IMPORTANT INSTRUCTIONS

for Installation, Operation and Maintenance of

FEDERAL

INTERCEPTOR

Electronic Siren

MODEL PA-20

SERIES EI-E

SIGNAL DIVISION

Federal Sign & Signal Corporation

136th and Western Avenue — BLUE ISLAND, ILLINOIS

Chicago Phone INterocean 8-4500 — Blue Island FUlton 9-3400

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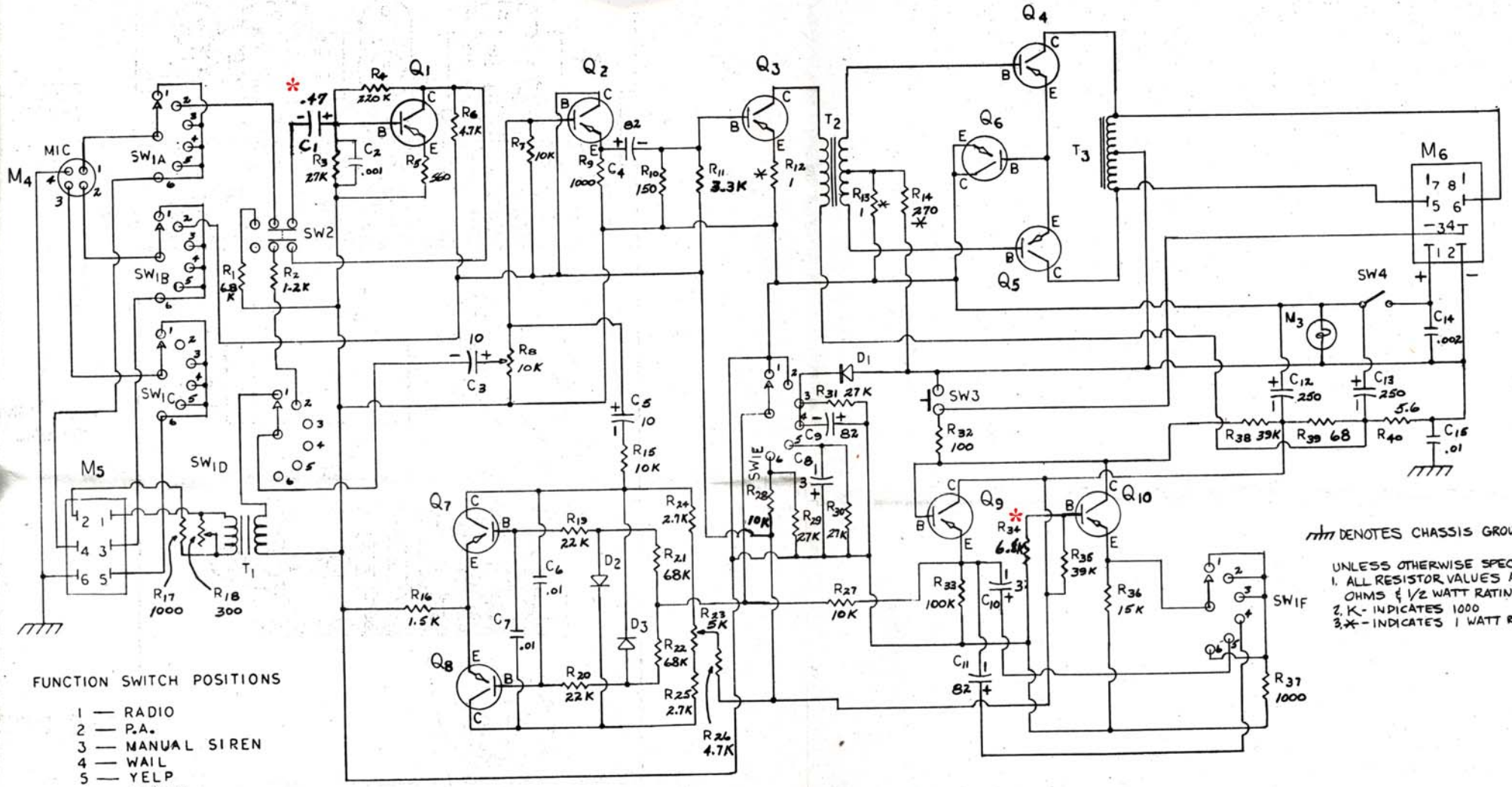

FUNCTION SWITCH POSITIONS

1 — RADIO
2 — P.A.
3 — MANUAL SIREN
4 — WAIL
5 — YELP
6 — ALERT

⏚ DENOTES CHASSIS GROUND

UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTOR VALUES ARE IN OHMS & 1/2 WATT RATING.
2. K- INDICATES 1000
3. ✳- INDICATES 1 WATT RATING

WIRING DIAGRAM

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11E1E466

✳Updated from parts list

PA - 20 SERIES E-I-E

2N2926 N - 18V .1
250 HFE
2N1560 P - 100V

PARTS LIST - MODEL PA-20

REF. NO.	PART NO.	DESCRIPTION
		TRANSISTORS
Q1	125-111	Preamplifier, GT2699
Q2	125-111	Amplifier, GT2699
Q3	125-402	Driver, TS1199
Q4	125-403	Output, 2N1560
Q5	125-403	Output, 2N1560
Q6	125-406	Blocking
Q7	125-113	Siren Oscillator, 2N3638/2N3702
Q8	125-113	Siren Oscillator, 2N3638/2N3702
Q9	125-112	Siren Oscillator Control, GT2773
Q10	125-112	Siren Oscillator Control, GT2773
		CAPACITORS
C1	108-102	10 mfd, 15V, Electrolytic
C2	107-207	.001 mfd, Ceramic Disc
C3	108-102	10 mfd, 15 V, Electrolytic
C4	108-106	82 mfd, 10V, Electrolytic
C5	108-102	10 mfd, 15V, Electrolytic
C6	107-401	.01 mfd, Dipped Mylar Tubular 10%
C7	107-401	.01 mfd, Dipped Mylar Tubular 10%
C8	108-101	3 mfd, 10V, Electrolytic
C9	108-106	82 mfd, 10V, Electrolytic
C10	108-101	3 mfd, 10V, Electrolytic
C11	108-106	82 mfd, 10V, Electrolytic
C12	108-107	250 mfd, 15V, Electrolytic
C13	108-107	250 mfd, 15V, Electrolytic
C14	107-209	.002 mfd, Ceramic Disc
C15	107-212	.01 mfd, Ceramic Disc
		CONTROLS AND RESISTORS
R1	100-322	6800 ohms, 10%, 1/2 watt
R2	100-315	1200 ohms, 10%, 1/2 watt
R3	100-326	27K, 10%, 1/2 watt
R4	100-333	220K, 10%, 1/2 watt
R5	100-312	560 ohms, 10%, 1/2 watt
R6	100-320	4700 ohms, 10%, 1/2 watt
R7	100-323	10K, 10%, 1/2 watt
R8	106-102	10K, Volume
R9	100-314	1000 ohms, 10%, 1/2 watt

Mot 48-124331

13E1 E466

REF. NO.	PART NO.	DESCRIPTION
R10	100-307	150 ohms, 10%, 1/2 Watt
R11	100-340	3300 ohms, 10%, 1/2 Watt
R12	100-501	1 ohms, 10%, 1 Watt Wirewound
R13	100-501	1 ohms, 10%, 1 Watt Wirewound
R14	100-502	270 ohms, 1 Watt
R15	100-323	10K, 10%, 1/2 Watt
R16	100-316	1500 ohms, 10%, 1/2 Watt
R17	100-314	1000 ohms, 10%, 1/2 Watt
R18	105-209	300 ohms, Control
R19	100-325	22K, 10%, 1/2 Watt
R20	100-325	22K, 10%, 1/2 Watt
R21	100-330	68K, 10%, 1/2 Watt
R22	100-330	68K, 10%, 1/2 Watt
R23	105-204	5000 ohms, Control
R24	100-318	2700 ohms, 10%, 1/2 Watt
R25	100-318	2700 ohms, 10%, 1/2 Watt
R26	100-320	4700 ohms, 10%, 1/2 Watt
R27	100-323	10K, 10%, 1/2 Watt
R28	100-323	10K, 10%, 1/2 Watt
R29	100-326	27K, 10%, 1/2 Watt
R30	100-326	27K, 10%, 1/2 Watt
R31	100-326	27K, 10%, 1/2 Watt
R32	100-306	100 ohms, 1/2 Watt
R33	100-331	100K, 10%, 1/2 Watt
R34	100-323	10K, 10%, 1/2 Watt
R35	100-328	39K, 10%, 1/2 Watt
R36	100-324	15K, 10%, 1/2 Watt
R37	100-314	1000 ohms, 10%, 1/2 Watt
R38	100-328	39K, 10%, 1/2 Watt
R39	100-305	68 ohms, 1/2 Watt
R40	100-301	5.6 ohms, 10%, 1/2 Watt

TRANSFORMERS

T1	120-103	Mic. & Radio Input
T2	120-101	Driver
T3	120-102	Output

SWITCHES

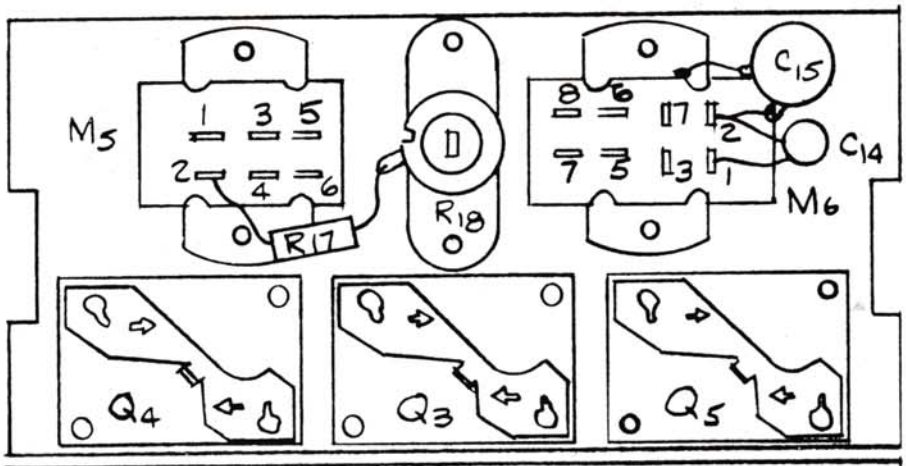
SW1A	122-101	Function
SW1B	122-101	Function
SW1C	122-101	Function
SW1D	122-101	Function
SW1E	122-101	Function

REF. NO.	PART NO.	DESCRIPTION
SW1F	122-101	Function
SW2	122-103	Mike Transfer
SW3	122-102	Manual Siren
SW4		On-Off (On Volume Control)

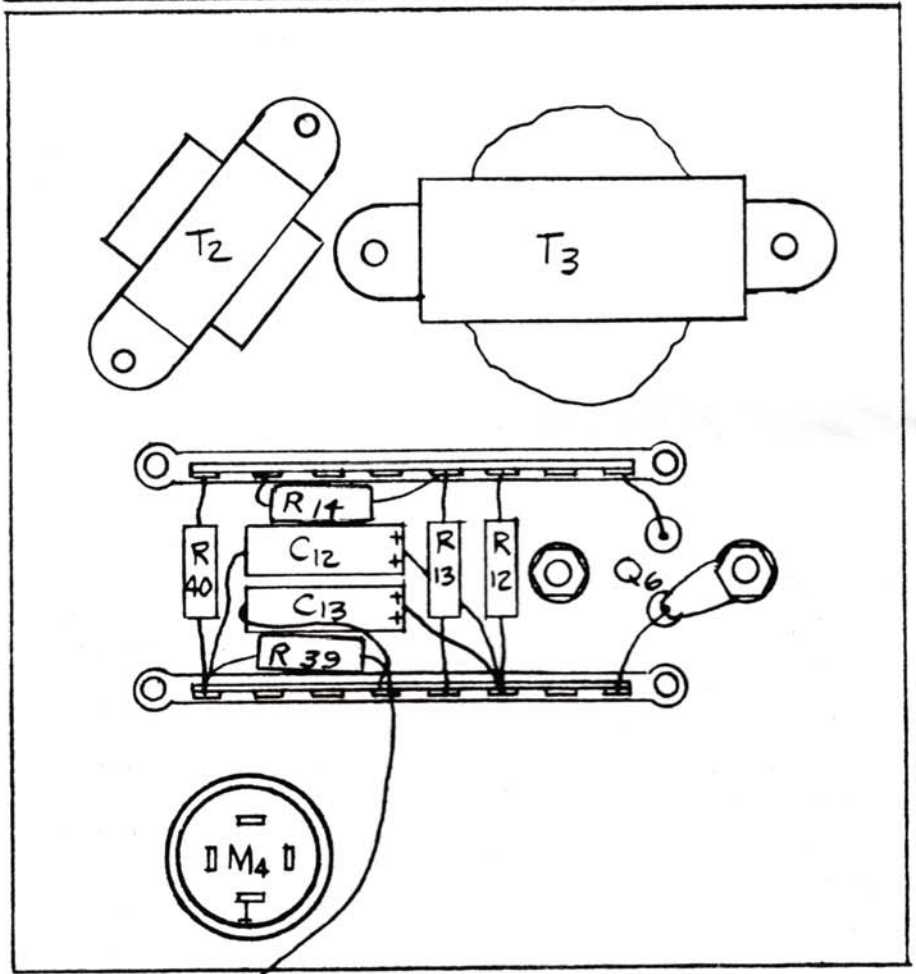
MISCELLANEOUS

D1	115-102	Diode IN198
D2	115-101	Diode T151
D3	115-101	Diode T151
M3	149-101	Pilot Light #53-12V
	149-102	Pilot Light #51-6V
M4	139-105	Mike Plug
M5	139-103	Interconnecting Plug
M6	139-104	Power Connector
	148-102	Fuse, 15 Amp.
	143-102	Fuse Holder
	146-206	Power Cable Assembly
	141-102	Knob, Volume Control
	141-103	Knob, Function Switch
	130-109	Printed Circuit Board
	229-102	Terminal Strip

COMPONENT LAYOUT
MODEL PA-20

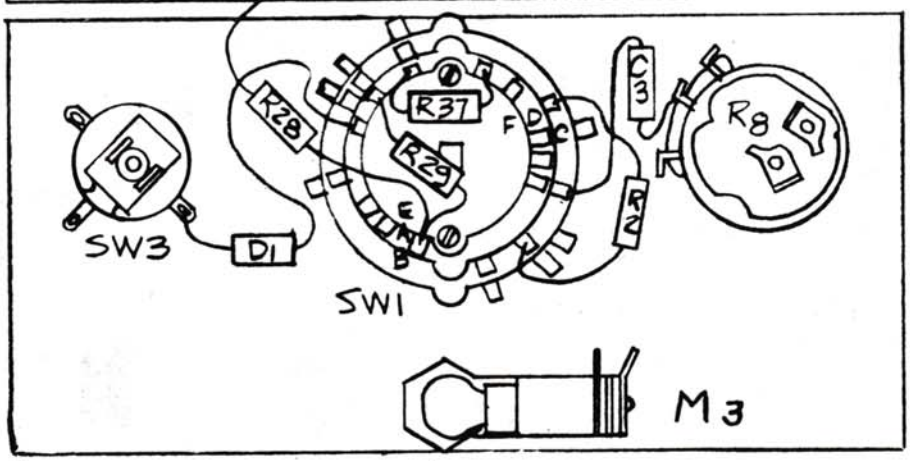


REAR PANEL



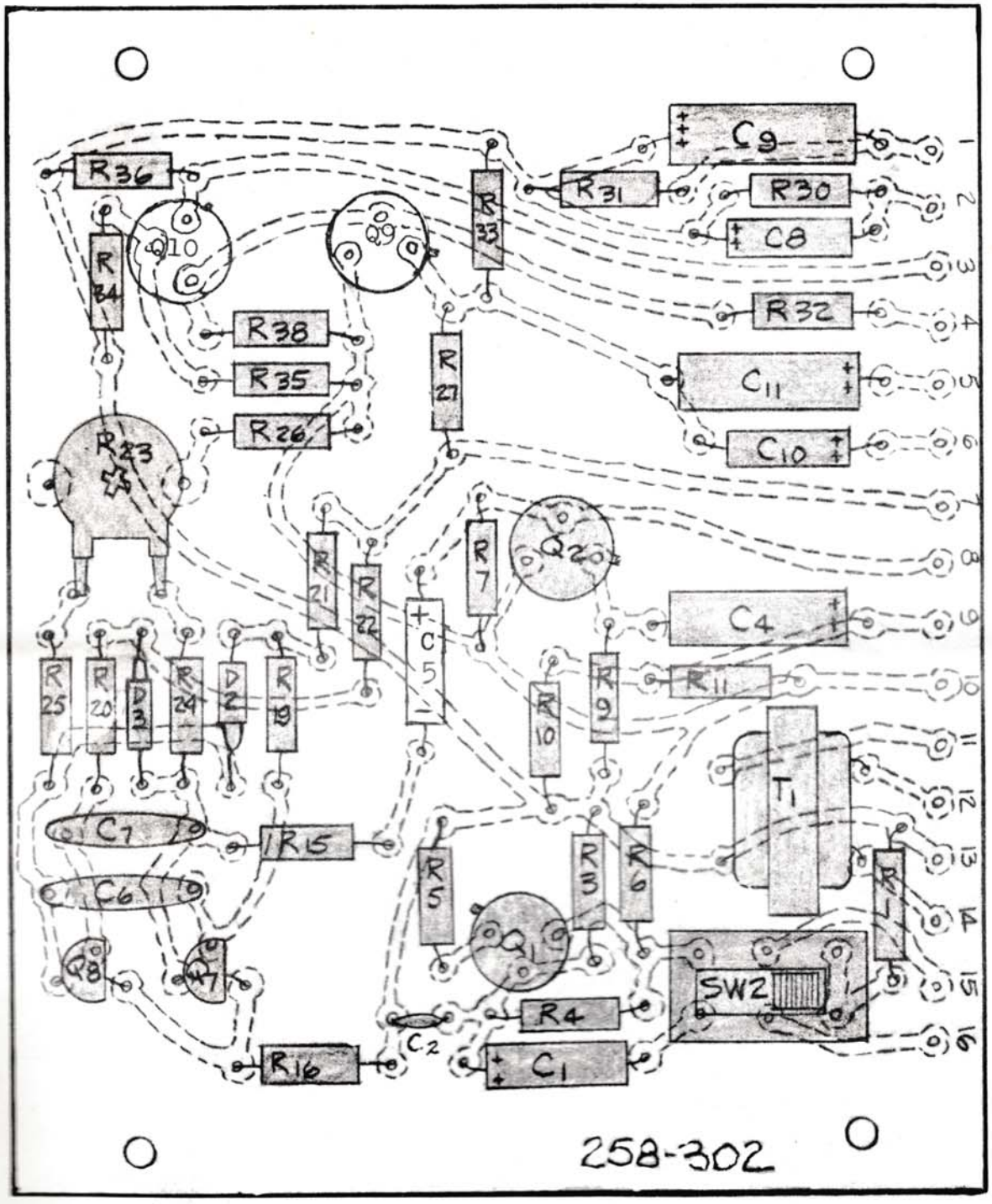
BOTTOM PANEL

258-202



FRONT PANEL

MODEL PA-20
COMPONENT BOARD
LAYOUT



LT. BRN
VIO
WHT/RED
BRN
WHT/BLU
LT. BLU
DK. BLU
PINK
GRY
BLK.
ORN
WHT
RED
WHT
GRN
YEL.

VOLTAGE READINGS

14.0 Volts Input
Made with V.T.V.M.
From Plug M6-Pin 1

Component	Point	D.C. Voltages	A.C.R.M.S. Voltages Siren in "ALERT"
Q1	E	0.5	
Q1	B	0.6	
Q1	C	8.0	
Q2	E	5.3	0.32
Q2	B	5.5	0.35
Q2	C	12.2	0
Q3	E	0	0.2
Q3	B	0.06	0.32
Q3	C	11.0	0
Q4	E	0.2	0
Q4	B	0.4	1.6
Q4	C	14.0	9.4
Q5	E	0	0
Q5	B	0.06	3.2
Q5	C	14.0	9.4
Q7	E	1.5	1.8
Q7	B	2.15	1.45
Q7	C	1.5	3.8
Q8	E	1.5	1.8
Q8	B	1.15	1.18
Q8	C	6.0	3.6
Q9	E	0.42	
Q9	B	0.48	
Q9	C	12.0	
Q10	E	0.46	
Q10	B	0.62	
Q10	C	0.48	

TROUBLE SHOOTING CHART

TROUBLE	LIKELY CAUSE
Fuse blows.	One or more output transistors shorted, emitter to collector, Q4 and/or Q5.
No siren in any position. Radio and P.A. work.	Open capacitor C5. Open resistor R7, 8, 19, 21, 25, 26, 16, 27.
No siren. Chirps in YELP position.	Open capacitor C6.
ALERT siren works. No other siren positions work.	Open resistor R27.
WAIL tone falls only. Manual tone only when siren button is held.	Open capacitor C9.
WAIL tone rises to steady tone and holds. All other tones OK.	Open capacitor C11.
YELP tone falls only. All other tones OK.	Open capacitor C8.
Steady tone in YELP position. All other tones OK.	Open capacitor C10.
Steady tone in all siren positions except MANUAL.	Open resistor R34 or R36.
Crackles and whistles in YELP.	Open capacitor C7.
No radio or P.A. Siren tones OK.	Open capacitor C3.
Little or no volume in all positions.	Open capacitor C4. Defective loudspeaker.
Little or no output when magnetic microphone is used.	Mike transfer switch in "C" position. Open capacitor C1. Defective microphone.

TROUBLE	LIKELY CAUSE
No output from carbon or transistorized microphone.	Mike transfer switch in "M" position.
Buzz in loudspeaker when engine or radio is operated.	Open capacitor C13.
Little or no volume in RADIO position. P.A. - OK.	Improper adjustment of R18.
Low output in all positions.	Defective transistor Q3, Q4, or Q5.
In MANUAL position, siren emits steady or intermittent tone even though auxiliary switch (horn ring or foot) is not operated.	Defective transistor Q7 or Q8. Electrical leakage at auxiliary switch due to dirt or moisture. (Switch resistance should not be less than one megohm)
Excess noise in "PA" position only.	Short in microphone. There should be no connection between pin #2 and shell of microphone plug.
Frequency of siren affected by flashing lights.	Voltage drop in power lead. Connect amplifier directly to battery terminal.