-11077B15	47k
R1135	06-11077B15	47k
R1136	06-11077A98	10k
R1137	06-11077B03	15k
R1138	06-11077A94	6.8k
R1139	06-11077B09	27k
R1140	06-11077A98	10k
R1141	06-11077A36	27
integrated circuit (see note)		
U501,502	51-80065C03	audio PA
U1101	51-80067C04	quad op amp
U1102	51-84621K32	quad op-amp
U1103	51-07498K01	attenuator, electric
voltage regulator (see note)		
VR500	48-80140L15	zener, 10V
non-referenced parts		
26-80129P01		heatsink, audio final (HLN5342C only)
03-10908A18		M3 x .5 x .6 (2 used) (HLN5342C only)

6/17/96

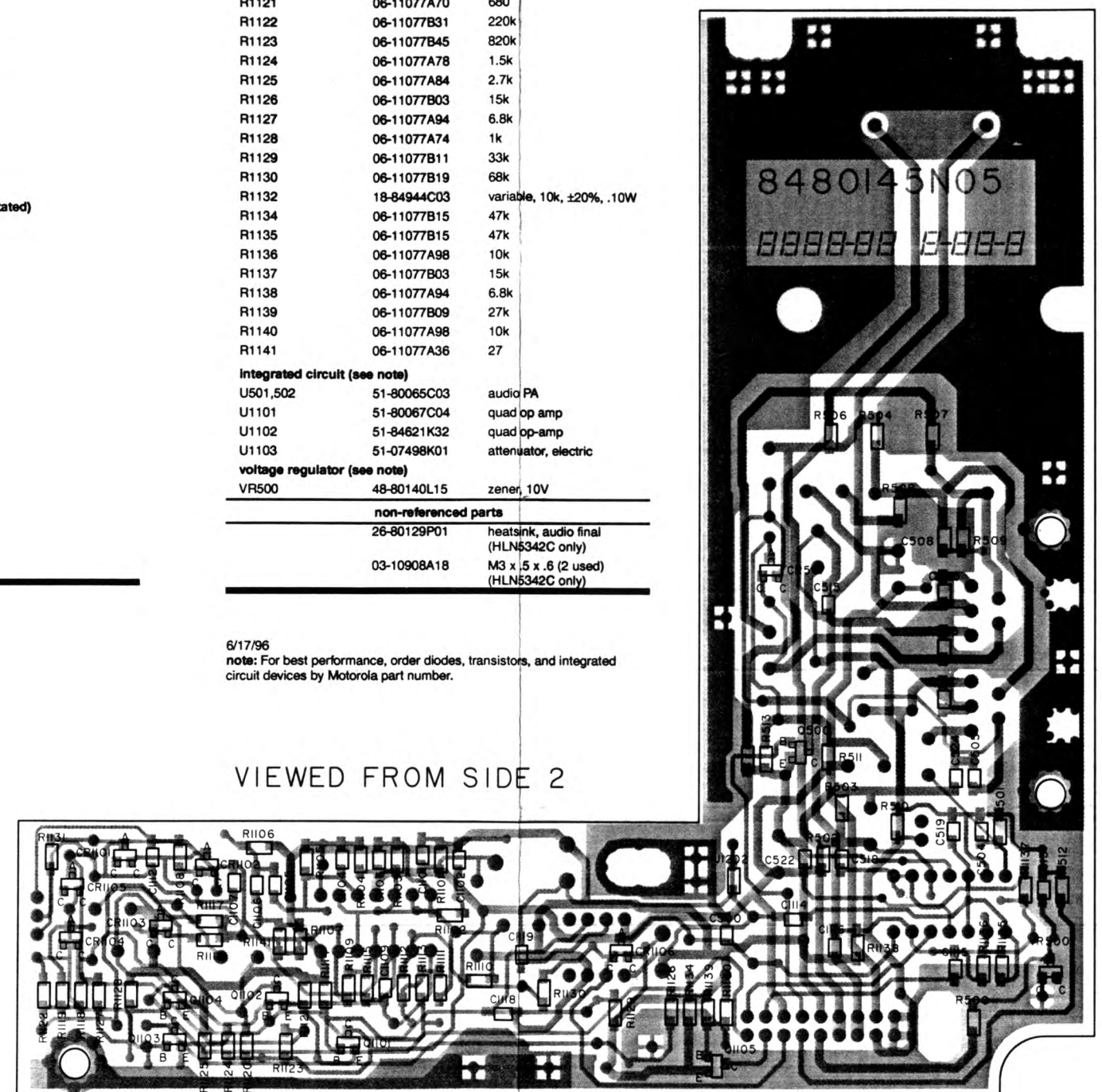
note: For best performance, order diodes, transistors, and integrated circuit devices by Motorola part number.

VIEWED FROM SIDE 1



OL-BEPF-22886-0
L1-BEPF-22887-0
L2-BEPF-22888-0

VIEWED FROM SIDE 2



OL-BEPF-22889-0
L1-BEPF-22890-0
L2-BEPF-22891-0

END OF DOCUMENT

Circuit Board Diagrams for HLN5342ESP01
Audio Squelch Board