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MIDLAND
ELECTRONICS COMPANY®

13—862

23—CHANNEL MOBILE

Manual No. 13-220 072
Date: April 5, 1973

SPECIFICATIONS

Circuitry : 17-transistor , 1 IC
and 11 diode

Receiver Section :

Sensitivity at 10 db S/N	:	1 μV
Image Rejection Ratio	:	40 db
1st IF Rejection Ratio at 10.635 MHz	:	45 db
2nd IF Rejection Ratio at 455 KHz	:	100 db
Squelch sensitivity at maximum	:	300 μV
Squelch sensitivity at threshold	:	0.5 μV
A.G.C. (input 5,000 μV, output 10 db down)	:	75 db
IF Response at 6 db down bandwidth	:	8 KHz
Adjacent channel selectivity	:	35 db
Audio output power at maximum (input 60 db)	:	4W
Audio output power at 10% distortion	:	2.8W
Distortion at input 60 db	:	10%
Audio fidelity at 1,000 Hz 0 db (6 db down)	:	300—2,000 Hz
Current drain at no signal	:	200 mA
Current drain at maximum output power	:	900 mA

Transmitter Section :

RF output power	:	3W
Modulation capability	:	90%
Frequency tolerance	:	0.005%
Spurious ratio	:	50 db
Current drain at no modulation	:	800 mA
Current drain at maximum modulation	:	1,300 mA

Measurement Condition :

Audio output power	:	0.5W
Audio output load	:	8 ohm
Modulation frequency	:	1,000 Hz
Modulation	:	30%
Antenna impedance	:	50 ohm
Power source	:	13.8V DC

MIDLAND
ELECTRONICS COMPANY®

GENERAL OFFICE : 1909 Vernon Street-North Kansas City, Missouri 64116 U.S.A.

Phone : 842-0511-Area Code 816

ALIGNMENT INSTRUCTIONS

TRANSMITTER SECTION

Set channel selector switch to channel No.13.
Connect RF output meter to antenna connector of unit.
Connect the microphone to MIC jack.

STEP	INDICATOR	ADJUST	REMARKS
1	RF output power meter	T7, T8, T9 T10,T11,T12 T13,T14 C5	Adjust for maximum indication. Adjust C5 for 3~3.5W
2	Field strengh meter	C1	Tune the dial of field strength meter to the signal of 2nd harmonic (54 MHz) which is radated from the unit.

MODULATION ADJUSTMENT

1. Connect the audio generator with 1000 Hz output signal to microphone jack.
2. Place the input cable of the oscillograph near an antenna connector, or use CB-Tester.
3. Adjust R58 for 90% modulation reading on the oscillograph.

RECEIVING SECTION

Connect either 8 ohm resistor or speaker with the probe of VTVM to external speaker jack.

STEP	GENERATOR	INDICATOR	ADJUST	REMARKS
1	Connect to Test point B Tune 455 KHz	VTVM	T3,T4,T5	Adjust for maximum output.
2	Connect to an antenna Connector Tune to 27 MHz 1000 Hz. 30% Modulation	VTVM	T6	Turn core clockwise untill stop and turn core counter-clockwise 1 turn.
3	Connect to antenna Connector Tune to 27 MHz 1000 Hz, 30% Modulation	VTVM	T1,T2,T18	Adjust for maximum output. Volume control:Maximum Squelch control:Minimum

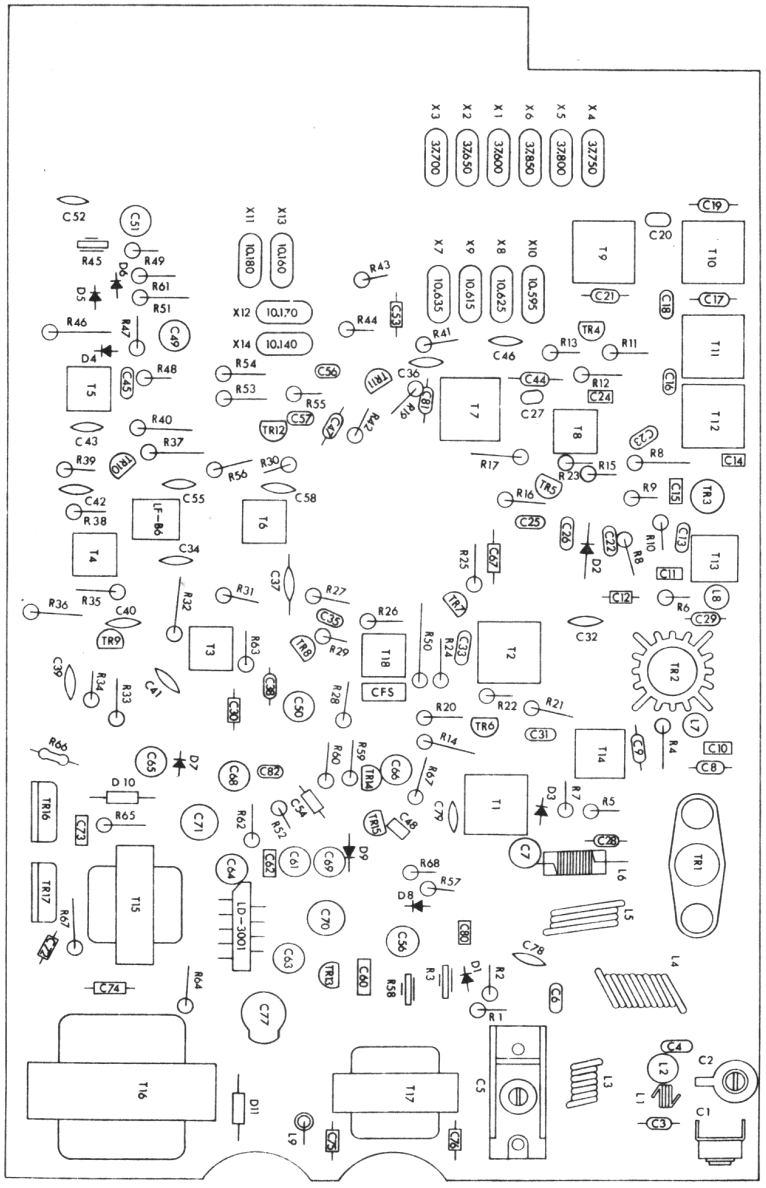
Meter Alignment
S-Meter

Connect the signal generator to the antenna connector, then tune to 27 MHz and 100 uV input with 1000 Hz. 30% Modulation.
Adjust R45 to obtain "9" on S-meter scale.

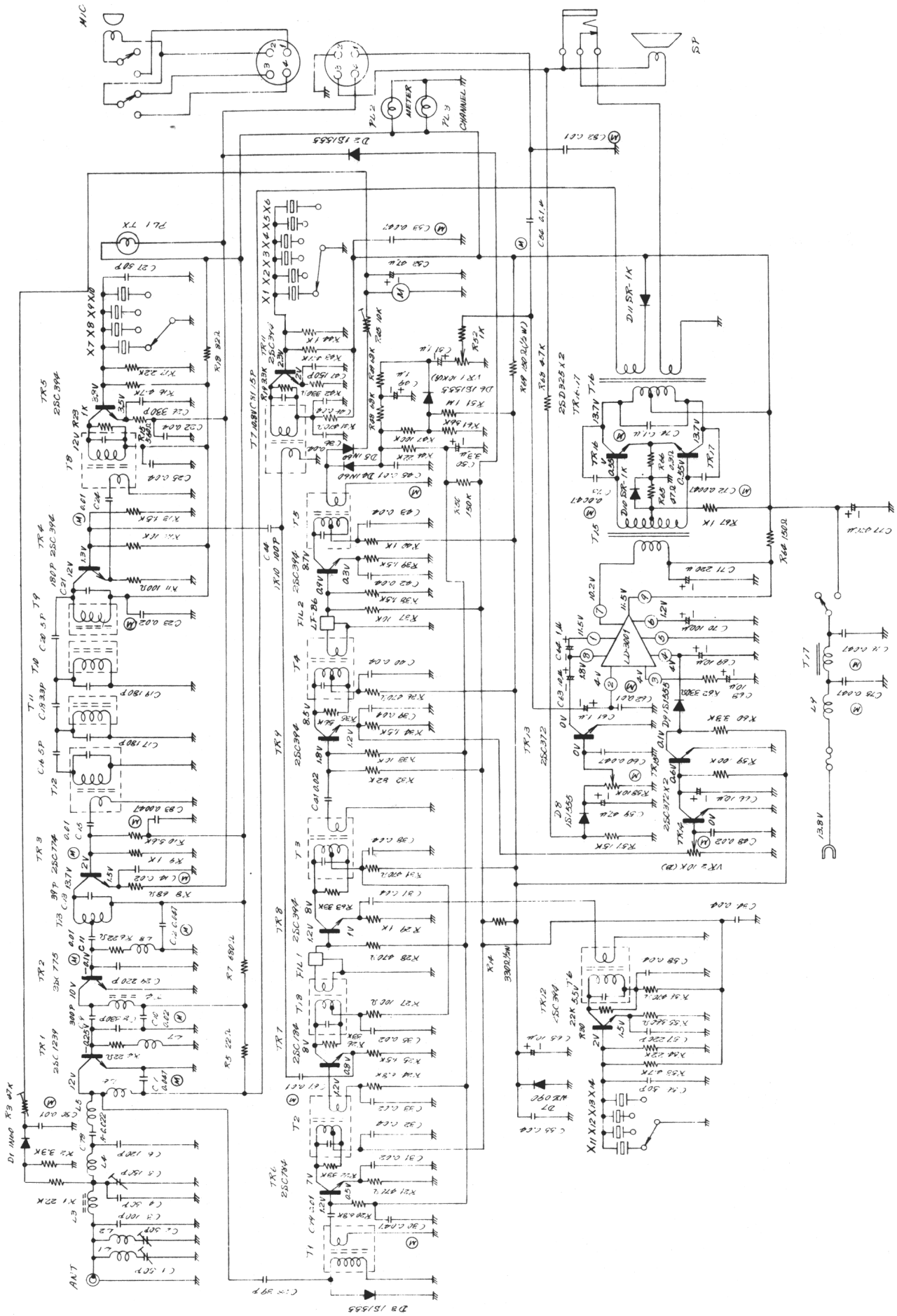
RF-meter

Connect RF output power meter with 50 ohm impedance to the antenna connector.
Adjust R3 to obtain "3W" on RF output meter.

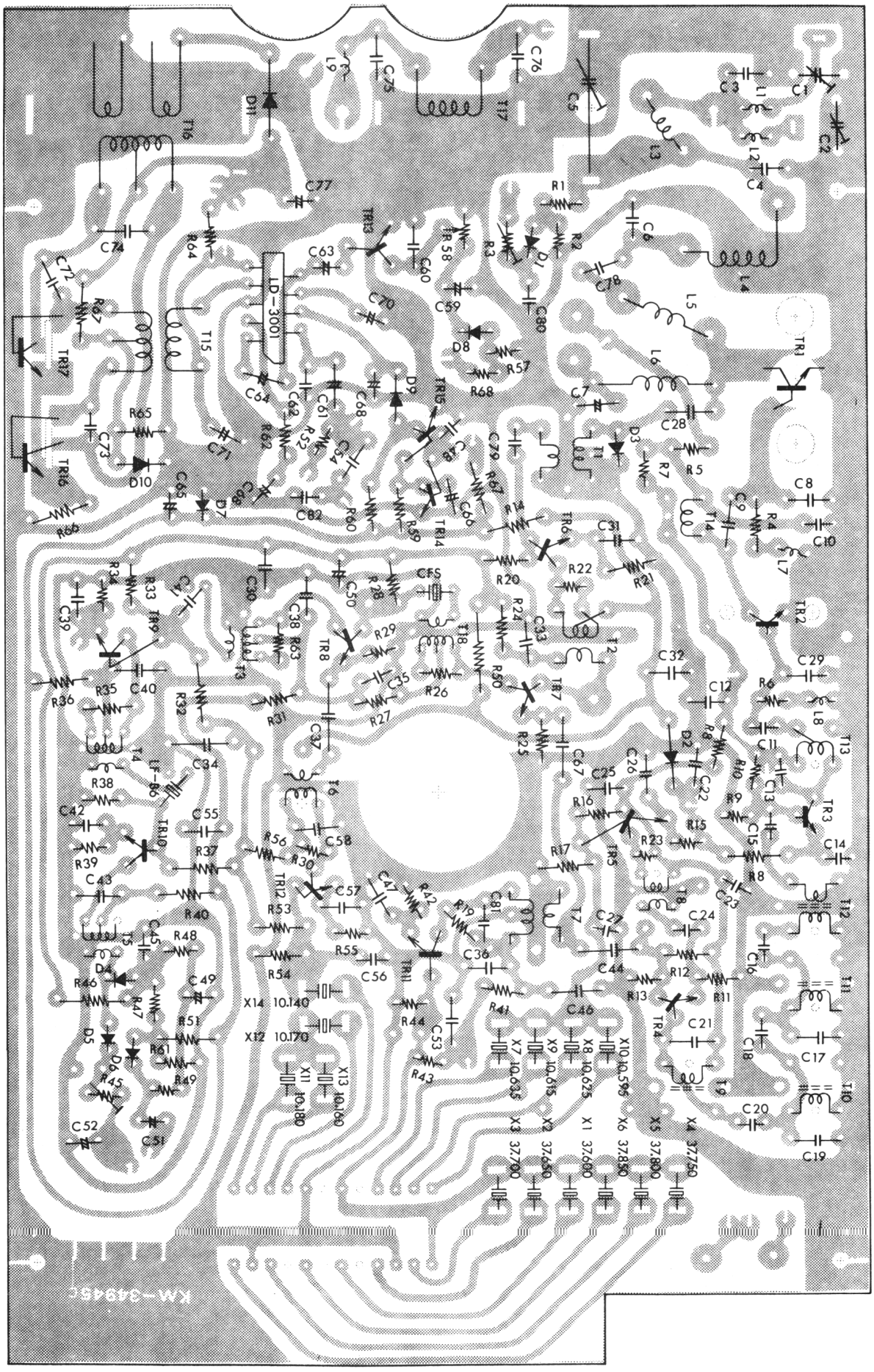
COMPONENT SYMBOL LAYOUT



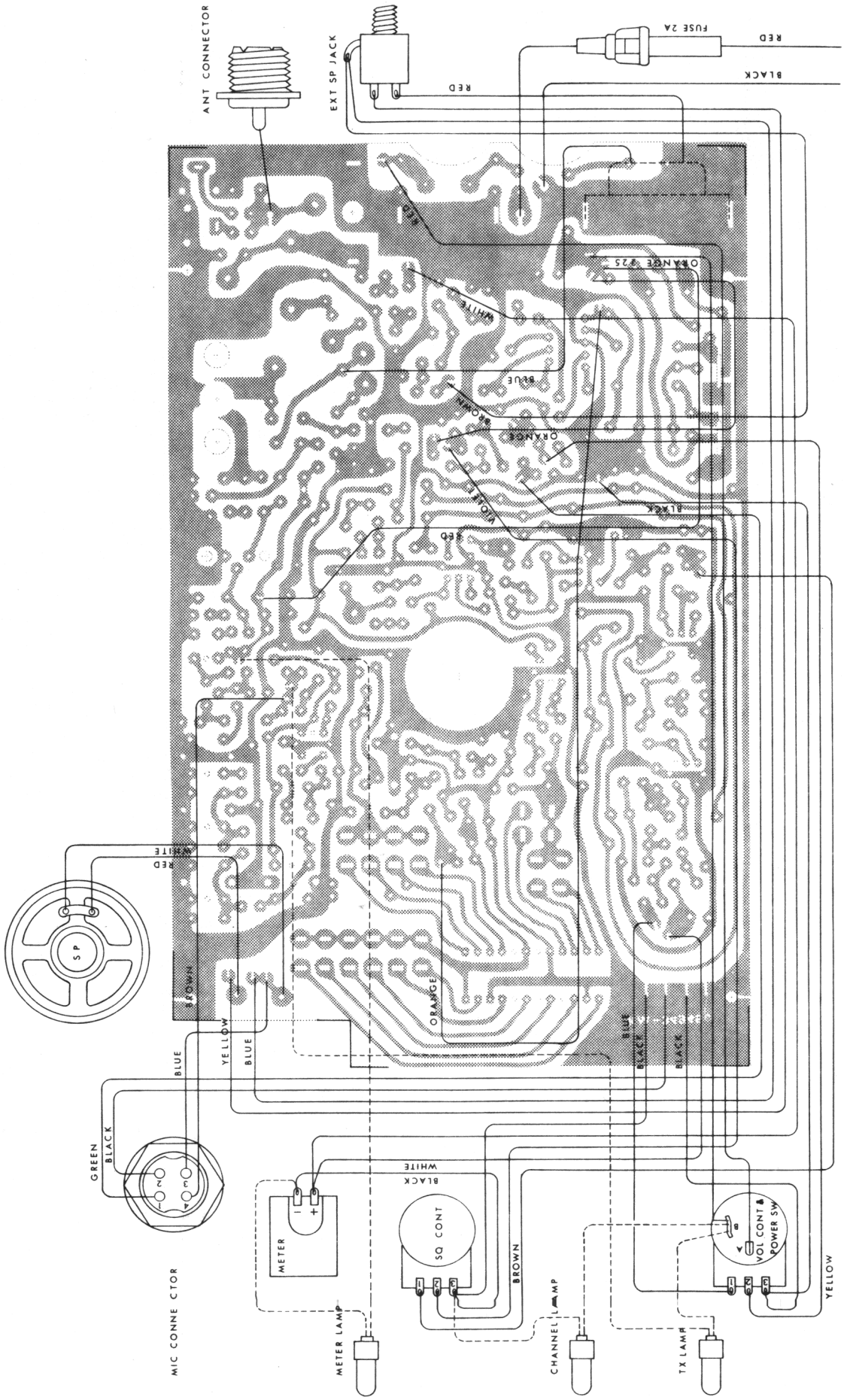
SCHEMATIC DIAGRAM



COMPONENT LAYOUT DIAGRAM



WIRING DIAGRAM



PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	LIST PRICE
	CABINET MATERIAL		
	Cabinet, Top	13-010187	$ 1.66
	Cabinet, Bottom	13-010188	1.66
	Panel, Front	13-010189	.96
	Plate, Name/Function (Silver)	13-020493	.96
	Plate, Function (Black)	13-020494	.96
	Lens, Channel Number	13-020495	.46
	Plate, FCC	13-023144	.46
	Plate, Monogram	13-020496	.46
	Knob, Volume/Channel/Squelch	13-110137	.74
	Drum, Channel Number	13-115073	.74
	MISCELLANEOUS		
	Microphone (w/Cord)	13-038048	12.62
	Speaker	13-060083	1.90
	Jack, Antenna	13-159123	1.44
	Jack, Ext. Speaker	13-153092	.46
	Meter, Signal/Power	13-200042	4.40
	Holder, Fuse	13-159107	.46
	Fuse, 2 Amp.	Purchase Locally	
	Socket, Crystal (14 used)	13-159122	.46
	Relief, DC Power Cord	13-157141	.46
PL1	Lamp, Transmit (16V-60MA)	13-201041	.74
PL2	Lamp, Meter (16V-60MA)	13-201042	.74
PL3	Lamp, Channel (16V-60MA)	13-201043	.74
	Connector, Microphone	13-159127	4.40
	HARDWARE		
	Mount-Bracket, Auto	13-158255	1.44
	Heatsink, Transistor (TR1 2SC1239)	13-089075	1.66
	Heatsink, Transistor (TR2 2SC775)	13-089076	.46
	Bolt, Auto Mount Bracket (2 used)	13-151311	.46
	Screw, Auto Mount (2 used) (6X15mm)	13-151312	.46
	Screw, Case Mount (3X8mm) (4 used)	13-151313	.46
	SWITCHES & CONTROLS		
VR1	Control, Volume w/on-off Sw. (10K ohm)	13-160088	1.44
VR2	Control, Squelch (10K ohm)	13-166040	.96
R3	Control, Sensitivity 47K ohm	13-164080	.74
R45	Control, Sensitivity 10K ohm	13-164081	.74
R58	Control, Sensitivity 10K ohm	13-164082	.74
	Switch, Channel Selector	13-180073	9.66

PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	LIST PRICE
	CRYSTALS		
	ALL CRYSTALS USED IN THIS MODEL ARE PLUG-IN TYPE. REFER TO CRYSTAL CHART FIG. NO. _____ FOR PROPER SELECTION OF MAL-FUNCTIONING CHANNEL.		
Q1	37.600 MHz	13-128149	$ 7.54
Q2	37.650 MHz	13-128150	7.54
Q3	37.700 MHz	13-128151	7.54
Q4	37.750 MHz	13-128152	7.54
Q5	37,800 MHz	13-128153	7.54
Q6	37.850 MHz	13-128154	7.54
Q7	10.635 MHz	13-128159	4.70
Q8	10.625 MHz	13-128160	4.70
Q9	10.615 MHz	13-128161	4.70
Q10	10.595 MHz	13-128162	4.70
Q11	10.180 MHz	13-128155	7.54
Q12	10.170 MHz	13-128156	4.70
Q13	10.160 MHz	13-128157	4.70
Q14	10.140 MHz	13-128158	4.70
	COILS AND TRANSFORMERS		
L1	Coil, Trap	13-176373	.46
L2	Coil, Trap	13-176374	.46
L3	Coil, Filter	13-176375	.46
L4	Coil, Filter	13-176376	.46
L5	Coil, Output	13-176377	.46
L6	Coil, Choke	13-178132	.46
L7,8	Coil, Micro Inductor	13-176378	.46
T1	Coil, Antenna	13-176379	.74
T2	Coil, 1st local	13-170186	.96
T3	Coil, IFT	13-090256	.74
T4	Coil, IFT	13-090257	.74
T5	Coil, IFT	13-090258	.74
T6,8	Coil, 2nd Local	13-170187	.96
T7	Coil, RF	13-176380	.74
T9,10,11	Coil, RF	13-176381	.74
T12	Coil, RF	13-176382	.96
T13	Coil, RF	13-176383	.74
T14	Coil, Drive	13-176384	.74
T15	Transformer, Input	13-096142	.74
T16	Transformer, Modulation	13-096143	1.66
T17	Transformer, Power Choke	13-178131	.74
T18	Coil, 1st IF	13-090259	.96
	FILTERS		
FIL1	Ceramic (CFS-10.7)	13-179029	1.90
FIL2	Ceramic (LF-B6)	13-179026	4.20

PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	LIST PRICE
	TRANSISTORS		
TR1	2SC1239	2SC1239	$ 6.18
TR2	2SC775	2SC775	3.28
TR3	2SC774	2SC774	2.72
TR4,5,8,9,10, 11,12	2SC394	2SC394	.74
TR6,7	2SC784	2SC784	.96
TR13,14,15	2SC372	2SC372	.74
TR16,17	2SD325	2SD325	1.90
	DIODES		
D1,4,5	1N60	1N60	.46
D2,3,6,8,9	1S1555	1S1555	.46
D7	WZ-090	WZ-090	1.44
D10,11	SR-1K	SR-1K	.46
	INTEGRATED CIRCUITS		
IC1	LD3001	LD3001	2.54
	RESISTORS		
	ALL RESISTORS NOT SHOWN ON THIS PARTS LIST ARE CARBON, ¼ WATT UNLESS OTHERWISE SPECIFIED. FOR SPECIFIC VALUES CONSULT SCHEMATIC DIAGRAM.		
R5	Metal Oxide, 22 ohm, 1 watt	77-604220	.88
R14	Carbon, 330 ohm, ½ Watt	77-102331	.30
R66	Wirewound, 0.3 ohm ¼ Watt	77-301308	.42
R69	Carbon, 150 ohm, ½ Watt	77-102151	.30
	CAPACITORS		
	TRIMMERS		
C1	50PF	13-123033	.96
C2	50PF	13-123033	.96
C5	150PF	13-123034	.96
	MICA TYPE		
C3,44	100PF	78-551101	.30
C4,27,56	50PF	78-551500	.30
C6	120PF	78-551121	.30
C8	330PF	78-551331	.30
C9	300PF	78-551301	.30
C17,19,21	180PF	78-551181	.30
C16,20	5	78-551509	.30
C18	3.3 PF	78-551339	.30
C13,28	39PF	78-551390	.30

PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	LIST PRICE
C26,29,47,57	220PF	78-551221	$ .30
C81	15PF	78-551150	.30
	CERAMIC DISC TYPE, 50 WV		
C22,25,34, 36,37,38, 39,40,42, 43,46,58	.04uF	78-151403	.26
C31,32,35, 41	.02uF	78-151203	.26
C78	.022uF	78-151223	.26
C79	.01uF	78-151103	.26
	MYLAR TYPE, 50 WV		
C10,14,24, 48	.02uF	78-651203	.38
C11,15,24, 45,62,67, 80,82	.01uF	78-651103	.38
C12,30,53, 60,75,76	.047uF	78-651473	.38
C54,75	.1uF	78-651104	.38
C72,73,83	.0047uF	78-651472	.38
	ELECTROLYTIC TYPE		
C49,51,61, 64	1uF,50V	77-333105	.96
C50	3.3uF,16V	77-337335	.96
C52,59	47uF,16V	77-337476	.96
C63,65,66, 68,69	10uF,16V	77-337106	.96
C70	100uF,16V	77-337107	.96
C71	220uF,16V	77-337227	.96
C77	470uF,16V	77-337477	.96

CRYSTAL CHART

CRYSTAL COMBINATION CHART

TRANSMIT	MASTER CRYSTAL 37.600	37.650	37.700	37.750	37.800	37.850	RECEIVE
10.635	1	5	9	13	17	21	10.180
10.625	2	6	10	14	18	22	10.170
10.615	3	7	11	15	19	22A	10.160
10.595	4	8	12	16	20	23	10.140

FOLLOW STEPS LISTED BELOW TO DETERMINE CORRECT SELECTION OF INOPERATIVE CRYSTAL

STEPS TO FOLLOW IN USING CRYSTAL CHART

1. Select channel number (1-23) which does not function properly.
2. Is the transmit or receive mode or both not functioning properly on that channel.
3. If transmit is (dead) not functioning properly, move to the extreme left-hand side of chart under (Transmit). Crystal frequency found is crystal to replace. Move to extreme right hand side of channel number if receive mode is not functioning properly.
4. If for example channels 1,2,3, and 4 do not function on either the transmit or receive mode. Move to top of chart under (master Crystal). Crystal frequency found is crystal to replace. In this instance crystal frequency 37.600 MHz.
5. To order the crystal desired refer to the parts list section of this manual under the crystal heading.

HOW AND WHERE TO ORDER REPLACEMENT PARTS

NOTE: To eliminate error and speed delivery of replacement parts, always include the following information on your order:

1. Complete identification of merchandise for which the part is wanted.

   A. Name Item
   B. Model Number
   C. Serial Number

2. Best possible identification of the part itself.

   A. Part Number
   B. Part Name
   C. Quantity
   D. If necessary, return old part as sample.

3. Customer should use address listed below when ordering replacement parts.

   MIDLAND ELECTRONICS COMPANY
   Parts Department
   110 West 12th Street
   North Kansas City, Missouri 64116