

Price \$4.00



SIGNAL DIVISION
Federal Signal Corporation

MODEL PA20A

INTERCEPTOR[®]

ELECTRONIC SIREN

Series B



INSTALLATION AND SERVICE INSTRUCTIONS

LIMITED WARRANTY

The Signal Division, Federal Signal Corporation (Federal), warrants each new product to be free from defects in material and workmanship, under normal use and service, for a period of two years on parts replacement and one year on labor from the date of delivery to the first user-purchaser.

During this warranty period, the obligation of Federal is limited to repairing or replacing, as Federal may elect, any part or parts of such product which after examination by Federal discloses to be defective in material and/or workmanship.

Federal will provide warranty for any unit which is delivered, transported prepaid, to the Federal factory or designated authorized warranty service center for examination and such examination reveals a defect in material and/or workmanship.

This warranty does not cover travel expenses, the cost of specialized equipment for gaining access to the product, or labor charges for removal and re-installation of the product. Lamps, flash tubes, or batteries are not covered under warranty.

This warranty does not extend to any unit which has been subjected to abuse, misuse, improper installation or which has been inadequately maintained, nor to units which have problems relating to service or modification at any facility other than the Federal factory or authorized warranty service centers.

THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL FEDERAL BE LIABLE FOR ANY LOSS OF PROFITS OR ANY INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY SUCH DEFECT IN MATERIAL OR WORKMANSHIP.



FEDERAL SIGNAL CORPORATION

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SECTION I

GENERAL DESCRIPTION

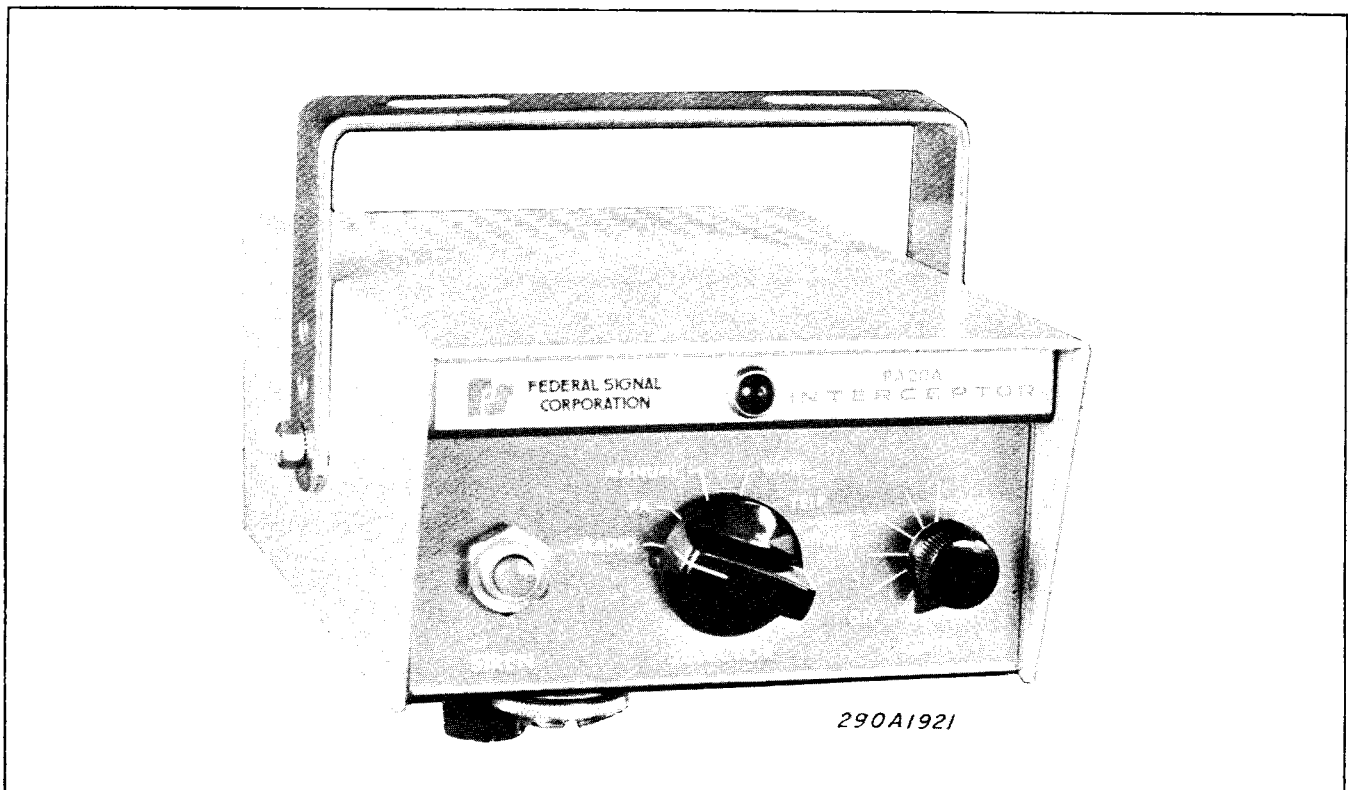


Figure 1. Model PA20A Electronic Siren.

The FEDERAL Model PA20A (Interceptor) Electronic Siren is a precision built, compact, solid-state unit of advanced design. The unit provides three distinct siren sounds plus provisions for public address, manual siren operation and the amplification of radio messages. The Interceptor ordinarily comes equipped for use with a 12 VDC power source (negative grounded system). Any 75 watt commercial speaker (11 ohm impedance) may be used with the PA20A. Your FEDERAL dealer has a full line of speakers that can be used with the PA20A. By use of an auxiliary switch, such as a horn ring or foot switch, the unit can be operated manually. The unit can still be operated manually by depressing the SIREN button, after the auxiliary switch is installed. The microphone plug-in convenience of the PA20A allows the user to utilize the vehicle's two-way radio

microphone, or an independent microphone. Other features of the PA20A include:

- Output isolation transformer to reduce the hazard of shorting the output transistors caused by instantaneous short-circuits across the load, i.e. rubbing of speaker coil.
- Trunk/hood activated burglar alarm.
- Blocking diode to prevent damage to the unit if the power leads are reversed.
- Silicon transistors for maximum reliability.
- Constructed to facilitate servicing.

SECTION II

SPECIFICATIONS

Input Voltage	10 VDC to 14.6 VDC
Standby Current	500 mA maximum (MANUAL position)
Operating Current	6 amperes (WAIL position, 1 speaker) 10 amperes (WAIL position, 2 speakers)
Operating Temperature	-30°C to +65°C
Frequency Range	500 Hz to 1400 Hz
Cycle Rate	Wail - 10 cycles/minute Yelp - 180 cycles/minute Hi-Lo - 45 cycles/minute
Voltage Output (13.6 VDC input)	48 Vpp (11 ohm resistive load) 46 Vpp (5.5 ohm resistive load)
Audio Distortion	Less than 10% from 300 Hz to 3000 Hz at output power levels of 1/10 watt to 25 watts
Auxiliary switch leakage resistance	10K ohms, minimum
Size	2-3/4 (H) x 5-1/4 (W) x 7-1/4 (D) inches
Net Weight	4 pounds, 2 ounces
Shipping Weight	6 pounds

NOTE: The following parameters were obtained with the radio input potentiometer (R30) and GAIN control set at maximum. The voltages shown are needed to obtain the maximum sine wave output of 17 volts RMS.

Radio Input	Impedance, 1800 ohms Voltage, 0.55V RMS
Carbon Microphone Input	Impedance, 3500 ohms Voltage, 0.15V RMS
Magnetic Microphone Input	Impedance, 20K ohms Voltage, 0.03V RMS

SECTION III

INSTALLATION

3-1. UNPACKING.

After unpacking the Model PA20A, examine it for damage that may have occurred in transit. If the equipment has been damaged, file a claim immediately with the carrier stating the extent of the damage. Carefully check all envelopes, shipping labels and tags before removing or destroying them. The radio interconnecting cable, if ordered, is packed in a separate carton. The packing carton in which the electronic siren is packed contains:

- A. Model PA20A Electronic Siren.
- B. Mounting bracket.
- C. Envelope containing mounting hardware.
- D. Power Cable.

3-2. MOUNTING BRACKET.

The electronic siren comes equipped with a swinging bracket which enables it to be mounted in a variety of positions (see figure 2). Positioning the bracket above the unit allows mounting to the underside of the dash. Positioning the bracket below the unit will permit mounting above the dash or on any horizontal surface. The unit should be mounted in a position that is both comfortable and convenient to the operator. After determining the mounting position, proceed as follows:

CAUTION: The unit must be installed in an adequately ventilated area. Never install in the path of air flow from heater ducts.

- A. Use the mounting bracket as a template and mark two positioning holes.
- B. Drill two $\frac{1}{4}$ -inch mounting holes.
- C. Mount the bracket with the $\frac{1}{4}$ -20 x $\frac{3}{4}$ hexagon head machine screws, $\frac{1}{4}$ -20 hexagon nuts and $\frac{1}{4}$ -inch split lockwashers as shown in figure 2.

3-3. ELECTRONIC SIREN TO MOUNTING BRACKET.

The height of the unit above or below a surface may be adjusted by selecting a set

of mounting holes in the bracket. Mount the unit to the bracket with the two $\frac{1}{4}$ -20 x $\frac{5}{16}$ hexagon head machine screws as shown in figure 2. The unit may be tilted to any convenient position.

3-4. POWER CABLE INSTALLATION.

The power cable included in the amplifier carton is equipped with an eight prong plug that mates with the connector (P3) on the rear of the electronic siren (see figure 3). The various wires on the connector must be connected as described below.

A. Speaker.

The unit is designed to operate with one 11-ohm impedance speaker, or two 11-ohm impedance speakers connected in parallel.

Speakers are not included as part of the electronic siren. FEDERAL speakers are weatherproof and may be installed in any convenient location: on the roof, fender, behind the grille, etc. Any special mounting instructions applicable

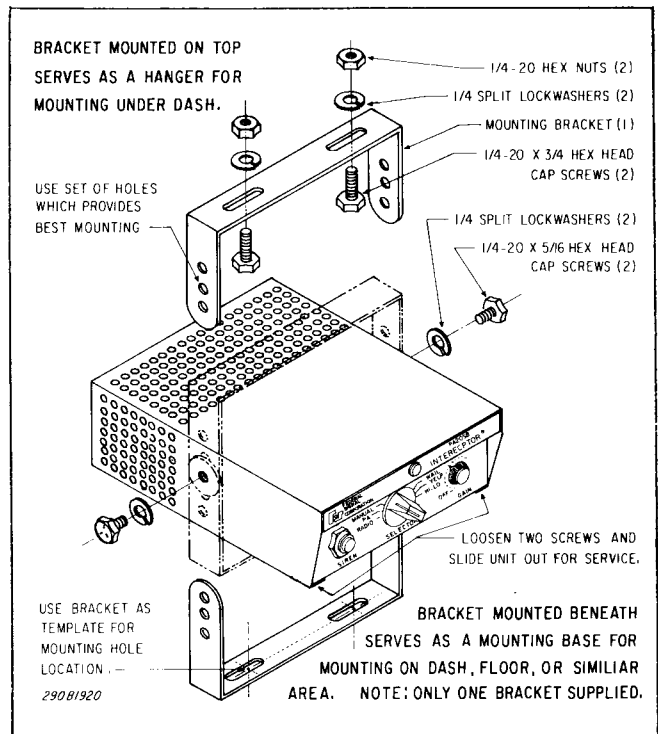


Figure 2. Mounting Bracket Installation.

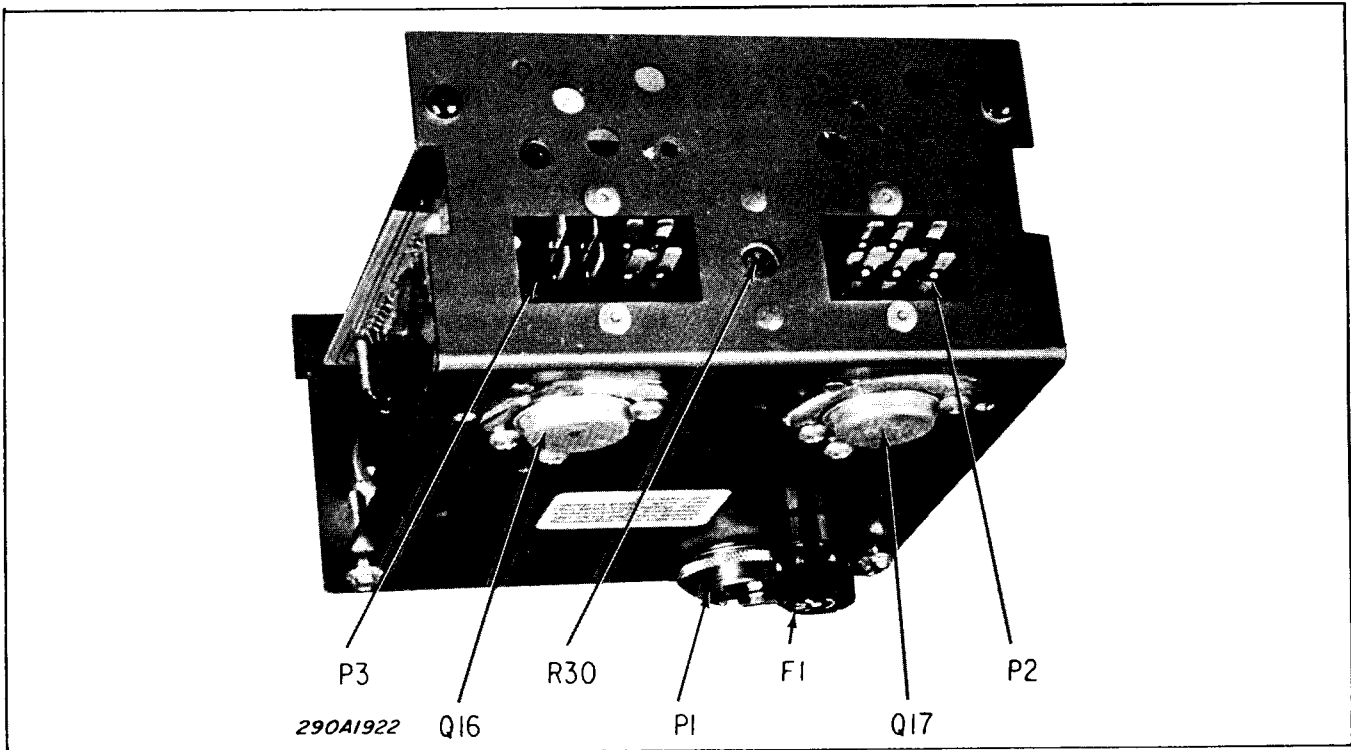


Figure 3. Rear View of Electronic Siren.

to the model of speaker you have selected will be found in the speaker carton. The 12-inch two conductor zip cord (P3, pins 5 and 6) should be connected to the speaker leads. Either wire may be connected to either speaker lead, since polarity is not a factor when using a single speaker. It is recommended that the wire splices be soldered and insulated with tape. If soldering equipment is not available, use the two nuts furnished with the speaker.

When two speakers are used, it is necessary to connect the speakers in parallel and in-phase for optimum performance. This can be accomplished by connecting the two speaker leads marked "1" to the same power cable lead, and the two speaker leads marked "2" to the other power cable lead (see figure 4).

B. Connection to Power Source.

The electronic siren will operate in vehicles having only a negative grounded system. Take care to insure battery charging voltage does not exceed 14.6 VDC at any time. Operating power can be obtained by making connections directly at the battery terminal, or to the hot side of the ignition switch. On negative ground systems, the negative terminal of the battery is connected to the vehicle frame.

Connect the red lead (P3, pin 1) to the positive (hot) side of the battery terminal or ignition switch. Connect the black lead (P3, pin 2) to the vehicle frame (see figure 4). When making connections directly to the battery terminal, proceed as follows:

1. Drill a $\frac{1}{2}$ -inch hole through the firewall on the battery side of the vehicle.
2. Place a grommet in the newly drilled hole.
3. Feed the black and red leads through the grommet and connect as previously described.

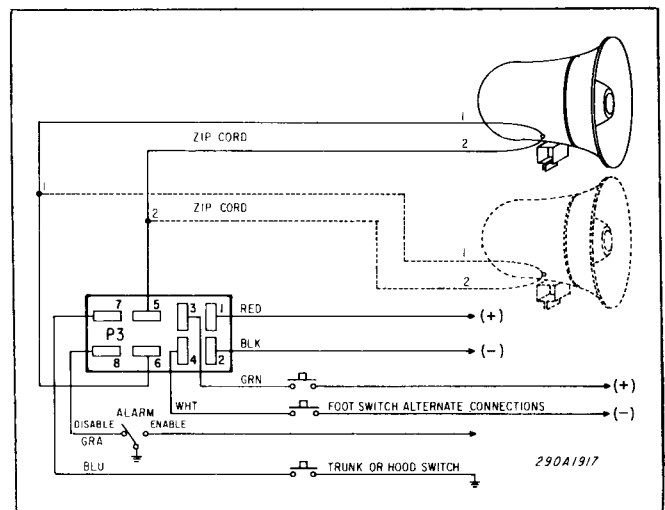


Figure 4. Power Cable Connections - Foot Switch Control.

NOTE

To protect the wire when connected to the battery terminal, use an in-line fuseholder and 20-ampere fuse (not supplied). The fuseholder should be installed as close to the battery as practical.

C. Foot Switch.

A foot switch is provided to allow foot control of the siren in addition to the control provided by the front panel SIREN button. Find a convenient mounting position on the vehicle floorboard and proceed as follows:

1. Use the foot switch as a template and mark two positioning holes on the floorboard.
2. Drill two 0.128 diameter (#30) holes into the floorboard at the positioning marks.
3. Connect one terminal of the foot switch to the green lead (P3, pin 3), and the other terminal to the positive (hot) side of the battery terminal (negative grounded systems). As an alternate method, connect one terminal of the foot switch to the white lead (P3, pin 4) and the other terminal to the vehicle frame or other good ground point (see figure 4).

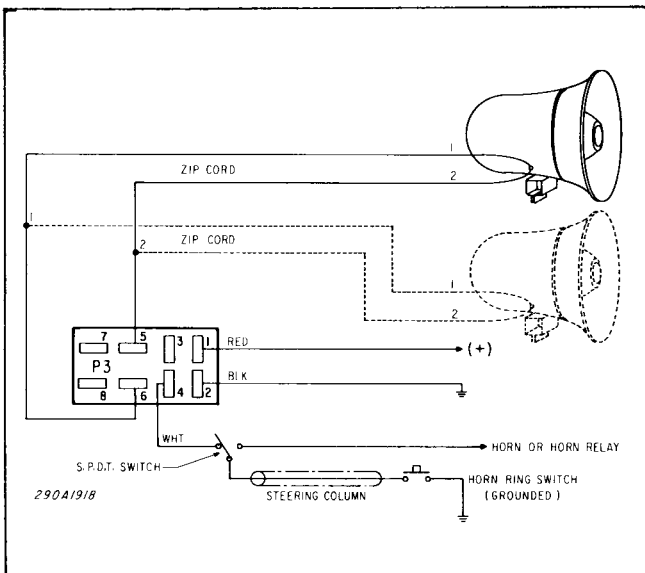


Figure 5. Power Cable Connections - Horn Ring Control (grounded horn ring).

4. Mount the foot switch to the floorboard with the two #8 x 3/4 round head screws (supplied).

D. Horn Switch.

Included with the electronic siren is a SPDT switch (toggle switch) which when properly installed, allows the user to activate the siren by depressing the horn button. When installing the horn switch in a vehicle with a negative ground system with a grounded horn ring, connect as shown in figure 5. See figure 6 when installing the horn switch in a negative ground vehicle with an ungrounded horn ring. Locate a convenient mounting position for the toggle switch (supplied) and proceed as follows:

1. Drill a 1/2-inch diameter hole into the dash at the selected mounting location. Take care not to damage wires located behind the dash when drilling.
2. Connect a length of wire from one terminal of the toggle switch to the horn or horn relay. A screw terminal is usually provided on the horn relay. If a screw terminal is not provided, connect the wire to the lead that connects to the horn relay.
3. Connect the other terminal of the toggle switch to the white lead (P3, pin 4), if the vehicle has a grounded horn ring (see figure 5). When the vehicle has a system with an ungrounded horn ring,

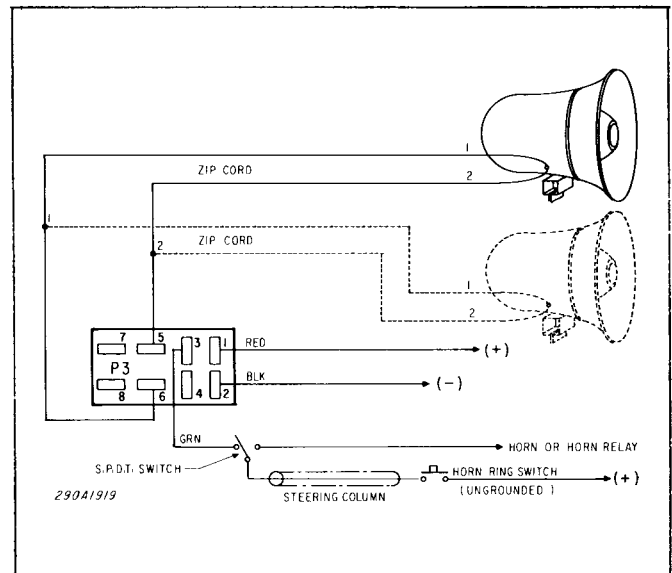


Figure 6. Power Cable Connections - Horn Ring Control (ungrounded horn ring).

connect this terminal of the toggle switch to the green lead (P3, pin3) (see figure 6).

4. Connect the center terminal of the toggle switch to the horn ring switch as shown in figure 5 or 6.

5. Place the hexagon nut on the threaded portion of the toggle switch. Insert the threaded portion of the toggle switch through the hole in the dash and secure with the knurled nut.

E. Burglar Alarm Connections.

The electronic siren's burglar alarm feature can be activated with the siren either "on" or "off" and the SELECTOR switch set to any position. The blue lead (P3-7) controls the burglar alarm trigger and the gray lead (P3-8) is the set/reset line.

A SPDT toggle switch is included in the siren's accessory envelope. When properly installed, this switch allows the operator to enable or disable the burglar alarm. Locate a convenient, but inconspicuous mounting position for the supplied toggle switch and proceed as follows (see figure 4):

1. Drill a 1/2-inch diameter hole at the selected mounting location. Take care not to damage wires, linkages, lines, etc. when drilling.

2. Connect the gray power cable lead (P3-8) to one contact of the SPDT switch. Connect the wiper contact of the switch to vehicle ground. The alarm is disabled when the gray lead is grounded. Label the "alarm enable" and "alarm disable" positions of the switch.

3. Connect the blue power cable lead (P3-7) to the interrupted ground side of the trunk or hood switch. The alarm has no built-in delay time provisions, so it will sound immediately when the

switch is grounded. The alarm will sound for one minute then reset. The alarm can be deactivated during accidental sounding by setting the enable/disable switch to disable.

4. Place the hexagon nut on the threaded portion of the toggle switch. Insert the threaded portion of the switch through the hole drilled in step 1. Secure with knurled nut.

3-5. RADIO INTERCONNECTING CABLE.

The radio interconnecting cable has a six prong connector that plugs into P2 at the rear of the electronic siren. After installation of the cable, the electronic siren has the provision to broadcast two-way radio messages over the loudspeaker. Also, the two-way radio microphone can be used to take advantage of the electronic siren's public address feature. Refer to the instruction sheet furnished with the radio interconnecting cable for proper connection.

3-6. MICROPHONE CONNECTION.

The electronic siren's public address feature can be utilized after the connection of a microphone. The two-way radio microphone can be used after the connections described in paragraph 3-5 have been made. The electronic siren has a receptacle at the bottom of the unit which is used to interconnect a separate microphone.

The unit will operate with a magnetic, controlled magnetic (noise cancelling), carbon or transistorized magnetic microphone. A slide switch (SW1), located on the PC Board (figure 9), must be set according to the type of microphone used. When a controlled magnetic microphone is used, set the switch to the position marked "M". If a carbon or transistorized microphone is used, set the switch to the position marked "C".

SECTION IV

CONTROLS

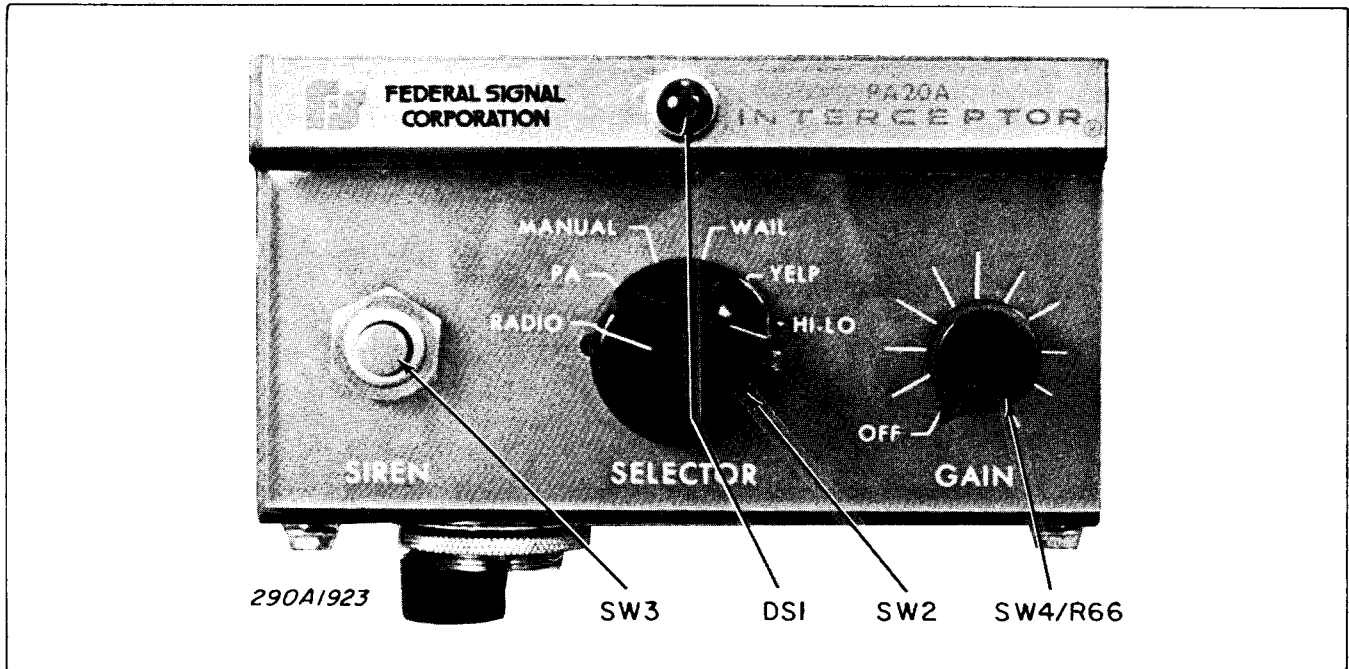


Figure 7. Front View.

All controls utilized during normal operation of the electronic siren are located on the front panel (see figure 7).

4-1. GAIN CONTROL.

The GAIN control is used to turn the electronic siren on and off. Also, it is used to control the volume when the electronic siren is used for public address or radio amplification. Clockwise rotation of this knob turns the unit on. Further rotation increases voice volume in the public address or radio amplification mode. The GAIN control does not control the volume of the siren.

Radial lines around the knob can be used for setting the volume to a predetermined level. The maximum clockwise setting of the control will be determined, in most cases, by the point at which feedback or "squeal" occurs. This will depend upon the microphone gain, open windows, speaker placement, proximity of reflecting surfaces (buildings or other vehicles), etc. Adjust the GAIN control to a position just below the point at which feedback occurs.

4-2. SIREN BUTTON.

The SIREN button, located on the lefthand side of the front panel, is used to activate the siren when the SELECTOR switch is in the MANUAL position.

4-3. SELECTOR SWITCH.

The SELECTOR switch is a six-position rotary switch used to select the mode of operation. If a common microphone is used for the electronic siren and two-way radio, the switch will disconnect the microphone from the radio's transmitter section only when the switch is set to P.A. The following are positions on the SELECTOR switch:

A. RADIO.

In this position, incoming radio messages are amplified by the electronic siren. Volume can be controlled by the GAIN control. The radio volume may be adjusted to match the P.A. volume by means of the resistor control located on the rear panel of the electronic siren (see figure 3).

B. P.A.

In this position the electronic siren may be used as a public address system. Volume is controlled by the GAIN control. This is the only position in which the microphone is disconnected from the two-way radio's transmitter, if a common microphone is used for both the electronic siren and two-way radio.

C. MANUAL.

In this position it is possible to operate the siren by depressing the front panel SIREN button. The siren can also be activated by means of an auxiliary switch, such as a foot switch or horn ring button. Operation will be similar to that of a conventional electro-mechanical siren.

D. WAIL.

In this position the siren will produce a continuous "wailing" sound, up or down in frequency.

E. YELP.

In this position a continuous rapid "warbled" tone is generated.

F. HI-LO.

In this position a two-tone sound will be heard. This distinctive tone may be reserved for any special indication or situation.

SECTION V

OPERATION

5-1. TURNING THE UNIT ON OR OFF.

To turn the unit on, rotate the GAIN control clockwise until a click is heard. The pilot lamp will illuminate. To turn the unit off, rotate the GAIN control fully counter-clockwise.

5-2. RADIO OR PA OPERATION.

Set the SELECTOR switch to RADIO or PA. Adjust the GAIN control to a position just below the point at which feedback occurs. When maximum volume in the P.A. position is required, hold the microphone close to your lips and speak in a loud voice.

The radial lines around the GAIN control can be used for pre-setting the level.

5-3. WAIL, YELP OR HI-LO OPERATION.

Set the SELECTOR switch to the desired siren position.

5-4. MANUAL SIREN OPERATION.

Set the SELECTOR switch to the MANUAL position. Depress the SIREN button or, if connected, activate the auxiliary switch. To activate the siren from the horn ring switch, the toggle switch must be in the on position.

SECTION VI

THEORY OF OPERATION

6-1. GENERAL.

The major circuitry consists of a wail-yelp timing oscillator, hi-lo timing oscillator, sweep oscillator, microphone pre-amplifier, and output amplifier. See figure 10.

6-2. WAIL-YELP TIMING OSCILLATOR.

In the WAIL or YELP position, Q1 and Q2 function as a timing oscillator. The output of the timing oscillator determines the frequency of operation of the sweep oscillator (Q7 and Q8). Initially, assume SELECTOR switch set to WAIL and Q1 on, C3 charges through R3 and the emitter-collector junction of Q1. When C3 is sufficiently charged, Q1 cuts off which turns on Q2. C3 discharges through R17. The charge and discharge of C3 determines the repetition rate (10 cycles/minute) in the WAIL mode. In the YELP mode, C4 has a similar function as C3. The repetition rate in the YELP mode is approximately 180 cycles/minute. An RC network (C6, R19 in WAIL and C5, R18 in YELP) develops a slowly rising and falling voltage having a triangular shape. This rising and falling voltage is applied to the sweep oscillator and determines the frequency of operation.

With the SELECTOR switch set to MANUAL, Q1 and Q2 no longer function as a timing oscillator. When a positive source is connected through an auxiliary switch to P3, pin 3 or when SW3 is depressed, Q2 turns on and allows C6 to charge. While C6 charges, the sweep oscillator frequency increases. After releasing SW3 or the auxiliary switch, Q2 turns off and C6 discharges through R19 causing the sweep oscillator frequency to decrease. The circuit will function in a similar manner when a negative source is connected through an auxiliary switch to P3 pin 4.

6-3. HI-LO TIMING OSCILLATOR.

When the SELECTOR switch is set to HI-LO, C26 charges through R44 and the gate to cathode resistance of Q15. After a period of time, the charge built up on C26 causes Q14 to conduct. The conduction of Q14 temporarily turns off and re-sets Q15. This on-off action between Q15 and Q14 sets the repetition rate. The high tone is generated by the ratio of R43, CR12 and R64. The low tone is generated by R42 and R64.

6-4. SWEEP OSCILLATOR.

The rising and falling voltages from the timing oscillators is applied to the junction of R29 and R32. The voltage at this point determines the bias voltage at Q7 and Q8, which function as an astable multivibrator. CR5 and CR6 are used to set the DC bias of the transistors. The output of the sweep oscillator is a series of square waves, frequency determined (500 Hz to 1400 Hz) by the bias voltage. This frequency increases when the bias voltage increases and decreases when the bias voltage decreases.

6-5. MICROPHONE PRE-AMP.

The microphone pre-amplifier is used only when SW1 is set to the "M" position (magnetic microphone) and the SELECTOR switch is set to PA. The signal from a magnetic microphone is applied through SW1 to the base of Q11. The low level signal is amplified by Q11, flows through SW1, S2G and the GAIN control to the input pin 6 of IC2.

6-6. OUTPUT VOLTAGE GAIN DRIVER.

An output from the sweep oscillator, microphone pre-amplifier, carbon or transistorized microphone, or two-way radio is applied to IC2. IC2 functions as a gain stage, supplying the voltage swing

needed to drive the 1:6 ratio transformer which develops sufficient drive voltage for Q12 and Q13. The outputs of Q12 and Q13 are applied to final output transistors Q17 and Q16, respectively.

6-7. OUTPUT AMPLIFIER.

Transistors Q16 and Q17 operate as a Class B, push-pull amplifier. The output of the amplifier is transformer coupled to the speaker which generates the audio power.

SECTION VII

SERVICE AND MAINTENANCE

7-1. SERVICE AND REPAIR.

Most of the component electronic parts used in the Interceptor are standard items that can be obtained from any radio or electronics supply shop.

To aid the repairman in isolating a malfunction and locating components, a top chassis view (figure 8), rear chassis view (figure 3), component location diagram (figure 9), and schematic diagram (figure 10) are provided. Any competent radio repairman or electronic technician should have no difficulty in tracing and correcting a malfunction, should any occur. When servicing the Interceptor, troubleshooting chart (table 1) can be useful in isolating a malfunction. For emergency replacement of any of the small components, care must be used when soldering. Heat easily impairs transistors, capacitors and circuit boards. It is therefore advisable to use longnose pliers or a similar heat sink on the lead being soldered.

When replacing output transistors, insure that a matched pair is used. Replace only with Federal part number 125B432 or Motorola 2N 5885. Other transistors will burn-out after a very short time. Also, use heat sink compound on both sides of the mica. Insure that the mica is installed properly. Improper installation of mica could cause a short circuit. Securely tighten transistor mounting screws.

NOTE

Most cases of defective output transistors are caused by a defective speaker (short circuited voice coil). Make certain that the speaker is not defective prior to installing the repaired Interceptor.

The factory can and will service your equipment or assist you with technical problems, should any arise, that cannot be handled satisfactorily and promptly locally.

Communications and shipments should be addressed to:

Service Department
Federal Signal Corporation
2645 Federal Signal Drive
University Park, Il 60466

If any unit is returned for adjustment or repair, it can be accepted only if we are notified by letter or phone in advance of its arrival. Such notice should clearly indicate the service requested and give all pertinent information regarding nature of malfunction, and if possible, its cause.

7-2. MAINTENANCE.

A. Removal from Mounting Bracket.

When removing the Interceptor from the mounting bracket, loosen the two hexagon head screws on the underside of the unit, near the front edge (see figure 2). It is not necessary to remove the mounting bracket from location or the siren case from the bracket. Disconnect all plug-in connectors. Slide the entire chassis and control panel out of the case.

B. Removal of Circuit Board for Service.

The board is attached to the chassis by two Phillips-head screws and the mounting nut on the SELECTOR switch. Removing the screws and switch nut allows the circuit board to be lifted out of the chassis without breaking any of the

electrical connections, and allowing ample access to all components.

C. Symmetry Adjustment.

The symmetry of the output waveform has been preadjusted at the factory and will not ordinarily require readjustment unless Q7 or Q8 have been replaced. To perform the symmetry adjustment, proceed as follows:

1. Remove the speaker leads connected between P3, pins 5 and 6. Connect an 11 ohm load across pins 5 and 6.
2. Connect an oscilloscope across pins 5 and 6.
3. Set the SELECTOR switch to WAIL, YELP or HI-LO. Adjust R28 for a perfect square wave on the oscilloscope.

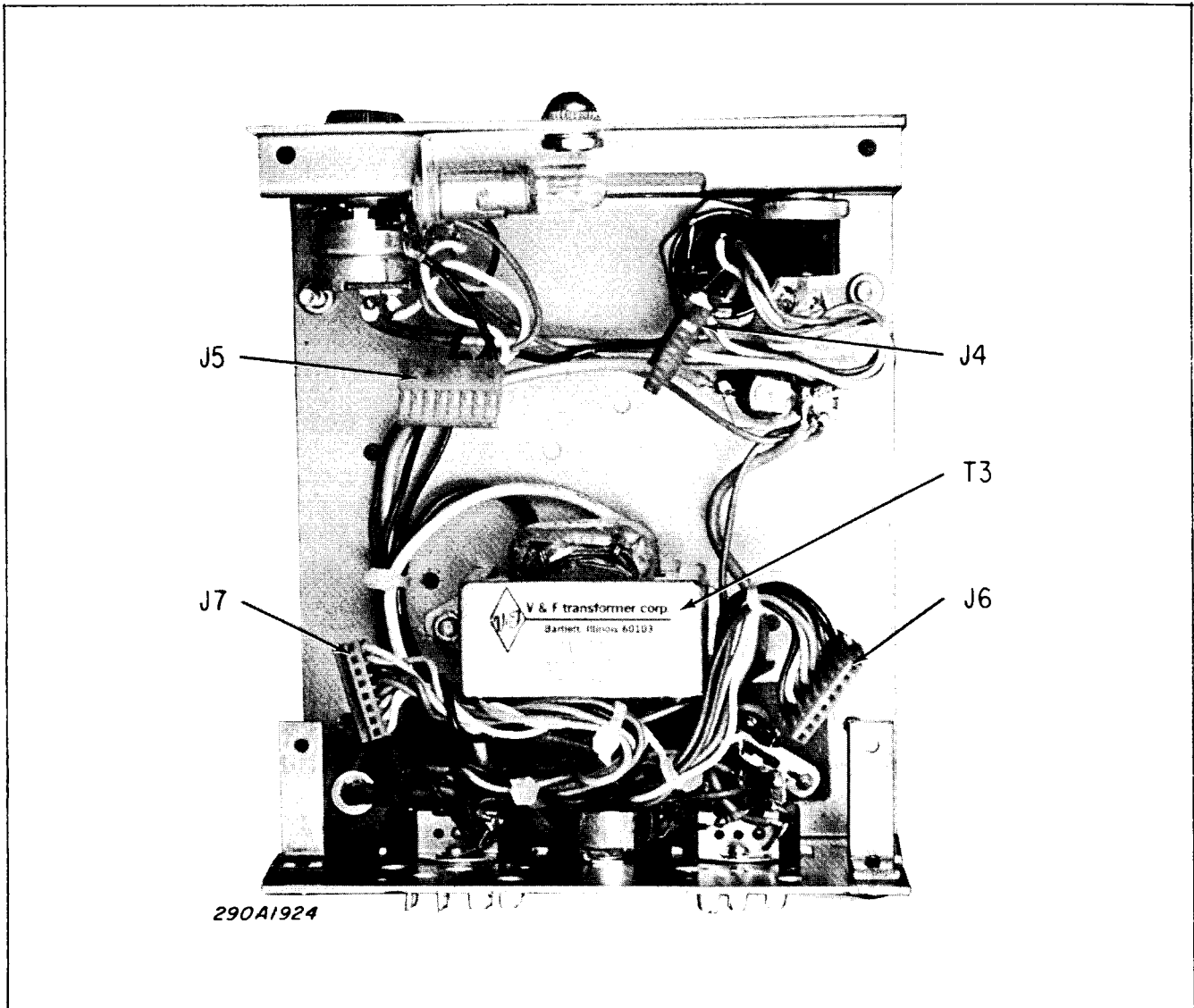


Figure 8. Top Chassis View.

Table 1. Troubleshooting Chart.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>
Fuse blows.	One or more output transistors (Q16, Q17) defective.
No siren. Unit "chirps" in YELP position.	Open capacitor C4 or C5.
Little or no volume in all positions.	Defective loudspeaker.
Low output in all positions.	Defective transistor Q12, Q13, Q14, Q15 or IC2.
Little or no volume in RADIO position. P.A. is OK.	Improper adjustment of R30.
Little or no output when magnetic microphone is used.	Microphone transfer switch in "C" position. Open capacitor C20. Defective microphone or Q11.
No output from carbon or transistorized microphone.	Microphone transfer switch in "M" position.
No HI-LO. All other tones OK.	Defective transistor Q14 or Q15.
No radio or P.A. Siren tones OK.	Open capacitor C28 or C29.
WAIL tone falls only. Manual tone only when SIREN button is held (does not coast down, but stops immediately when SIREN button is released).	Open capacitor C6.
WAIL tone rises to steady tone and holds. All other tones OK.	Open capacitor C3.
YELP tone falls only. All other tones OK.	Open capacitor C5.
Steady tone in YELP position. All other tones OK.	Open capacitor C4.
In MANUAL position, siren emits a 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 10K ohms).
Excessive noise in P.A. position only.	Short circuit in microphone. There should be an open circuit between pin 2 and shell of microphone plug.
Buzz in loudspeaker when engine or radio is operated.	Open capacitor C32.
Short siren blast in MANUAL position. Sometimes heard when vehicle is being started.	Defective capacitor C1 and/or defective diode CR11.
Frequency of siren affected by flashing lights.	Voltage drop in power lead. Connect amplifier directly to battery terminal.

PARTS LIST

<u>Schematic Symbol</u>	<u>Description</u>	<u>Part Number</u>	<u>Schematic Symbol</u>	<u>Description</u>	<u>Part Number</u>
	*RESISTORS			CAPACITORS continued:	
R1, 34, 51, 59	1.5K Ohm	100A220	C19, 23, 25	220UF, 16V, Electro-lytic	108A223
R2, 8, 18, 19	27K Ohm	100A244	C20	0.047UF, 50V, Mylar	107A418
43, 55, 68			C22	100PF, 100V, Disc	107A235
R3	39K Ohm	100A260	C28, 29	2.2UF, 16V, Tantalum	107A636
R4	470 Ohm	100A248	C32	500UF, 15V, Lytic	108A122
R5, 23, 56, 61	150 Ohm	100A238	C24	100UF, 16V	108A146
62				SEMICONDUCTORS	
R6, 20, 22, 37, 53	15K Ohm	100A239	Q1, 2, 7, 8, 11, 14	Transistor, 2N2925	125A119
R7, 9, 11, 13, 21, 35, 38, 54, 64	10K Ohm	100A257	Q3, 4, 5, 9, 10	Transistor, TIS92	125B132
R10	1.8K Ohm	100A205	Q6	Transistor, TIS93	125B133
R12	390K Ohm, 2%	100A760	Q12, 13	Transistor, 2N6109	125B431
R14	18K Ohm	100A258	Q15	Transistor, D13T1	125C310
R15, 25, 57, 67	1K Ohm	100A233	Q16, 17	Transistor, 2N5885	125B432
R16	8.2K Ohm	100A223	IC1	IC, LM555C	128A043A-02
R17	100K Ohm	100A262	IC2	IC, LM380N	128A046
R24	56K Ohm	100A229	CR1, 2, 3, 5, 6, 12, 17, 18	Diode, TI55	115B101
R26, 31	2.7K Ohm	100A256	CR4	Diode, Zener, 11 volt	115A201
R27, 33	22K Ohm	100A259	CR7, 8, 9, 10, 11, 13, 14, 15, 16	Diode, CL1(ED3002S)	115B301
R28	5K Ohm, Potentiometer	105B204-01	CR19	Diode, 1N5400	115A105
R29, 32	68K Ohm	100A261		MISCELLANEOUS	
R30	500 Ohm, Potentiometer	105A229	T1	Transformer, Audio	120B123
R36, 45, 47, 49, 65	4.7K Ohm	100A298	T2	Transformer, Driver	120B145
R39	220 Ohm	100A219	T3	Transformer, Output	120B164
R41	270 Ohm, 2 Watt	103A128	RT1	Thermistor, 200 Ohm	104A111
R42	100K Ohm	100A262	SW1	Switch, Slide, DPDT	122A220
R44	330K Ohm	100A212	SW2	Switch, Rotary, SELECTOR	122C221
R46	150K Ohm	100A226	SW3	Switch, Pushbutton, SIREN	122A228
R48	270K Ohm	100A227	SW4	Switch, On/Off (part of R66)	106A105
R50	22K Ohm	100A259	P1	Connector, Micro - phone	139B134
R52	8.2 Ohm	100A234	P2	Plug, 6-Pin	140A113
R58	10 Ohm	100A251	P3	Plug, 8-Pin	140A114
R60	27 Ohm	100A290	P4, 5, 6, 7	Connector, 8-Pin	233A138
R63	3.3K Ohm	100A242	K1	Relay, 12V, 280 Ohm	131A130A-01
R66	50K Ohm, Potentiometer	106A105	F1	Fuse, 15 Amp, 3AG	148A107
	CAPACITORS		DS1	Lamp, Panel (#53)	149B101
C1, 2, 8, 12, 17, 31	0.01UF, 25V, Disc	107A226		Holder, Panel Lamp	147A104
C3, 6	82UF, 15V, Tantalum	107A650		Fuseholder	143A106
C4, 5	4.7UF, 16V, Tantalum	107A656		Knob, SELECTOR switch	141A103
C7, 21, 33	0.005UF, 25V, Disc	107A211		Knob, GAIN control	141A102
C9, 26	3.9UF, 16V, Tantalum	107A642		Socket, Transistor, (Q16, Q17)	138B102
C10, 11, 30	10UF, 16V, Tantalum	107A634		Circuit Board (with parts installed)	200D887
C13	100UF, 16V, Electro-lytic	108A146			
C14, 15	0.0068UF, 50V, Mylar	107A413			
C16	0.1UF, 100V, Mylar	107A406			
C18	470UF, 16V, Electro-lytic	108A222			

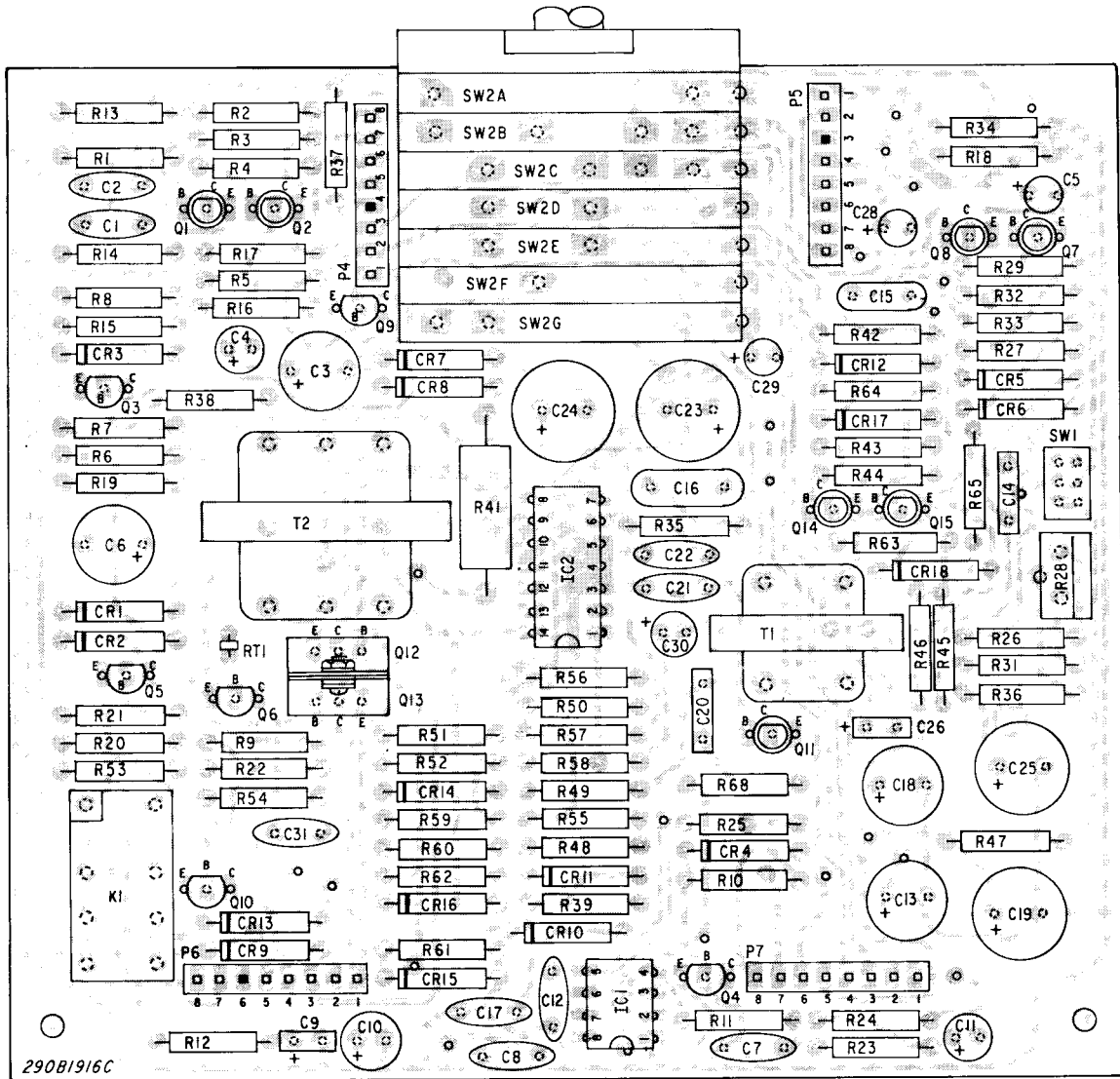
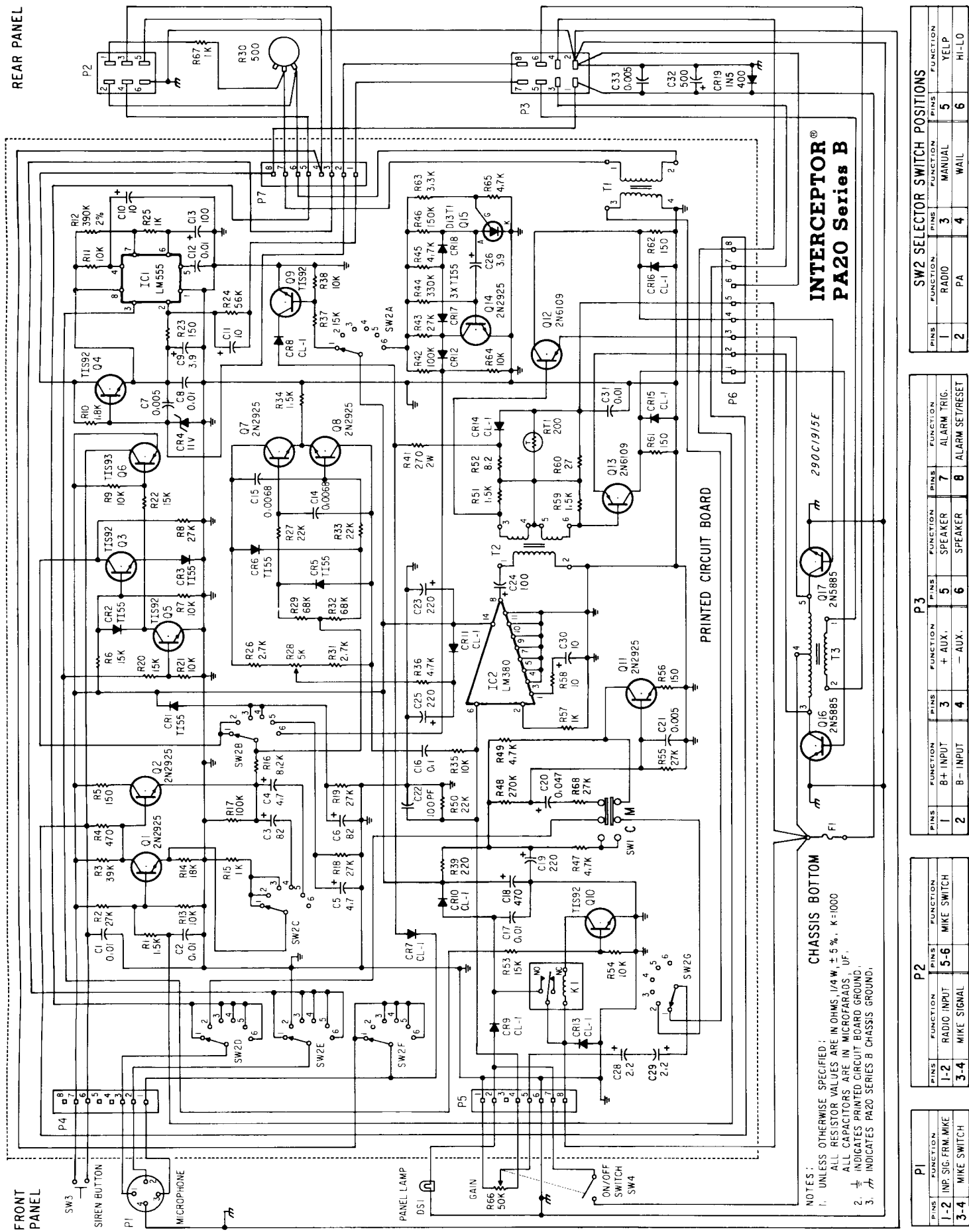


Figure 9. Component Location Diagram.



**INTERCEPTOR®
PA20 Series B**

CHASSIS BOTTOM

- NOTES:
 1. UNLESS OTHERWISE SPECIFIED:
 ALL RESISTOR VALUES ARE IN OHMS, 1/4 W, ± 5%, K=1000
 ALL CAPACITORS ARE IN MICROFARADS, μF.
 2. INDICATES PRINTED CIRCUIT BOARD GROUND.
 3. ⊥ INDICATES PA20 SERIES B CHASSIS GROUND.

P1

PINS	FUNCTION	PINS	FUNCTION
1-2	IMP. SIG. FRM. MIKE	5-6	MIKE SWITCH
3-4	MIKE SIGNAL		

P2

PINS	FUNCTION	PINS	FUNCTION
1-2	RADIO INPUT	5-6	MIKE SWITCH
3-4	MIKE SIGNAL		

P3

PINS	FUNCTION	PINS	FUNCTION
1	B+ INPUT	5	SPEAKER
2	B- INPUT	6	— AUX.
3	+ AUX.	7	ALARM TRIG.
4	— AUX.	8	ALARM SET/RESET

SW2 SELECTOR SWITCH POSITIONS

POSITION	FUNCTION	POSITION	FUNCTION
1	RADIO	3	MANUAL
2	PA	4	WAIL
5		6	HI-LO

Figure 10. Schematic Diagram.

