PRICE $5.00

SIGNAL DIVISION
Federal Signal Corporation

Models :

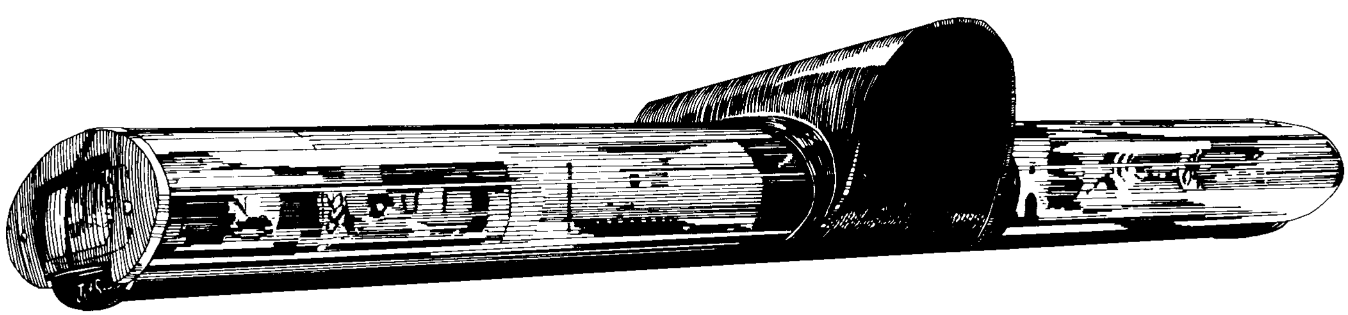
JSC

ASM*2

JS2

JS4

JC2



JetSonic™

MAINTENANCE AND REPAIR MANUAL

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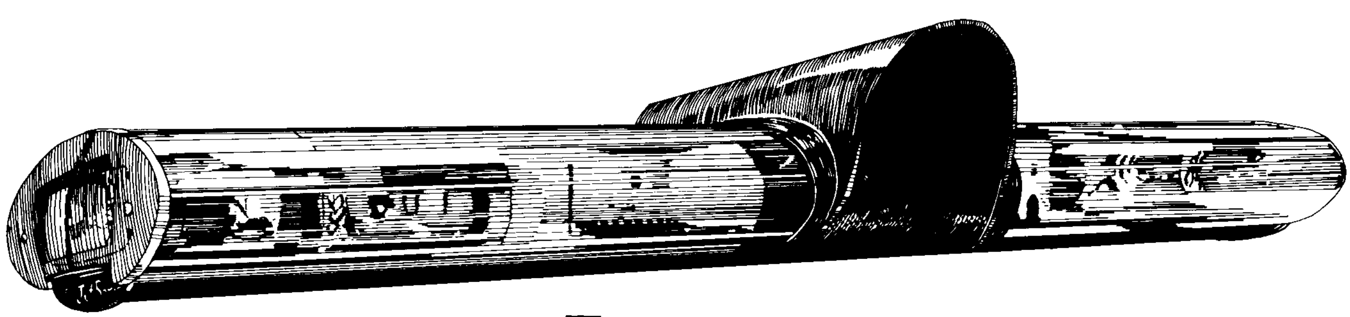

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MAINTENANCE AND REPAIR MANUAL

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The Federal Signal Corporation warrants each of its new electronic sirens to be free from defective material and workmanship for a period of two years from date of purchase. Federal Signal Corporation will remedy any defect which under normal installation and operation discloses such defect; provided the unit is delivered, transportation prepaid by owner, to our factory for examination and such examination reveals that in our judgment a defect in material and/or workmanship exists. In all cases, Federal Signal Corporation will be sole judge of what constitutes defective material and workmanship.

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This warranty does not extend to any electronic siren which has been subjected to abuse, misuse; improper installation or violation of any instructions supplied by us, nor extended to units which have been serviced or modified at any facility other than our factory.

This warranty takes precedence over all other warranties expressed or implied and no representative or other person is authorized to assume for Federal Signal Corporation any other liability in connection with the sale of our electronic sirens.

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FEDERAL SIGNAL CORPORATION

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SECTION I
GENERAL DESCRIPTION

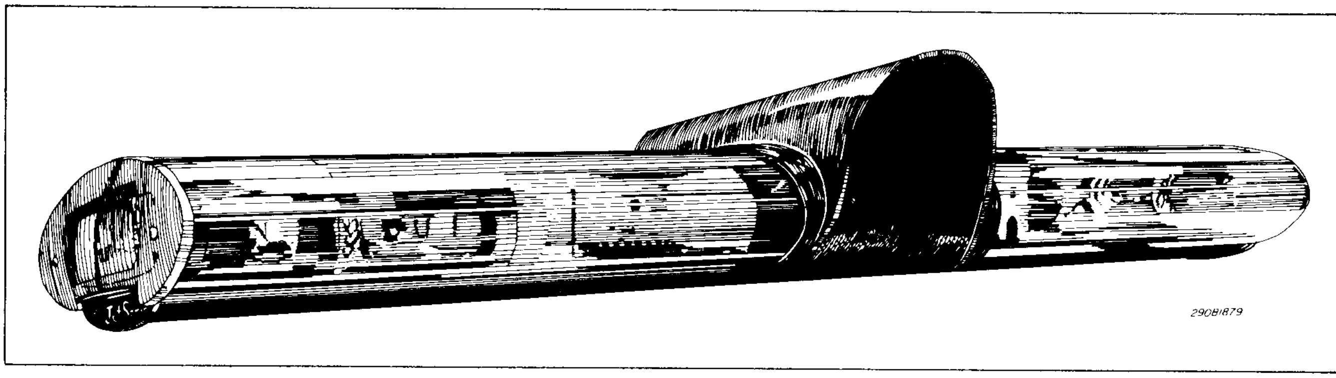


Figure 1-1. JetSonic Light/Sound System.

1-1. SCOPE.

This manual covers the repair and maintenance of Federal Models JSC*, ASM*2, JS2*, JS4* and JC2*. For installation and operating procedures, refer to the instructions packed with each light bar.

NOTE

Before proceeding insure that you know your unit's model number, options, and how it is supposed to operate. Also, insure that the unit is properly installed.

1-2. GENERAL.

The Federal JetSonic Light/Sound System is an emergency vehicle light bar with built-in siren amplifier. It is designed to operate from a nominal 12-volt DC negative ground electrical system. Its slim, aerodynamic profile provides less wind drag which translates to better vehicle fuel economy and top speed. Components are mounted on a heavy-duty extruded aluminum base and protected by two clear, impact resistant polycarbonate domes. Colored inserts (supplied) satisfy all dome color requirements. A corrosion-resistant polymer speaker housing is located in the center of the bar.

All standard light and siren functions are controlled by the Model JSC Control Center, via the interface PC board (see figure 1-2). Optional lighting and auxiliary sound functions require the use of the Model ASM*2 Auxiliary Switch Module. The interface PC board decodes data transmitted from the Model JSC and Model ASM*2 and activates the siren PC board and/or the applicable emergency light functions. Other control units are not compatible with Federal JetSonic Models JS2, JS4 and JC2.

Two cables connected to the light bar contain all the conductors necessary for control of all basic and optional JetSonic functions.

1-3. LIGHTING SYSTEM.

A. <u>General.</u>

The Federal JetSonic (Models JS2 and JC2) provides 360° visual warning from a combination of four 50-watt halogen lamps with parabolic reflectors and a total of 12 polished-aluminum mirror surfaces. (Model JS4 has front only rotating lights. Only two halogen lamps are used.)

In the primary mode, a high torque, permanent magnet motor drives the reflectors, via worm reduction, at 70 RPM. A total of 840 flashes per minute are provided. Flashes are synchronized, via a timing chain, to move inward from each end. Two distinct inward moving flashes are followed by a quick double flash on each side.

In the secondary mode, rotation stops with each reflector directed outward preceisely at the "V" mirror sections (see figure 1-2). The flasher PC board then directs the lights at each

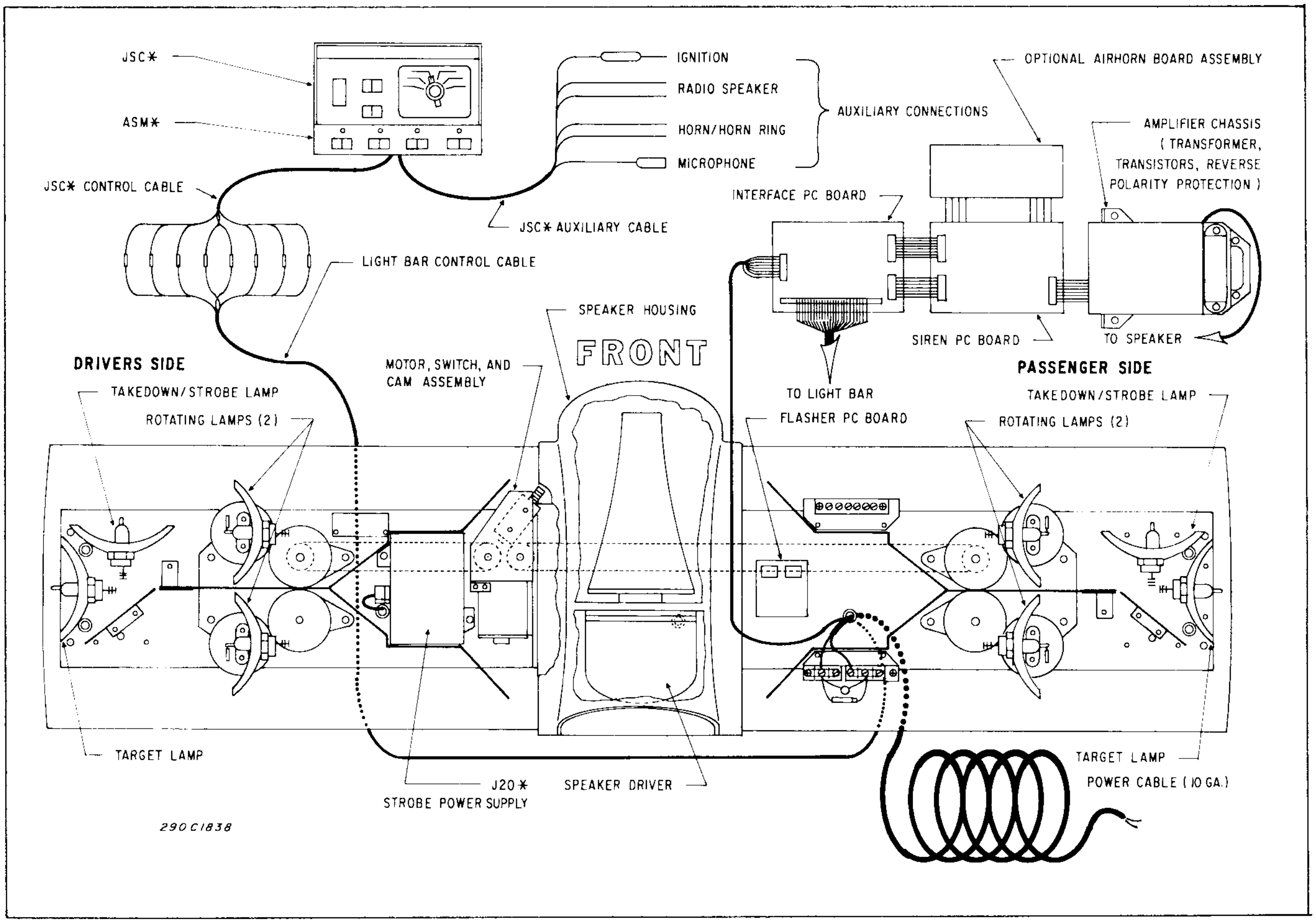


Figure 1-2. Major Assembly Location Diagram.

end to flash in unison. The flasher board contains relays and other circuitry which allows the use of low-powered, five-ampere switches to control the light functions.

NOTE

A Model ASM*2 Auxiliary Switch Module is required to operate the light options described in paragraph B, C, and D (below).

B. Takedown Lights (Optional).

Forward facing takedown lights can be located at either or both sides, towards the end of the light bar (see figure 1-2). High intensity 50-watt halogen lamps illuminate a stopped vehicle ahead. When this option is selected, the outboard mirror sections to the front are removed.

C. Directional Strobes (Optional).

Directional strobes can be installed towards each end (facing forward) of the light bar (see figure 1-2). They are especially useful in helping to clear the right-of-way. Each strobe light produces 70 high intensity flashes per minute. They are powered and synchronized to flash alternately by the Model J20 strobe power supply (not customer repairable). When the option is selected, the outboard mirror sections to the front must be removed.

D. Target Lights (Optional).

Target lights can be installed at both ends of the light bar (see figure 1-2) and are especially useful when illuminating an alley, storefront, etc. The target lights consist of 50-watt halogen lamps with parabolic reflectors. They can be activated individually or simultaneously via the Model ASM*2 Auxiliary Switch Module.

1-4. SOUND SYSTEM.

A. General.

The system provides three distinct siren sounds (wail, yelp, hi-lo) plus public address, radio rebroadcast, manual siren (peak-and-hold), automatic horn ring transfer and TAP II instant yelp. An optional air horn sound is available.

All JetSonic sound functions, except air horn (Model ASM required), are controlled by the Model JSC Control Center. The Control Center also acts as an audio pre-amplifier for PA and radio rebroadcasts. A MNCT microphone is optional.

The encoded signals, originating in the Control Center, are decoded and used to drive the tone generation circuitry in the siren PC board (see figure 1-2). The amplifier chassis amplifies the output of the siren PC board before applying it to the speaker. The amplifier chassis also houses reverse polarity protection circuitry.

B. Speakers.

The Federal JetSonic speaker needs only a single 100-watt compression driver to deliver the performance of a conventional 200-watt speaker when mounted in a light bar. The JetSonic speaker meets or exceeds CHP and AAMVA Class A requirements with a single driver.

C. Air Horn Sound (Optional).

An air horn PC board can be included in the JetSonic at the factory. The Model ASM*2 Auxiliary Switch Module must be ordered along with this option.

SECTION II
SPECIFICATIONS

NOTE

The following specifications assume input voltage to be 14VDC.

2-1. POWER REQUIREMENTS.

Input Voltage	10Vdc to 16Vdc, negative ground only. (16Vdc operation limited to 15 minutes).
Primary (Rotating) Visual System . .	17 amps. continuous
Secondary (Flashing) Visual System .	17 amps. (8.5 amps with front cutoff).
Siren Operating Current (Yelp mode) .	7 amps.
Directional Strobe	4 amps.
Target Lights	4 amps. (each)
Approach Lights	4 amps. (each)

2-2. SIREN.

Operating Current (Yelp mode) . . .	7 amps.
Voltage Output (approx.)	64V p-p
Frequency Range	Wail - 550 to 1500Hz Yelp - 550 to 1500Hz Hi-Lo - 800 and 1100Hz
Cycle Rate	Wail - 11/min. Yelp - 180/min. Hi-Lo - 45/min.

2-3. AUDIO.

Frequency Range	300 to 10,000Hz
Harmonic Distortion	10% max. at all power levels from 0.5 to 38 watts
Input voltage required to obtain 20Vrms across speaker load . .	0.67Vrms

2-4. LIGHT BAR.

Construction

Base	Heavy-duty extruded aluminum
Domes	Clear impact-resistant polycarbonate
Speaker Housing	Corrosion-resistant polymer
Inserts	Polycarbonate (red, blue, green, amber, clear)

Dimentions

Length	47-1/4" (120.02cm)
Width (at dome)	11-3/16" (28.42cm)
Width (at speaker housing) . . .	14-1/4" (36.20cm)
Height (at dome)	4-11/16" (11.91cm)
Height (at speaker housing) . .	6-5/8" (16.83cm)

Weight

Light Bar	29 pounds (13.2kg)
Light Bar (with speaker and amplifier) . .	40 pounds (18.1kg)

2-5. MODEL JSC.

Standby Current	275mA
Operating Temperature Range . . .	-30°C to +70°C
Dimensions (HWD)	2-3/4" x 4-7/8" x 2-3/8" 70mm x 124mm x 60mm
Weight (approx.)	1 lb. 2 oz. (510g)

2-6. MODEL ASM*2.

Operating Temperature Range . . .	-30°C to +70°C
Dimensions (HWD)	1-1/4" x 4-1/2" x 2-3/4" 32mm x 114mm x 70mm
Weight (approx.)	3 oz. (85g)

2-7. SIREN MODULE.

Standby Current	400mA
Operating Temperature Range . . .	-40°C to +120°C
Dimensions (HWD)	8" x 6-1/4" x 3-1/4" 203mm x 159mm x 83mm
Weight (approx.)	2 lb. 12 oz. (1247g)

SECTION III
THEORY OF OPERATION

3-1. BLOCK DIAGRAM.

Refer to figure 3-1 while reading this section. Circuitry shown on the left side (multiplexer) of figure 3-1 is located in the Model JSC Control Center. This includes audio pre-amplifier circuitry, multiplex circuitry, and the system on/off switch. The right side of figure 3-1 is devoted to components located in the light bar.

The system is activated by varying the Model JSC GAIN control (see figure 3-2) from its off detent position. With the system "on", power is applied to the Model JSC via the GAIN control (on/off switch). The switched power line in the cable leading to the light bar goes high, and turns on a transistor that supplies power to the light bar electronic circuitry.

There are two audio circuits in the Model JSC: microphone and radio rebroadcast. The RAD/PA switch (see figure 3-2) determines which circuit will be amplified. The front panel GAIN

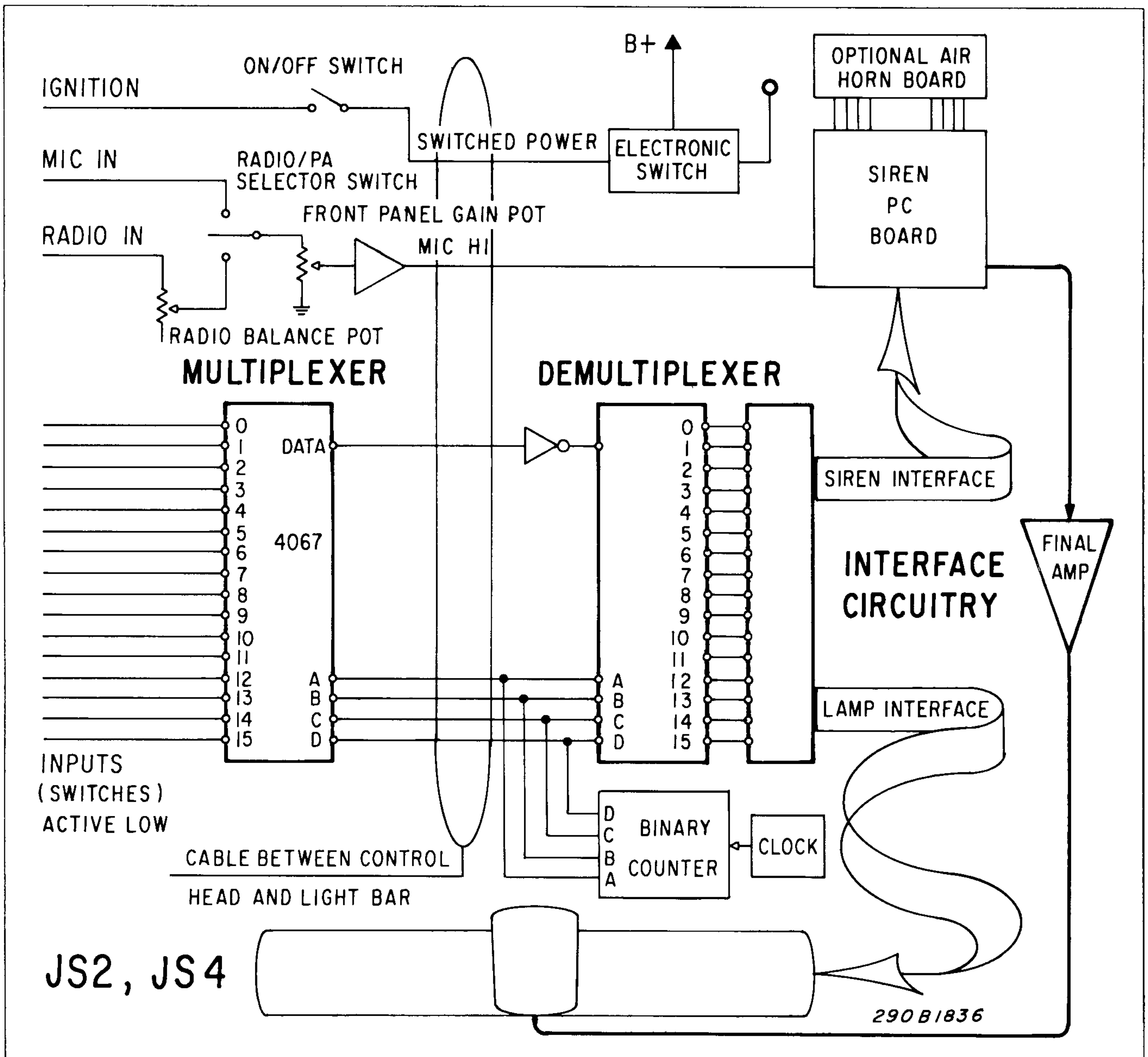


Figure 3-1. System Block Diagram.

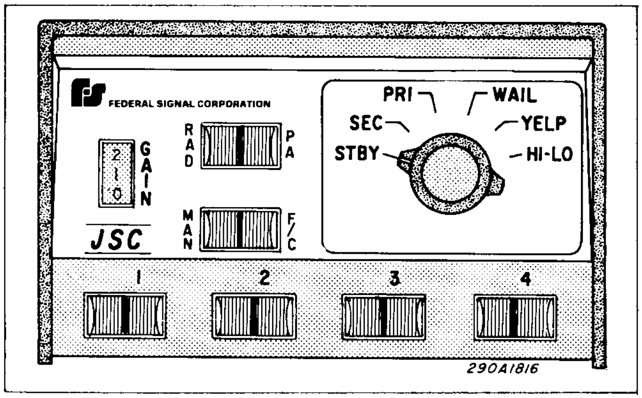


Figure 3-2. Control Center, Front View.

potentiometer varies the audio output level. The radio balance potentiometer balances the radio rebroadcast level with the microphone level.

Model JSC multiplexer circuitry sends input switch data to the light bar over a single data line. The input switch being selected is determined by address lines A, B, C and D.

At the light bar, the data is demultiplexed and latched. The latched data drives interface circuitry that controls the siren's tone generation circuitry (on another PC board) and powers the lamps. A flasher circuit, six relays and a motor/switch assembly are included in the lamp interface circuitry.

The output of the siren PC board drives the final amplifier state, consisting of two output transistors and a transformer. This output in turn drives the speaker.

3-2. MULTIPLEXING.

To reduce the number of wires between the Model JSC Control Center and the light bar, the JetSonic system treats control switches as data bits. As a switch is set "on", it creates a low (zero volt) data bit. When a switch is opened (set "off"), it creates a high (12-volt) data bit. These data bits, there are 16 in all, are time multiplexed onto one data line.

Time multiplexing is a system which all inputs are scanned repeatedly and their state (high or low) is deposited on a common data line. Each input is assigned an address (location). When a certain input switch is connected to the data line, that input is said to be "addressed".

In the JetSonic system, all 16 inputs are scanned three times per second. This means that each input is observed by the system for 1/48th second. During the first 1/48th second of operation, it looks at the horn ring input. During the second 1/48th second, it checks if the rotary switch is in the STBY position. In the third 1/48th second, it checks if the rotary switch is in the SEC position, and so on. After all 16 inputs have been scanned, the first input is scanned again to verify the state of that switch.

There are 16 data latches on the output (light bar) side of the system. These latches will hold all data applied to them (high or low, 12V or zero V). Each latch is also assigned an address that corresponds to a particular input switch. The 16 latches are scanned concurrently with the 16 input switches. This process is called "demultiplexing". The system is designed so that a latch and its associated input switch will always be addressed together.

During the first 1/48th second of operation, while the horn ring input is connected to the data line, the first output latch is also connected to the data line (see figure 3-3). If the horn ring is being activated, this high data will be applied to the first latch causing the siren to change states. If the horn ring is not being activated, this low data will be applied to the first latch, but the siren will not change states. Notice in figure 3-3 that the data is inverted between input and output.

During the second 1/48th second, the same data transfer occurs, but the multiplex circuit is looking at the STBY position of the rotary switch. In the third 1/48th second, this process occurs

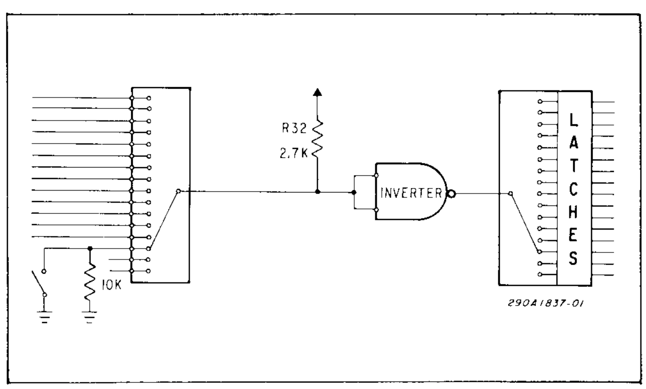


Figure 3-3. Multiplexing Circuit.

for the SEC position of the rotary switch, and so on. Note that if the horn ring was activated during the time it was addressed, it has been latched "on" by the output latches and will not change states while the multiplex circuit is looking at other inputs. It will, however, be scanned again in 1/3rd second; and if the horn ring is no longer activated, then the latch will be reset. The scan rate, because of its speed, is not detectable.

3-3. DATA LEVELS.

The manner in which data is transferred is described below (see figure 3-3 and 3-4). R32 is a resistor on the interface PC board in the light bar. Each input line in the Control Center has a 10K ohm pull-down resistor and a switch to ground. The multiplexer IC is a 4067, an analog multiplexer. Circuit current flows through an analog multiplexer as if it is merely a switch. When a particular input is addressed, the circuit can be reduced to that shown in figure 3-4. Since the multiplexer switch is essentially a short circuit, it does not affect current or voltage levels.

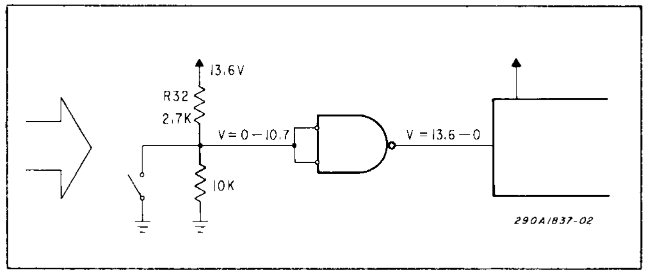


Figure 3-4. Voltage Level Equivalent Circuit.

When the input switch is open (function deactivated), R32 and Rn form a voltage divider. In a system operating at 13.6Vdc and R32 equal to 2.7K ohm and Rn equal to 10K ohm, the resulting voltage will be 10.7Vdc. This voltage is high enough for the inverter in the light bar to recognize it as a logic 1. When the input switch is closed, the inverter input is grounded and recognized as a logic 0. The inverter output levels are 0-volts and B+; in this case, 13.6Vdc. This output is applied to the demultiplexer circuit where the data is stored in the appropriate latch. The latched data is conditioned by the interface circuitry so that it can drive the light and siren circuitry.

SECTION IV
CIRCUIT DESCRIPTION

4-1. MODEL JSC CONTROL CENTER.

Refer to the Model JSC schematic diagram, figure 5-1, while reading the following paragraphs.

A. Power Supply.

The Model JSC receives its power via the red ignition lead in the control cable. Current flows to SW4 via P1-1, P2-6 and J2-6. SW4 is the zero (detent) position of the front panel thumbwheel potentiometer (GAIN). When SW4 is closed, B+ is applied to panel lamps DS1, 2 and 3. It is also applied to the ASM*2 through P3-2, and turns-on the light bar electronics via P1-10 and the green wire in the control cable. The 12-volt Model JSC circuitry receives power through CR8. C11 and C12 provide filtering. R45, CR9 and C14 provide regulation and filtering for the audio circuitry. IC4, R31 and C10 form a power-up one shot. When power is first turned on in the Model JSC, IC4-3 goes high for a few hundred milliseconds, resetting the front cutoff latch through R35 and CR12..

B. Audio Circuitry.

The radio rebroadcast input is applied to radio balance potentiometer, R1, via P1-12 and P1-13. R1 is adjusted so that the overall audio output for the radio circuitry is the same as the output for the microphone circuitry. C4 and C5 provide DC isolation for the differential amplifier composed of R14, R16, R15, R17, R25 and IC3A. The output of IC3-1 is coupled through C6 and R18 to R19, the front panel GAIN potentiometer. The signal is then passed through C7 to the amplifier formed by R20, R21 and IC3B. R29 and R30 provide DC bias and C13 provides high frequency roll-off. The amplified signal is applied to the light bar circuitry via C8, P1-2 and the white/black wire.

The transistorized microphone circuit receives its bias from R27. The microphone input is applied to the front panel GAIN potentiometer (R19) via P1-14, C9 and R28.

C. Audio Switching.

Transistors Q4 and Q6 short the audio output of the radio and microphone circuits respectively, to ground, depending upon which function is not desired. Q4 is held on by R46 and R47, unless SW1 is in the RAD position. Q4 will then let radio information pass. Q6 is held on by either R22 and R24 or R23 and R24. SW1 must be in the PA position and the microphone push-to-talk switch must be depressed before Q6 can turn off and let microphone audio pass.

SW1 also controls the push-to-talk (PTT) circuit. When SW1 is in the RAD position, the PTT input to IC1 is pulled low through CR6. PTT is sent as a data bit through IC1 to the light bar, allowing bias to be turned on at the final amplifier. PTT will also be pulled low when the microphone PTT switch is depressed and JU1 is installed. The microphone ground circuit is completed when JU1 is installed. If an FN module is installed (common microphone operation), JU1 should be cut. The relay in the FN module will be controlled by SW1 through CR5.

D. Horn Ring Switching.

If the vehicle is wired for TAP II operation, relay K1 will switch the horn ring from vehicle horn to the siren sound. The horn ring will be connected to the siren when one end of the K1 relay coil is grounded through SW3B. This will occur when SW3 is in SEC, PRI, WAIL, YELP or HI-LO. In STBY, the vehicle horn will operate normally.

E. Data Inputs.

IC1 has 16 data inputs. Each input is an active low. This paragraph describes each in order of addressing.

If rotary switch SW3 is in the SEC, PRI, WAIL, YELP or HI-LO position; a high or low applied to the horn ring input will activate the siren. A high (B+), coupled through CR2, drives the emitter of Q2 high enough to turn on Q2. When

Q2 conducts, it turns on Q1 which grounds IC1-9. C1 functions as a radio bypass capacitor. Refer to Section III for explanation of R2 and R3. A low applied to the horn ring input pulls the base of Q2 down through R8 and CR3, turning it on. Q2 then allows Q1 to conduct.

Pins IC1-8, 7, 6, 5, 4 and 3 correspond to STBY, SEC, PRI, WAIL, YELP and HI-LO. The applicable pin is pulled low when SW3A is set to the corresponding position.

IC1-2 is the PTT input. It is pulled low when the microphone is keyed or in the radio broadcast mode, as described in paragraph 4-1.B.

IC1-23 is the MAN (peak) input. When rocker switch SW2 is depressed on the MAN (left) side, a ground is applied to IC1-23.

IC1-22 is the F/C (front cut-off) input. When SW2 is depressed on the F/C side, the base of Q5 is pulled low, turning Q5 on. This turns-on Q8 and pulls IC1-22 low through CR7. When Q8 conducts, the Q7 base drive is shorted away, causing it to turn off. This causes the Q7 collector to go high, latching Q8 on. The latch is reset upon power-up by the power-up reset circuitry already described, or whenever rotary switch SW3 is varied. SW3 is a non-shorting switch. This means that between switch detent positions, there is no electrical contact. Therefore, any time SW3 is between positions (rotating), the horn ring transfer relay is ungrounded; and Q7 is turned on via R40, SW3 and the relay coil of CR4.

IC1-17, 18, 19, 20 and 21 are inputs from the Model ASM*2. They are all switches to ground, through diodes. IC1-16 is not used.

Address lines A, B, C and D (IC1-10, 11, 14 and 13) step the multiplexer from one input to the next. The address lines are driven by a counter in the light bar. The data (voltage levels) for the light bar appear at IC1-1.

4-2. MODEL ASM*2 AUXILIARY SWITCH MODULE.

The switches shown in schematic diagram figure 5-4 are drawn in the same relative position as they are located on the actual Model ASM*2. Each switch pulls an input line low through a diode, and also turns on a red L.E.D. above the switch. SW1 controls the left target lamp, if installed. SW2 controls the optional strobe and approach lamps. SW3 controls the optional auxiliary sound. SW4 controls the right target lamp, if installed.

4-3. INTERFACE BOARD.

Refer to figure 5-6 while reading the following circuit description.

A. Power Supply.

A high (B+) at P1-1 will cause Q2 to conduct. When the collector of Q2 goes low, it turns on Q1. C1 and C2 provide filtering for the logic circuitry. R30, C4 and IC8 provide a power-up reset pulse (high) to IC1-2 and IC2-2, causing their outputs to go low.

B. Multiplex Generation.

R9, R10, C8 and IC4 form a clock which oscillates at approximately 140Hz. Q12 and Q13 reduce the noise immunity of IC4. The clock output is applied to pin 1 of binary ripple counter IC3. Pin IC3-12 is the LSB, address A. The counter output there is one-half the clock frequency. Pins IC3-11, 9 and 6 are addresses B, C and D, respectively. Each is one-half the frequency of the proceeding output. The counter outputs are fed back to the Model JSC via P1-8, 7, 6 and 5; and to the demultiplex circuitry, IC1 and IC2. IC1 and 2 pins 5, 6 and 7 correspond to addresses A, B and C. Pin 4 corresponds to address D.

IC1 and IC2 are 8 bit addressable latches. Since there are 16 data bits, 2 integrated circuits must be used. The WE (write enable) line is used as an IC select. In this case, it is address D. While IC1 and IC2 pins 5, 6 and 7 follow the counter output directly, IC1 and IC2 pin 4 does not. This is because of a peculiarity in the integrated circuits (CD4099BE) being used. The address cannot change while the write enable is low (active).

C7, R11 and IC5B form a half monostable that outputs a pulse everytime the clock goes low. The pulse is applied to IC1-4 through CR6. The waveform at IC1-4 and IC2-4 is shown in figure 4-1. The waveform at IC2-4 is the same as at IC1-4, but 180° out-of-phase. The difference is accomplished by logic gating using IC5C and IC5D.

C. Data.

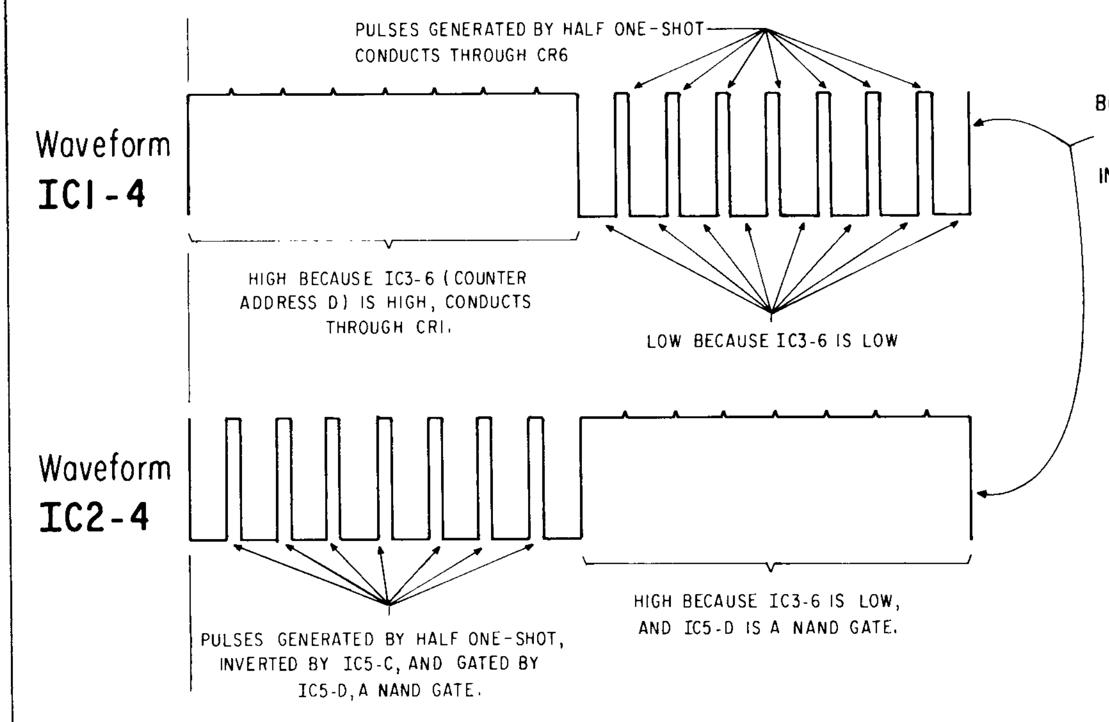
Data levels from the Model JSC appear at P1-4. R5 and C3 provide noise filtering. R32 is the pull-up resistor and IC5A is the inverter described in the multiplexer theory of operation. IC5A also serves to "clean-up" the data waveform. The output of IC5A is applied to IC1-3 and IC2-3. The data last entered in each latch will stay there even when latch is not being addressed.

D. Latched Outputs.

In the following discussion, all IC1 and IC2 outputs are active when high (12V). Also, the outputs will be discussed in the order of addressing. The first to be addressed is the horn ring, IC1-9. The siren circuitry (described later) will sense a high (12V) or low for a horn ring input. When IC1-9 goes high, CR2 conducts and the siren will trigger. When IC1-9 remains low, CR2 does not conduct and the siren will not trigger. IC1-1,11,12,13,14 and 15 are buffered by IC6 to increase current drive capability.

The secondary output, IC6-15, drives the MANUAL input to the siren through CR18. When the MANUAL input is high, the siren is in a ready state. The siren will "coast down" in manual if it was previously on. IC6-15 also supplies base drive to Q7, turning it on. When the collector of Q7 goes low, Q6 is turned on via R27. The high at the Q6 collector is also applied to TB1-9, the FLASH IN terminal. This circuit drives the flasher board oscillator circuitry described in paragraph 4-4. If desired, the IC6-15 output can also drive the strobe circuit. If a diode is placed in the PC board holes reserved for CR8 (see figure 5-6), the optional strobe will activate in the secondary mode.

The PRIMARY output, IC6-12, also drives the siren MANUAL input; but



TRUTH TABLE FOR A NAND GATE

INPUTS A	INPUTS B	OUTPUT OUT
0	0	1
0	1	1
1	0	1
1	1	0

4-1. Waveform Diagram

through CR19. IC6-12 will drive the strobe circuitry if the user installs a diode at CR9. IC6-12 drives the base of Q9 through CR15. When the Q9 collector goes low, Q8 is turned on via R19. Q8 then drives the ON OVERRIDE terminal, TB1-8. The signal at TB1-8 drives flasher board circuitry which makes the flasher stop and the rotating lamp remain "on". ON OVERRIDE also energizes the relay on the motor bracket assembly. The relay powers the motor, which rotates the lamps, via a microswitch. CR20 protects Q8 against relay turn-off spikes.

The WAIL output, IC6-10, drives the siren Wail line through CR21. CR21 and CR5 are blocking diodes. The Hi-Lo sound is a combination of the Wail and Yelp sounds, as far as the siren is concerned. CR3 and CR4 drive the Wail and Yelp lines in the Hi-Lo mode. The Wail line also drives Q11 through CR10 and R24. When Q11 conducts, its collector goes low and turns on Q10. The Q10 collector goes high and drives the strobe electronics located on the flasher board via TB1-10. The Wail output at IC6-10 also turns on the ON OVERRIDE terminal through CR16.

The YELP output, IC6-4, drives the Yelp input to the siren as well as the STROBE and ON OVERRIDE terminal (previoiusly described).

The PTT output, IC6-6, turns on Q3 via R16. The Q3 collector pulls the PTT input to the siren low via P2-3. When the collector goes low, it also turns off Q4, which is normally held "on" by the amplifier bias on the siren board through P2-3. The Q4 collector is connected to the audio line. When Q4 conducts, the audio signal is short-circuited to ground. When Q4 turns off, the audio signal can pass through the interface PC board. Q4 shuts-off only when the PTT output of IC6 is high.

The Peak output, IC2-9, drives the Peak line on the siren PC board via P2-8.

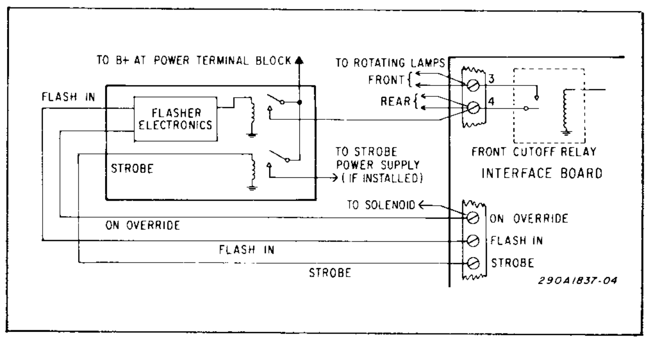
IC7 is a relay driver integrated circuit. The inverter shown in figure 5-6 is merely an NPN Darlington pair. When the input goes high, the output will go low and energize a relay. IC7 also contains reverse spike protection diodes. Pins IC2-10, 11, 12 and 13 are drive inputs to IC7. IC7 outputs drive relays K1, K2, K3 and K4. Relay K1 controls power to the front rotating lamps. When K1 is not energized; current flows from the WIPER terminal (TB1-4), through the normally closed contact (K1) to the FRONT CUTOFF terminal (TB1-3). The front rotating lamps are connected to TB1-3. Relay K2 switches power for the optional left target light (if installed). Relay K3 switches power for the optional right target light (if installed). Relay K4 switches power for the optional takedown light (if installed).

4-4. FLASHER BOARD.

Refer to figures 4-2 and 5-8 while reading the following circuit description.

When the FLASH IN terminal (TB1-9) on the interface PC board goes high, it powers the flasher circuitry through CR702 on the flasher PC board. R704, C703, and C704 provide filtering. R702, R703, C702 and IC701 form an oscillator that drives relay K701 through R701, Q701 and CR705. Relay K701 flashes at approximately 90 flashes per minute and provides power to all 4 rotating lamps. The output of K701 is fed back to interface PC board terminal TB1-4. The rear rotary lamps are connected at TB1-4. The front lamps are connected at TB1-3. Power to the front lamps is switched by K1 on the relay board.

Relay K702 switches power for the Model J20 Power Supply (optional). When STROBE terminal TB1-10 (located on interface PC board) goes high, STROBE IN goes high and energizes K702.



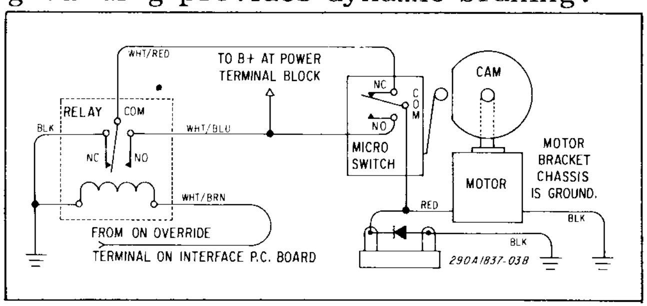
4-2. Flasher Board / Lamp Wiring

When ON OVERRIDE (TB1-8 on the interface board) goes high, K701 is held energized via CR706, and the rotating lamps remain on continuously.

4-5. LIGHT MECHANICAL ACTIVATION.

Refer to figure 4-3 while reading the following paragraph.

The ON OVERRIDE terminal on the interface PC board is also connected to the relay on the motor bracket. When ON OVERRIDE goes high, the relay engages and connects the motor to B+ through the microswitch's normally closed contact (assuming the cam is in the "home" position). When the cam rotates, the motor will be connected to B+ through the normally open contact of the microswitch. This prevents the motor from stopping except at the "home" or detent position of the cam. When ON OVERRIDE goes low, the relay disengages and the normally closed relay contact will be connected to ground. When the cam rotates enough to allow the microswitch to drop into the detent, the motor will be connected to ground through the normally closed contacts of the microswitch and relay. This grounding provides dynamic braking.



4-3. Motor/Microswitch Electrical Diagram.

4-6. SIREN BOARD.

A. Conventions.

For the purpose of circuit description in this section, a "high" is at least +5V with respect to B-; a "low" is equal to B-. For example: if the siren is operating from a negative ground electrical system, a low is within 0.7-volts of +12V; a high is at least +7V. Refer to figure 5-10 while reading the following circuit description.

B. Input and Control Circuitry.

The siren Input and Control circuitry is contained in a custom integrated circuit (chip), IC1. IC1 contains the power supply control and switching logic circuits.

When the vehicle ignition switch is turned on, a high is applied to R44. R44 is an encapsulated resistance network that consists of five individual, independent 10K ohm resistances. These resistances drop the voltage of logic highs to a level that is safe for IC1. The output of IC1-9 is then applied to the base of Q2, allowing Q2 to conduct. The conduction of Q2 completes the current path of the 8.2 Volt Regulator. CR2 is an 8.2V zener diode that, in conjunction with R8, maintains a constant voltage output.

This regulated voltage is applied as operating voltage to circuits in IC1 and IC3, and the optional Auxiliary Sound Board. Operation of the 5V Regulator is similar to that of the 8.2V Regulator. The 5V Regulator supplies regulated 5V to IC1, R45, IC2, IC3, and the optional Auxiliary Sound Board.

If the microphone push-to-talk (PTT) circuit is activated, a low will be applied to IC1-7, enabling the siren, as previously described.

C. Siren Signals.

1. TAP II.

When the vehicle horn ring is activated, P3-5 goes high and drives IC1-5 high. IC1 contains a flip-flop that "toggles" every time the horn ring is activated. The flip-flop output, IC1-3, goes low the first time the horn ring is activated.

IC1-3 remains low until the horn ring is operated again. However, IC1-6 goes low each time the horn ring is operated and remains low only for the time that the horn ring is depressed.

The low from IC1-3 is applied through the 10K pull-up network, R45. R45 consists of several 10K ohm resistances that are connected to the regulated 5V supply on one end and to the signal lines on the other end. This arrangement ensures that all IC2 inputs are held high ("pulled up") with no signal applied. The low from IC1-3 is then applied to IC2-5.

2. Wail.

Wail is initiated when a high is present at JI-1. This high is then applied through R44 to IC1-16. As a result, IC1-15 goes low. This low is then coupled through R45 to IC2.

3. Yelp.

The Yelp signal is initiated by a high at J1-13. This high is coupled through R44 to IC1-18, causing IC1-17 to go low. The low from IC1-17 is applied through R45 to IC2-7.

4. Hi-Lo.

Hi-Low is activated when J1-11 and J1-13 are high. These highs are then coupled through R44 to IC1-16 and IC1-18. Consequently, IC1-15 and IC1-17 go low. Both lows are then coupled through R45 to IC2-7 and IC2-4.

5. Manual.

When P2-7 (MANUAL) goes high, R44 couples the high to IC1-14. As a result, IC1-13 goes low. This low is then coupled through R45 to IC2-3.

D. Decoder.

Decoder, IC2, is a programmable read-only memory (PROM) that contains the decoding necessary for the production of the various siren signals. The section of the program for a given siren signal is addressed when a low is applied to the appropriate pin of IC2, as described in paragraph 4-6.C.

The output of IC2 consists of various combinations of highs and lows at IC2-12, IC2-11, IC2-10, and IC2-9. These logic levels cause IC3 to produce the various siren signals. The logic level combinations and the siren signals that they control are shown in Table 4-1.

E. Signal Production.

IC3 contains most of the circuitry necessary for the production of all siren signals. The actual siren signal being produced at any given time is determined by the logic levels applied by IC2 to IC3-22, IC3-17, IC3-3 and IC3-24 (see Table 4-1).

Table 4-1.

	IC2(IC3) Pin No.			
SIGNAL	12(22)	11(17)	10(3)	9(24)
OFF	1	1	1	1
PEAK	0	1	0	1
WAIL	1	1	0	0
YELP	1	0	0	1
HI-LO	0	1	1	0
COAST*	1	1	0	1

*Coast is part of Wail or Peak and Hold (see paragraph 4-6.E.).

Some of the signal production circuitry is external to IC3. R11 and C6 are connected to IC3-16. These two components control the frequency of the rate oscillator, in IC3, to approximately 360Hz. The rate oscillator controls the cycle rate of the Wail, Yelp and Hi-Lo Signals.

R12, R14, and R19 control the frequency of the tones in the Hi-Lo signal.

R15, R16, R17, R20 and R21 control the waveshape of the Wail and Yelp signals. C8 is an integrating capacitor that controls the signal envelope. R18 sets the gain of an amplifier that is internal to IC3. This controls the frequency range of the output signal.

F. Preamplifier and Output Stages.

Preamplifier, IC4 amplifies all audio signals to the level necessary to drive the output stages. After IC4 amplifies the signal, it is coupled from IC4-8 through C17 to the primary of T1. T1 applies a paraphase input to the push-pull amplifier stages. The network consisting of R34, R35, CR4 and RT1 is a biasing circuit that improves amplifier linearity. The power amplifier consists of Q5, Q6, Q7 and Q8. These stages amplify the signal power to the level required to drive speaker(s). This amplified signal is coupled through T2 to the SPKR terminals.

4-7. AIR HORN BOARD.

The air horn board is not a user serviceable component. Refer to Section V for instructions on returning a faulty component to the factory.

4-8. DIFFERENCES BETWEEN CALIFORNIA JC2 AND STANDARD JS2.

The Model JC2, the California version of the Model JS2, is identical to the JS2 in most respects. The JC2 has two stationary lamps on the driver's side, a steady burning red lamp facing forward, and a flashing amber lamp facing the rear.

The flasher circuitry on the JC2 is wired differently than the JS2. Relay K701 flashes the amber light and K702 controls the red lamp. Both relay control lines are connected to the STROBE terminal (TB1-10) on the interface board. Diodes CR8 and CR9 are installed on the interface board of California versions. The steady burning red and flashing amber will be activated when the Model JSC rotary switch is set to SEC, PRI, WAIL, YELP or HI-LO; or when the Model ASM*2 strobe control switch (Switch 2-left) is actuated.

On California versions, the motor and lamps are powered in a different manner. There is no microswitch/cam assembly on Model JC2. ON OVERRIDE engages the relay and the relay contacts supply power to the motor and rear lamps. The front lamps are still powered via the front cutoff relay on the interface PC board.

4-9. NOISE INHIBITOR BOARD (Optional).

The noise inhibitor board is designed to be installed in units which exhibit speaker noise when the vehicle's two-way radio microphone is keyed. The noise inhibitor board will cut off the light/sound system's audio output when the siren is in STBY, SEC, PRI, RAD or PA modes and RF energy is present. Refer to figure 5-14 for the noise inhibitor schematic diagram.

SECTION V
SERVICE AND MAINTENANCE

5-1. SERVICE.

Except for the custom chips and the PROM, most of the electronic components used in the unit are standard parts that are available at most electronic supply outlets.

The factory can and will service your equipment or provide technical assistance with problems that cannot be handled satisfactorily and prompty locally.

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

Address all communications and shipments to:

Service Department
Signal Division
Federal Signal Corporation
2645 Federal Signal Drive
Park Forest South, IL 60466

The following diagrams are provided to assist repair personnel when service to the equipment is required.

Fig.	Diagram
5-1	Model JSC* Control Center Schematic Diagram
5-2	Model JSC* Front PC Board Component Location Diagram.
5-3	Model JSC* Rear PC Board Component Location Diagram.
5-4	Model ASM*2 Auxiliary Switch Module Schematic Diagram.
5-5	Model ASM*2 Auxiliary Switch Module Component Location Diagram.
5-6	Interface Board Schematic Diagram.
5-7	Interface Board Component Location Diagram.
5-8	Model JS2*Flasher Schematic Diagram.
5-9	Model JS2* Flasher Component Location Diagram.
5-10	Siren Amplifier Schematic Diagram.
5-11	Siren Amplifier Component Location Diagram.
5-12	Air Horn Board Schematic Diagram.
5-13	Air Horn Board Component Location Diagram.
5-14	Noise Inhibitor Board Schematic Diagram.
5-15	Noise Inhibitor Board Component Location Diagram.
5-16	JetSonic Exploded View.

5-2. BASIC MAINTENANCE.

WARNING

High voltages are present inside the Light Assembly when the strobe light option is installed. Wait at least ten (10) minutes, after shutting off power, before servicing the light bar.

A. Cleaning the Plastic Domes.

Ordinary cleaning of the plastic domes can be accomplished by using mild soap and a soft rag. Should fine scratches or a haze appear on the domes, they can ordinarily be removed with Federal Dome and Chrome Cleaner (Federal Part No. 8287B349A). CAUTION: The use of other materials such as strong detergents, solvents, petroleum products, etc. can cause crazing (cracking) of the plastic domes.

B. Lamp Replacement.

CAUTION

Always allow lamps to cool before removing.

1. Replace 50-watt halogen lamps with Federal Part No. 8107A119 and 35-watt with 8548A028.

2. Replace strobe lamps with Federal Part No. 8107A127.

C. Lubrication.

At least once a year, lubricate the lamp shaft bearings with a drop of SAE10 oil and apply a film of light grease to the worm.

D. Cleaning Reflectors and Mirrors.

Use a soft tissue to clean the reflector and mirrors. Avoid heavy pressure and use of caustic or petroleum base solvents which will scratch or dull the surface.

5-3. ADJUSTMENTS.

A. Alley Lights.

The alley lights may be adjusted up to 7° toward the front or rear. To adjust, loosen the center screw and rotate the reflector and socket assembly to the required angle. Tighten screw after completing adjustment.

B. Flashing Lights.

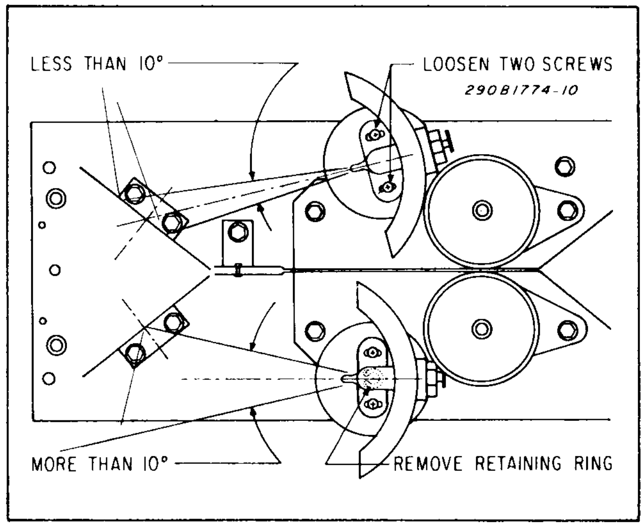
In the flashing light mode, each reflector assembly should be aimed at the center of its end mirror. This adjustment has been made at the factory and will ordinarily require no additional adjustment. However, should an adjustment be necessary, the reflector assembly may be re-aimed by performing the following procedure:

1. Operate unit in the flashing mode, to set the reflector assemblies in the initial aiming position.

2. Turn off power. Visually check each reflector, in relation to its end mirror, to determine if adjustment is necessary.

3. If the adjustment required is 10° or less, proceed as follows:

a. Loosen the two screws which secure the reflector assembly to the gear (see diagram below).



b. Rotate the reflector assembly to the proper position and retighten the screws.

4. If the adjustment required is more than 10°, proceed as follows:

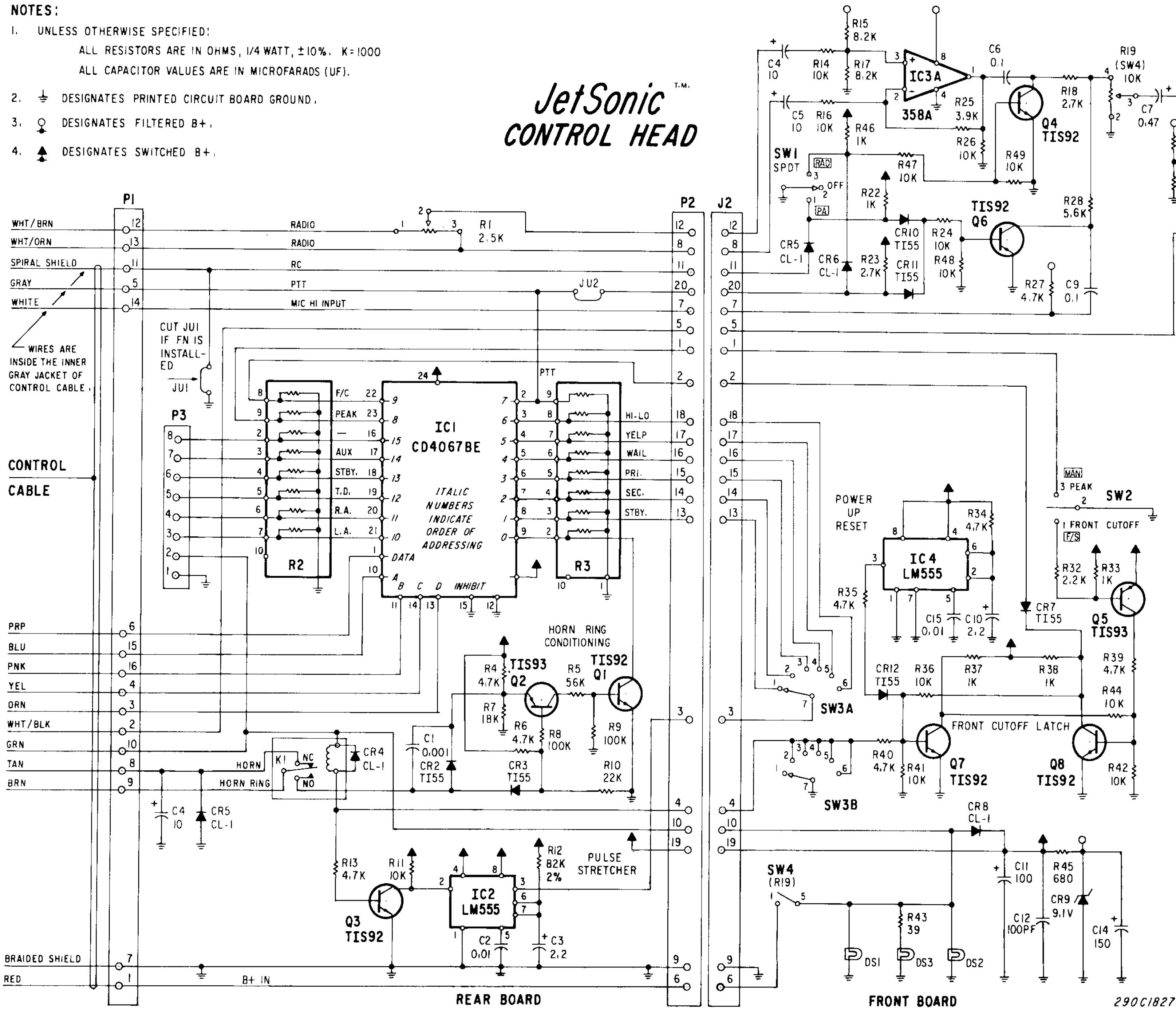
a. Remove the retaining ring (see diagram). Lift the gear and reflector assembly to disengage the gear teeth.

b. Rotate the assembly to the correct aiming position. Engage the gear teeth and reinstall the retaining ring.

c. To complete the adjustment, repeat step 3.

NOTES:

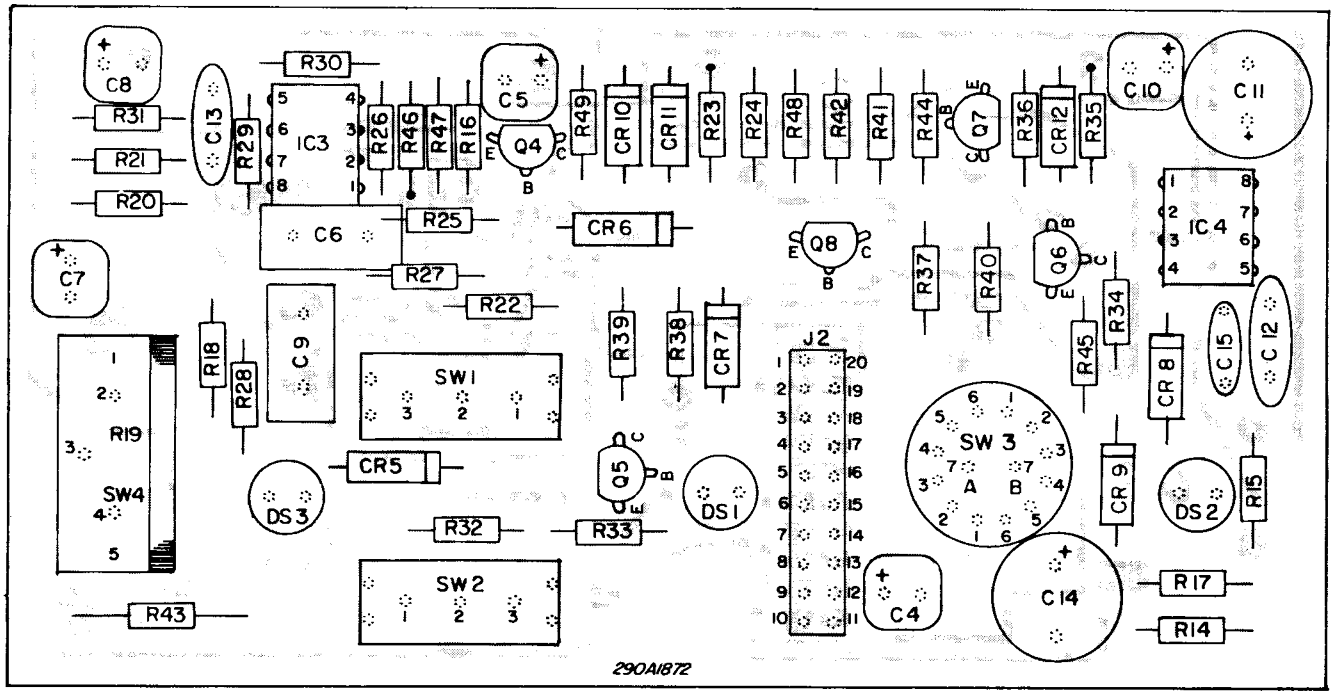
1. UNLESS OTHERWISE SPECIFIED:
   ALL RESISTORS ARE IN OHMS, 1/4 WATT, ±10%. K=1000
   ALL CAPACITOR VALUES ARE IN MICROFARADS (UF).
2. ⏚ DESIGNATES PRINTED CIRCUIT BOARD GROUND.
3. ⚲ DESIGNATES FILTERED B+.
4. ▲ DESIGNATES SWITCHED B+.



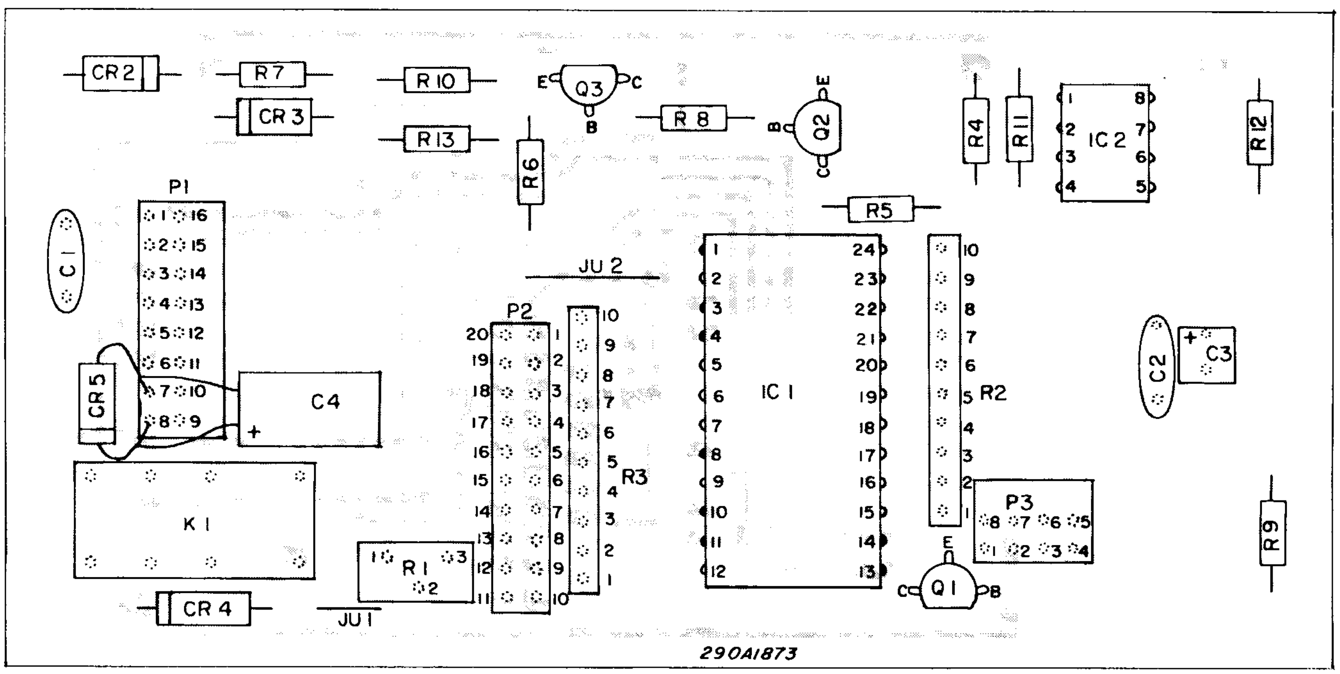
P1 PIN OUT	
PIN	FUNCTION
1	B+ IN
2	AUDIO OUT
3	ADDRESS D
4	ADDRESS C
5	PTT (MIC)
6	DATA
7	GROUND
8	HORN
9	HORN RING
10	SWITCHED B+
11	RELAY CONTROL
12	RADIO
13	RADIO
14	MIC IN
15	ADDRESS A
16	ADDRESS B

P3 PIN OUT	
PIN	FUNCTION
1	GROUND
2	SWITCHED B+
3	LEFT ALLEY
4	RIGHT ALLEY
5	TAKE DOWN
6	STROBE
7	AUXILIARY
8	——

5-1. Model JSC Control Center Schematic Diagram.*



5-2. *Model JSC* Front PC Board Component Location Diagram.*



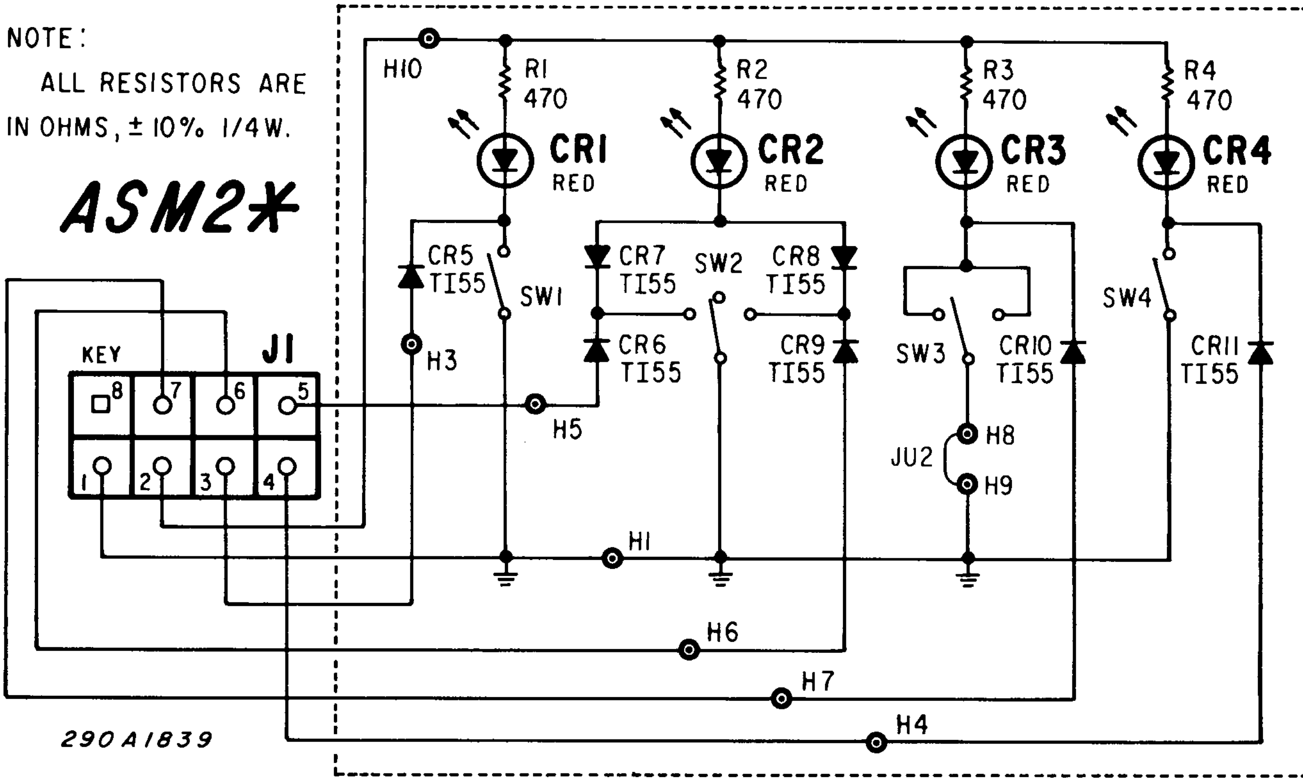
5-3. *Model JSC* Rear PC Board Component Location Diagram.*

PARTS LIST
MODEL JSC* CONTROL CENTER

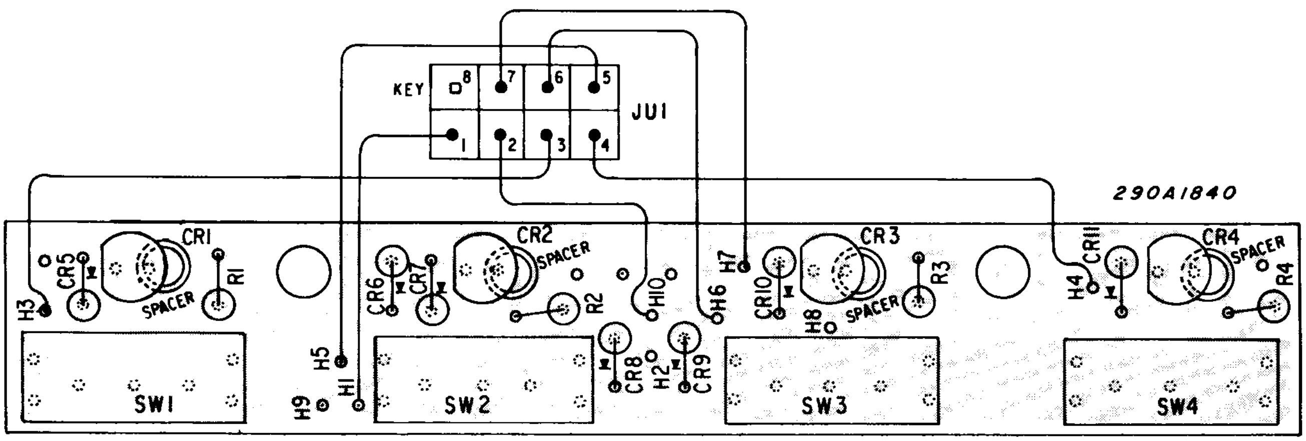
Schematic Symbol	Description	Part No.
	***RESISTORS**	
R1	2K Ohm, Potentiometer	100A258
R2,3	47K Ohm, Resistor Network	100A803
R4,6,27,34, 35,39,40	4700 Ohm	100A224
R5	56K Ohm	100A229
R7	18K Ohm	100A204
R8,9	100K Ohm	100A222
R10,13	22K Ohm	100A208
R11,14,16,24, 26,29,30,31, 36,41,42,44, 47,48,49	10K Ohm	100A207
R12	82K Ohm, 5%	100A757
R15,17	8200 Ohm	100A268
R18,23	2700 Ohm	100A206
R19	Switch/Pot.,Thumbwheel	104B116
R20	12K Ohm	100A269
R21	82K Ohm	100A230
R22,33,37,38, 46	1000 Ohm	100A233
R25	3900 Ohm	100A273
R28	5600 Ohm	100A253
R32	2200 Ohm	100A221
R43	39 Ohm	100A286
R45	680 Ohm	100A231

*Unless otherwise specified, all RESISTORS are in ohms, ±10%, 1/4 watt.

Schematic Symbol	Description	Part No.
	CAPACITORS	
C1	0.001UF,500V,Disc	107A263
C2,15	0.01UF,25V,Disc	107A226
C3	2.2UF,20V,Tantalum	107A636
C4,5	10UF,16V,Electrolytic	108A143
C6,9	0.1UF,25V,Mylar	107A406
C7,8	0.47UF,35V,Tantalum	107A645
	CAPACITORS (continued)	
C10	2.2UF,25V,Electrolytic	108A142
C11	100UF,16V,Electrolytic	108A146
C12	100PF,100V,Disc	107A235
C13	200PF,25V,Disc	107A254
C14	150UF,16V,Electrolytic	108A147
	SEMICONDUCTORS	
CR2,3,7,10, 11,12	Diode,T155	115B101
CR4,5,6,8	Diode, CL1 (ED3002S)	115B301
CR9	Diode, Zener, 1N960B	115A210
IC1	Integrated Circuit, CD4067BE	128B089
IC2,4	Integrated Circuit, LM555C	128A043-02
IC3	Integrated Circuit, LM358	128A045
Q1,3,4,6, 7,8	Transistor,NPN,TIS92	125B132
Q2,5	Transistor, PNP, TIS93	125B133
	MISCELLANEOUS	
K1	Relay,12V,280 Ohm,DPDT	131A130A-01
P1	Connector, 16-position	140A205A
P2	Connector, 10-position (2 required)	140A204A
P3	Connector, 8-position	140A205A-01
J2	Connector, 20-position	139A191
SW1	Switch, Rocker (RAD/PA)	122B190
SW2	Switch,Rocker (MAN/F/C)	122B191
SW3	Switch,Rotary, 6-position	122B195-06
DS1,2,3	Lamp, Sub-miniature	149A117
	Knob, 1/8-inch Mounting	141A120
	PC Board, Rear (with parts)	200C830
	PC Board, Front (with parts)	200C834



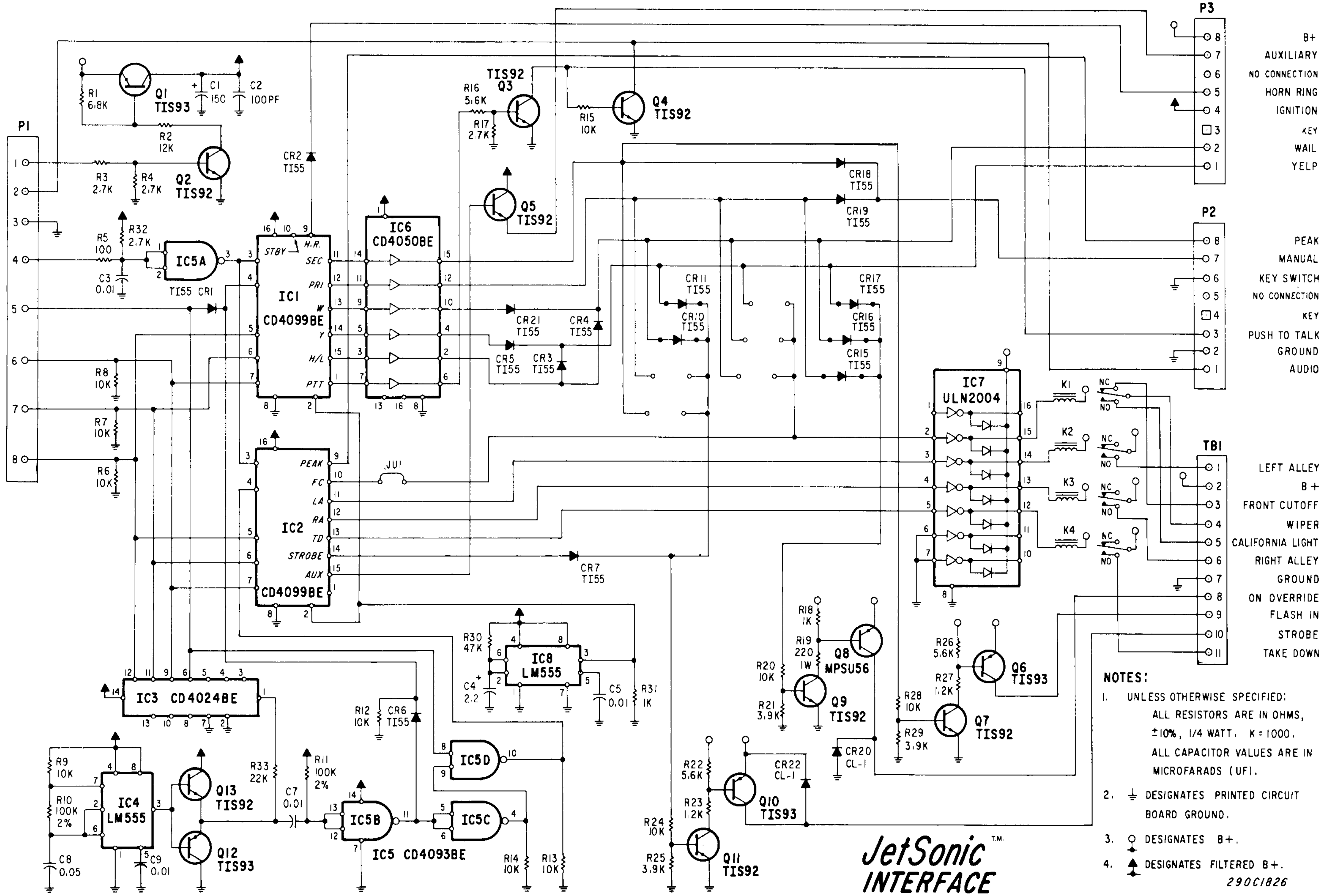
5-4. *Model ASM*2 Auxiliary Switch Module Schematic Diagram.*



5-5. *Model ASM*2 Auxiliary Switch Module Component Location Diagram.*

PARTS LIST
MODEL ASM*2 AUXILIARY SWITCH MODULE

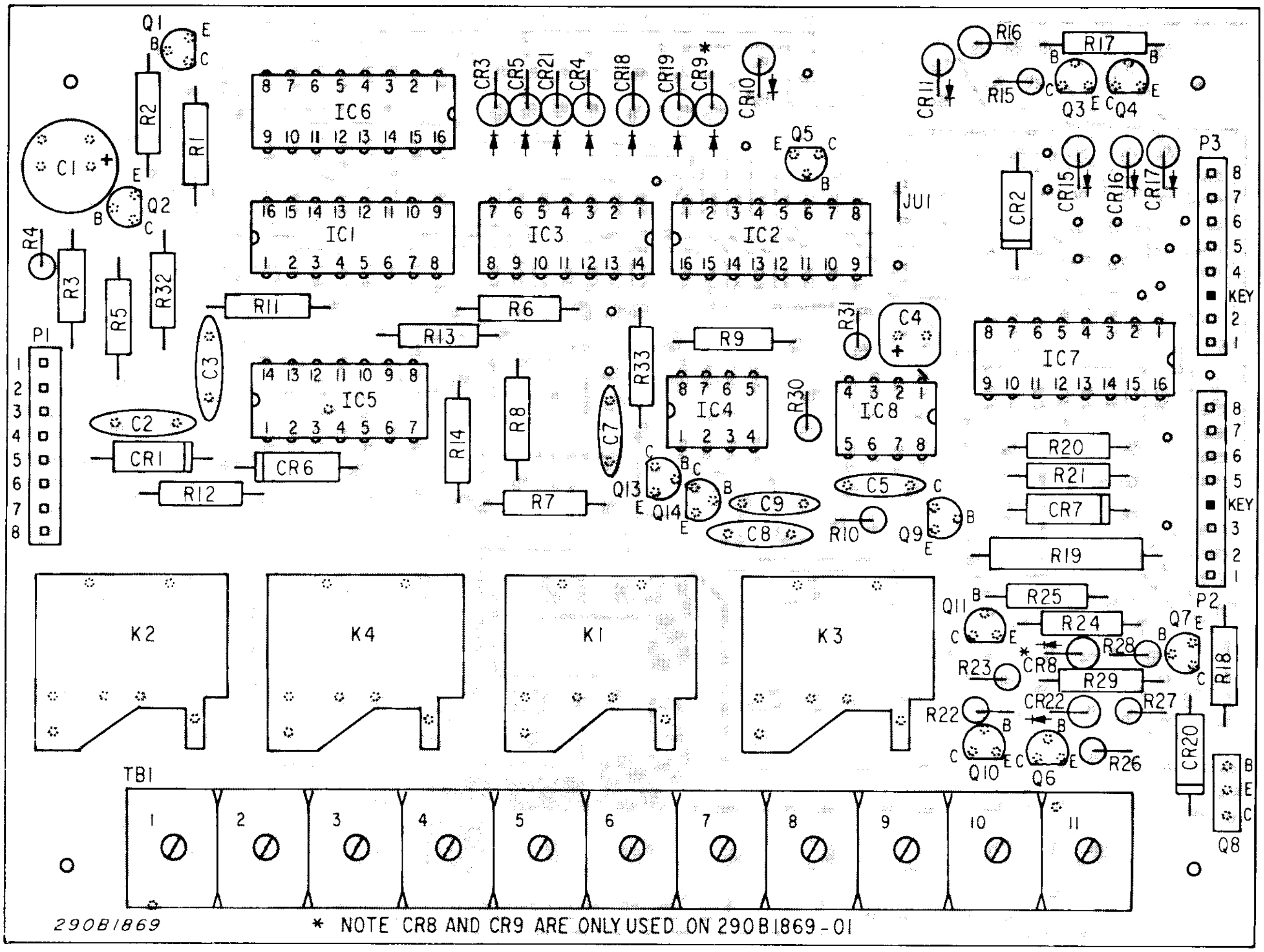
Schematic Symbol	Description	Part No.
R1,2,3,4	Resistor, 470 Ohm, 10%, 1/4 Watt	100A255
CR1,2,3,4	LED, Red	147A113A-01
CR5 thru 11	Diode, TI55	115B101
SW1,4	Switch, Rocker (on-none-on)	122B192
SW2	Switch, Rocker (on-off-on)	122B190
SW3	Switch, Rocker ((on)-off (on))	122B191
J1	Connector, 8-contact	139A198
	Plug, Keying	231A149
	Stud Retainer	8540A060
	PC Board (with parts)	200A848



NOTES:

1. UNLESS OTHERWISE SPECIFIED: ALL RESISTORS ARE IN OHMS, ±10%, 1/4 WATT, K = 1000. ALL CAPACITOR VALUES ARE IN MICROFARADS (UF).
2. ⏚ DESIGNATES PRINTED CIRCUIT BOARD GROUND.
3. ○ DESIGNATES B+.
4. ▲ DESIGNATES FILTERED B+.

5-6. *Interface Board Schematic Diagram.*



5-7. Interface Board Component Location Diagram.

PARTS LIST
INTERFACE PC BOARD

Schematic Symbol	Description	Part No.
R1	6800 Ohm	100A210
R2	12K Ohm	100A269
R3,4,17,32	2700 Ohm	100A206
R5	100 Ohm	100A236
R6,7,8,9,12, 13,14,15,20, 24,28	10K Ohm	100A207
R10,11	100K Ohm, 2%	100A780
R16,22,26	5600 Ohm	100A253
R18,31	1000 Ohm	100A233
R19	270 Ohm, 1 Watt	100A502
R21,25,29	3900 Ohm	100A273
R23,27	1200 Ohm	100A295
R30	47K Ohm	100A228
R33	22K Ohm	100A208

*Unless otherwise specified, all RESISTORS are in ohms, ±10%, 1/4 watt.

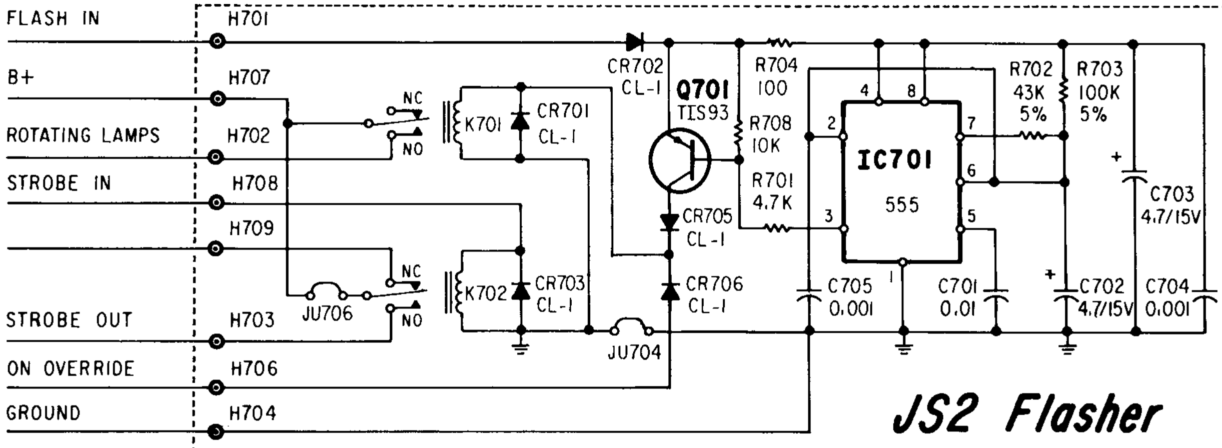
CAPACITORS

Schematic Symbol	Description	Part No.
C1	150UF, 16V, Electrolytic	108A147
C2	100PF, 100V, Disc	107A235
C3,5,7,9	0.01UF, 25V, Disc	107A226
C4	2.2UF, 20V, Tantalum	107A636
C8	0.05UF, 25V, Disc	107A227

Schematic Symbol	Description	Part No.
CR1 thru 7, 10,11,15,16,17 18,19,21	Diode, TI55	115B101
CR20,22	Diode, CL1 (ED3002S)	115B301
IC1,2	Integrated Circuit, CD4099BF	128A091
IC3	Integrated Circuit, MC14024BAL	128A076-01
IC4,8	Integrated Circuit, LM55C	128A043-02
IC5	Integrated Circuit, CD4093BF	128B093
IC6	Integrated Circuit, CD4050BF	128A092
IC7	Integrated Circuit, ULN2004A	128A090
Q1,6,10.12	Transistor, PNP, TIS93	125B133
Q2,3,4,5,7, 9,11,13	Transistor, NPN, TIS92	125B132
Q8	Transistor, PNP, MPSU56	125A440

MISCELLANEOUS

Schematic Symbol	Description	Part No.
K1,2,3,4	Relay, 12-Volt	8536A401
P1,2,3	Connector, Wafer	140A170
TB1	Terminal Block, 11-position	229A161
	Printed Circuit Board, (with parts)	220D842



NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES ARE IN OHMS, ± 10%, 1/4 W. K = 1000
2. ALL CAPACITOR VALUES ARE IN MICROFARADS (UF).

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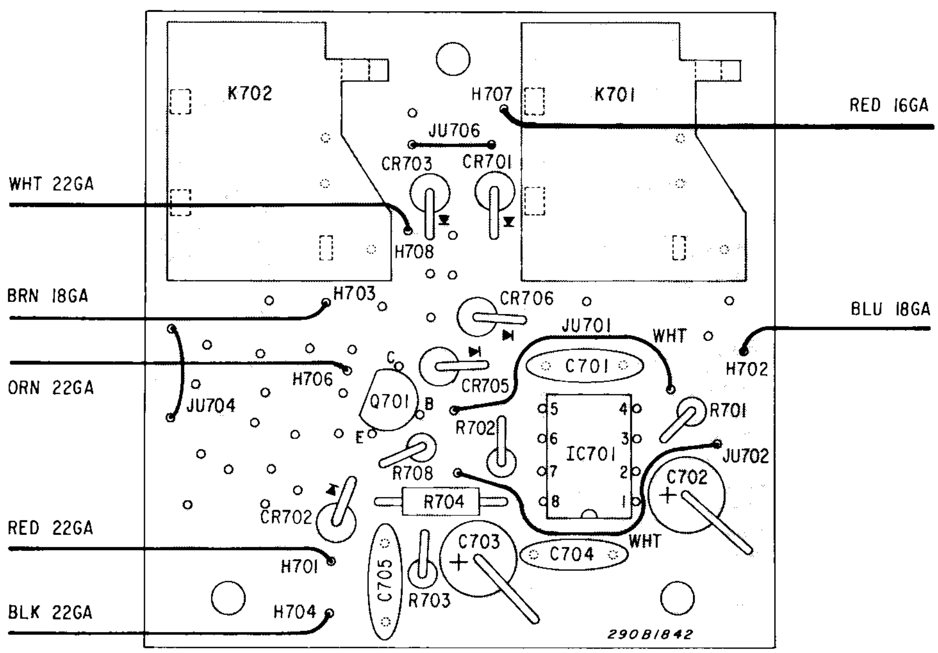
5-8. *Model JS2* Flasher Schematic Diagram.*



5-9. *Model JS2* Flasher Component Location Diagram.*

PARTS LIST
MODEL JS2 FLASHER BOARD

Schematic Symbol	Description	Part No.
R701	Resistor, 4700 Ohm, 10%, 1/4 Watt	100A224
R702	Resistor, 43K Ohm, 5%, 1/4 Watt	100A710
R703	Resistor, 100K Ohm, 5%, 1/4 Watt	100A262
R704	Resistor, 100 Ohm, 10%, 1/4 Watt	100A236
R708	Resistor, 10K Ohm, 10%, 1/4 Watt	100A207
C701	Capacitor, 0.01UF, 25V, Disc	107A226
C702,703	Capacitor, 4.7UF, 15V, Tantalum	107A678
C704,705	Capacitor, 0.001UF, 500V, Disc	107A263
CR701 thru 706	Diode, CL1 (ED3002S)	115B301
IC701	Integrated Circuit, LM555C	128A043A-02
Q701	Transistor, PNP, TIS93	125B133
K701,702	Relay, 12-volt	8536A401
	Printed Circuit Board (with parts)	200C722-02

PARTS LIST
SIREN AMPLIFIER ASSY.

Schematic Symbol	Description	Part No.
	RESISTORS (See Note 2)	
R1	2200 Ohm	100A221
R2,24,25,27	1000 Ohm	100A233
R3,26,46, 47,49	10K Ohm	100A207
R4,43	560 Ohm	100A274
R5	330K Ohm	100A212
R6	470 Ohm	100A311
R7	220 Ohm	100A219
R8	33 Ohm, 2 Watt	103A132
R9	15 Ohm, 2 Watt	103A116
R10,37,38	150 Ohm	100A238
R11,15,17	47K Ohm, 2%	100A778
R12	See Note 1	
R13	See Note 1	
R14	See Note 1	
R16	2700 Ohm, 2%	100A773
R18	8200 Ohm, 2%	100A783
R19	See Note 1	
R20	6800 Ohm, 2%	100A762
R21	100K Ohm, 2%	100A780
R22	15K Ohm	100A203
R23	18K Ohm	100A204
R29	5K Ohm, Potentiometer	105A248
R30,31	10 Ohm	100A251
R32	270 Ohm,2 Watt,Wirewound	103A128
R33	100 Ohm, Potentiometer	105A250
R34	8.2 Ohm, 5%	100A724
R35	27 Ohm, 5%	100A290
R36	39 Ohm	100A286
R39,40	0.47 Ohm,2Watt,Wirewound	103A130
R44	5 by 10K Resistor Network	100A802
R45	9 by 10K Resistor Network	100A801
R48	4700 Ohm	100A224
R51	Thermistor, 200 Ohm	104A111

NOTES

1.

2 TONE HI-LO

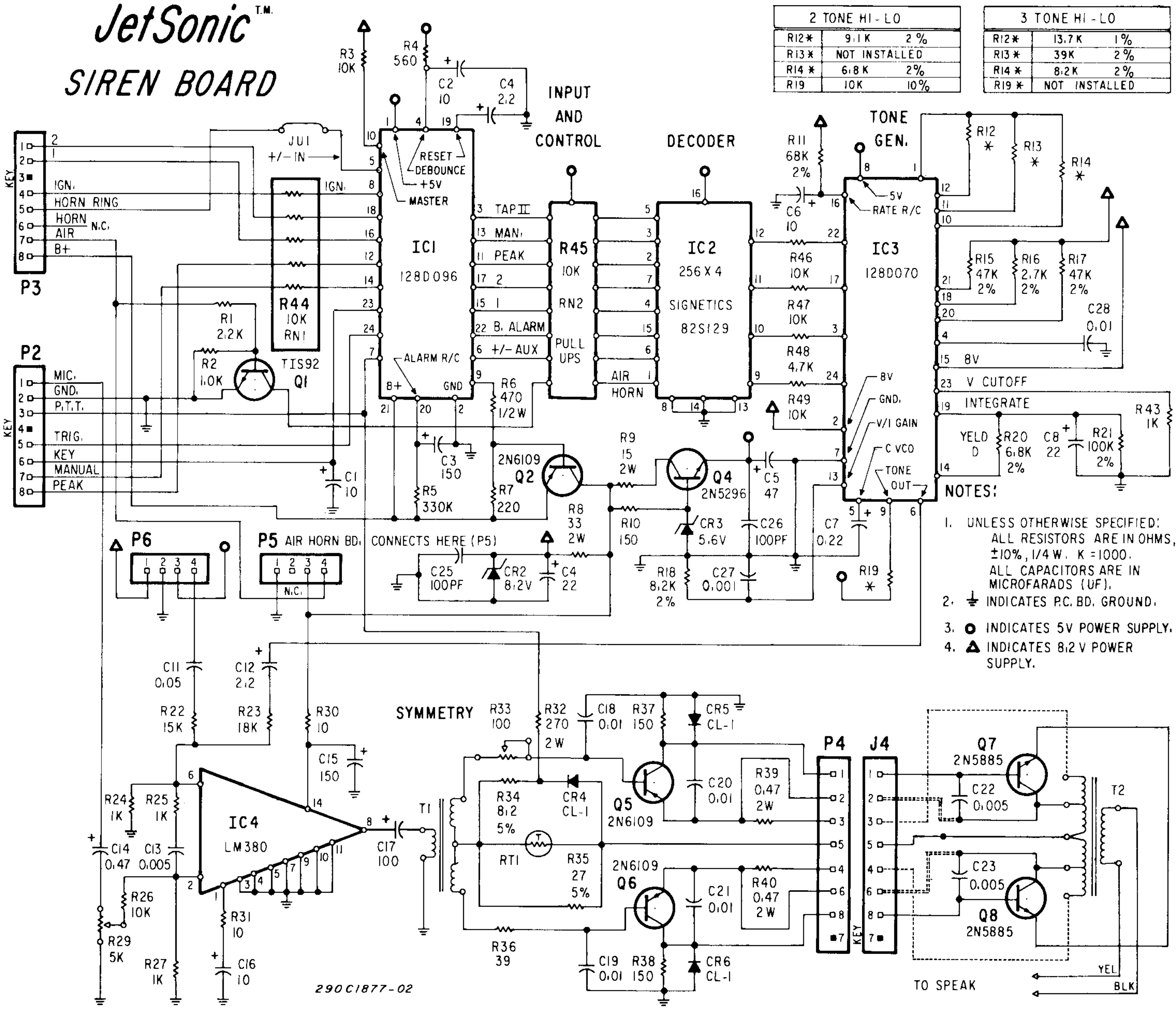
R12	9100 Ohm, 2%	100A781
R13	Not installed	
R14	6800 Ohm, 2%	100A762
R19	10K Ohm	100A207

3 TONE HI-LO

R12	13.7K, 1%	
R13	39K, 2%	
R14	8200, 2%	
R19	Not installed	

2. Unless otherwise specified, all RESISTORS are in Ohms, ±10%, 1/4 watt.

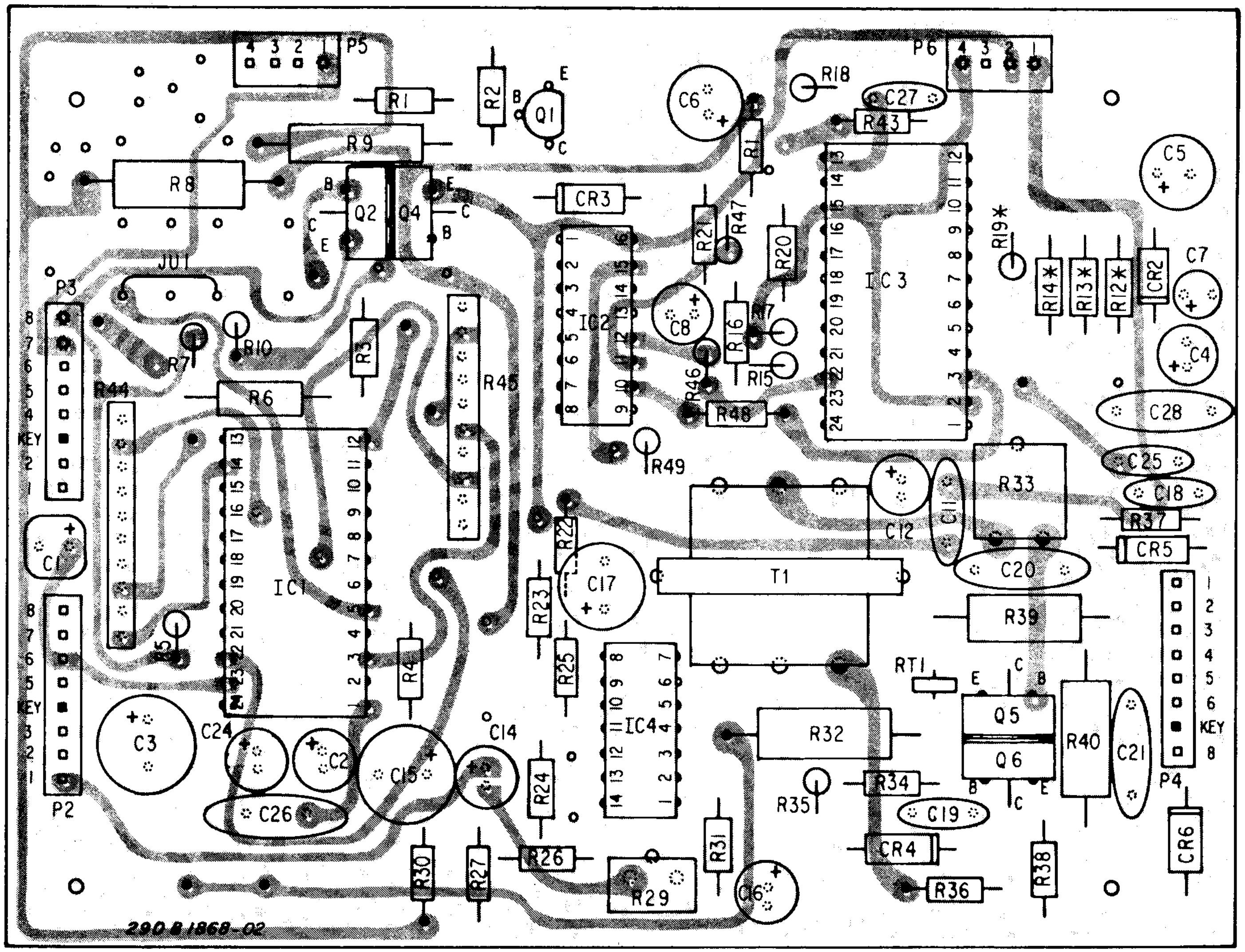
Schematic Symbol	Description	Part No.
	CAPACITORS	
C1,2,16	10UF, 16V, Electrolytic	108A143
C3,15	150UF, 16V, Electrolytic	108A147
C4	22UF, 16V, Electrolytic	108A144
C5	47UF, 16V, Electrolytic	108A145
C6	10UF, 10V, Tantalum	107A634
C7	0.22UF, Tantalum	107A1101
C8	22UF, 15V, Tantalum	107A677A-02
C11	0.05UF, 25V, Disc	107A227
C12,24	2.2UF, 25V, Electrolytic	108A142
C13,22,23	0.005UF, 100V, Disc	107A211
C14	0.47UF, Tantalum	107A645
C17	100UF, 16V, Electrolytic	108A146
C18,19,28,29	0.01UF, 25V, Disc	107A226
C20,21	0.01UF, 100V, Disc	107A223
C25,26	100PF, 100V, Disc	107A235
C27	0.001UF, 500V, Disc	107A263
	SEMICONDUCTORS	
CR2	Diode,1N4738,8.2V,Zener	115A232
CR3	Diode, 5.6V, Zener	115A254
CR4,5,6	Diode, CL1 (ED3002S)	115B301
IC1	Integrated Circuit, Siren Control	128D069
IC2	Integrated Circuit, PROM (Prog. No. 1)	128A055A-01
IC3	Integrated Circuit, Tone Gen.	128D070
IC4	Integrated Circuit, LM380N	128A046
Q1	Transistor,NPN,TIS92	125B132
Q2,5,6	Transistor,PNP,2N6109	125B431
Q4	Transistor,NPN,2N5296	125B415
Q8,9	Transistor,NPN,2N5885	125B432
	MISCELLANEOUS	
T1	Transformer, Driver	120B145
T2	Transformer, Output (100 watt)	120C154-01
	Transformer, Output (58 watt)	120B124
P2,3,4	Connector, Wafer	140A170
P5,6	Connector, Interlocking	140A186
J2,3,4	Connector, PC Board	233A138
	Fuse, 20-ampere (2)	148A127
	Fuseholder (2)	143A110
	Rectifier, 368AR, 15A 50V (2)	115A311
	Printed Circuit Board, (with parts)	200D775A-02
	PC Board Cover	8552C106



2 TONE HI - LO		
R12*	9.1K	2%
R13*	NOT INSTALLED	
R14*	6.8K	2%
R19	10K	10%

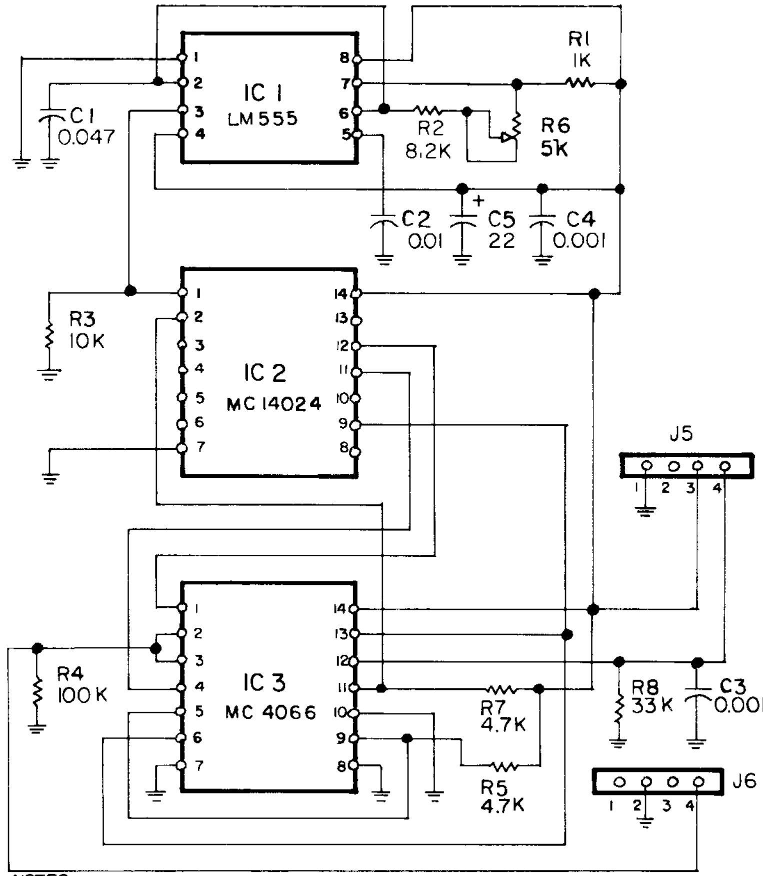
3 TONE HI - LO		
R12*	13.7K	1%
R13*	39K	2%
R14*	8.2K	2%
R19*	NOT INSTALLED	

5-10. Siren Amplifier Schematic Diagram.



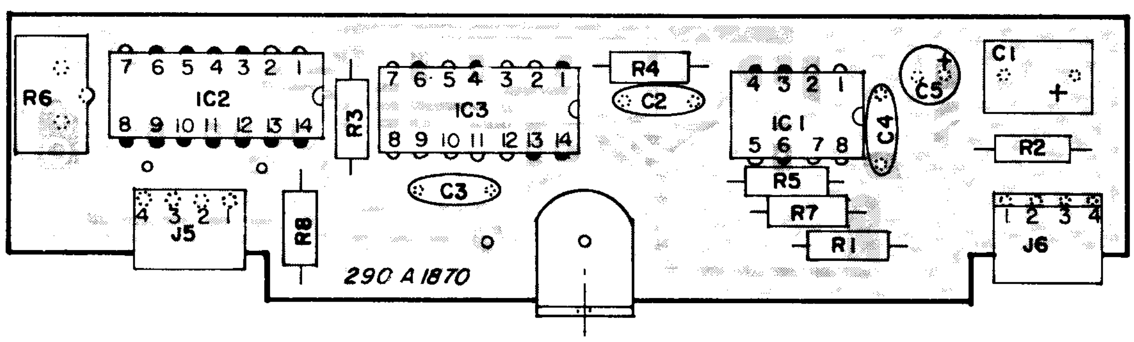
* SEE PARTS LIST

5-11. Siren Amplifier Component Location Diagram.



NOTES:
1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES ARE IN OHMS, ±10%, 1/4 W. K=1000
2. ALL CAPACITOR VALUES ARE IN MICROFARADS (UF).

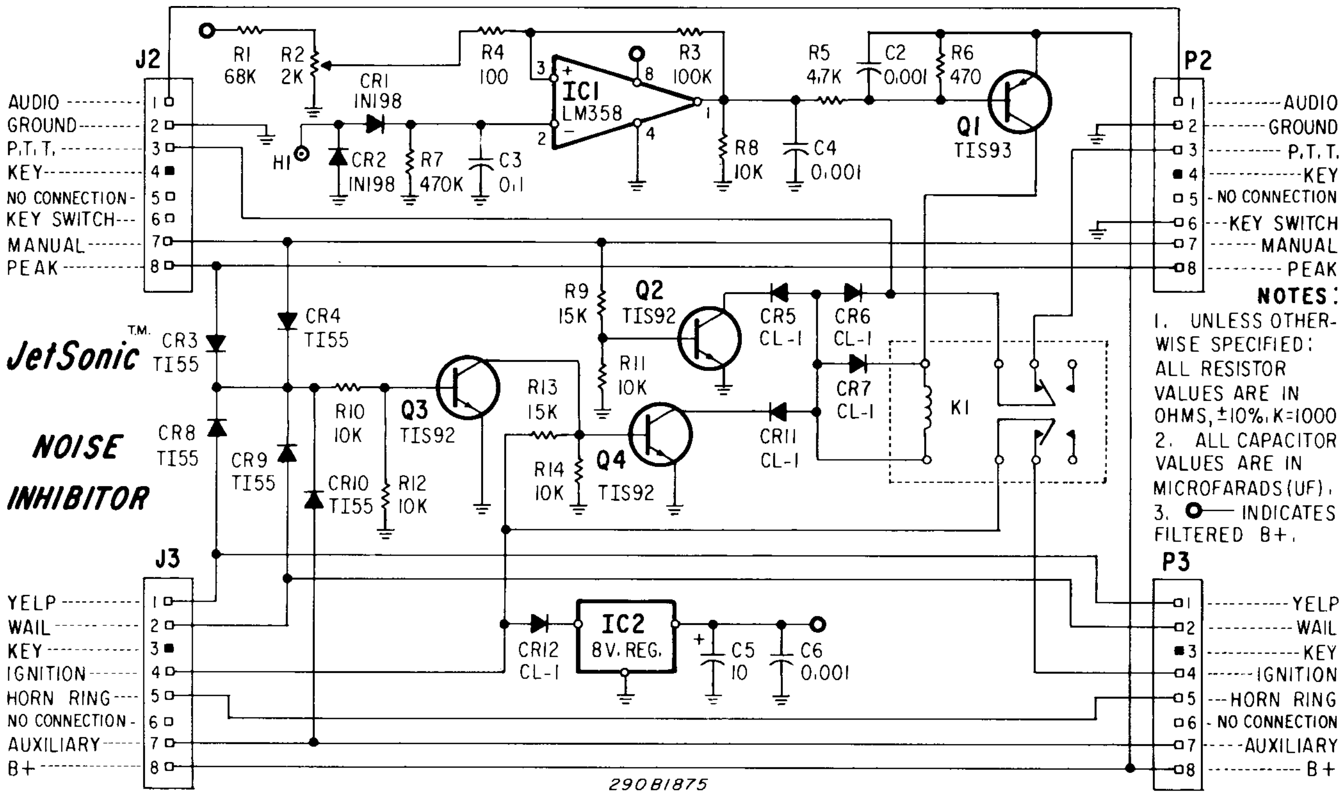
5-12. Air Horn Board Schematic Diagram.



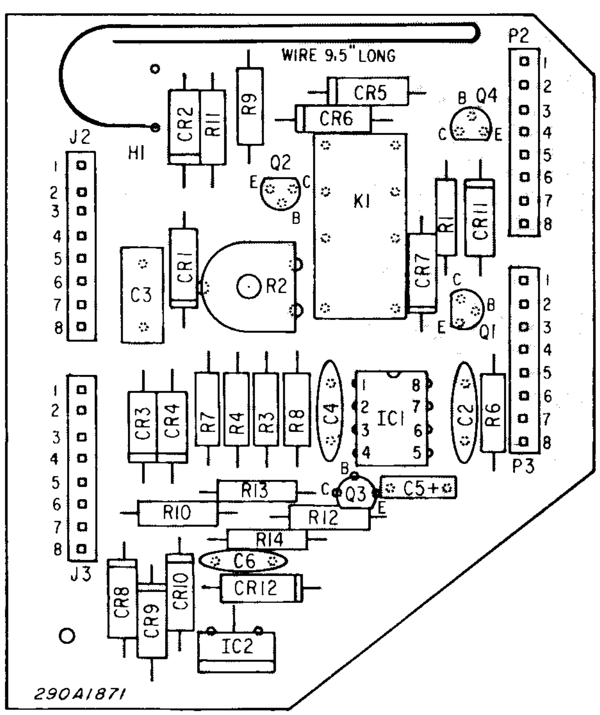
5-13. Air Horn Board Location Diagram.

PARTS LIST
MODEL ASB1* AIR HORN PC BOARD

Schematic Symbol	Description	Part No.
R1	Resistor, 1000 Ohm, 10%, 1/4 watt	100A233
R2	Resistor, 8200 Ohm, 5%, 1/4 watt	100A223
R3	Resistor, 10K Ohm, 10%, 1/4 watt	100A207
R4	Resistor, 100K Ohm, 10%, 1/4 watt	100A222
R5,7	Resistor, 4700 Ohm, 10%, 1/4 watt	100A224
R6	Potentiometer, 5000 Ohm	105A248
R8	Resistor, 33K Ohm, 10%, 1/4 watt	100A211
C1	Capacitor, 0.047UF, 50V, Mylar	107A418
C2	Capacitor, 0.01UF, 50V, Disc	107A213
C3,4	Capacitor, 0.001UF, 500V, Disc	107A263
C5	Capacitor, 22UF, 16V, Electrolytic	108A144
IC1	Integrated Circuit, LM555	128A043A-02
IC2	Integrated Circuit, MC14024B	128A076
IC3	COS/MOS Quad Bilateral Switch, MC14066B	128A047
J5,6	Connector, Right Angle	139A161A-01
	Printed Circuit Board (w/parts)	200C794



5-14. Noise Inhibitor Board Schematic Diagram.



5-15. Noise Inhibitor Board Component Location Diagram.

PARTS LIST
NOISE INHIBITOR BOARD

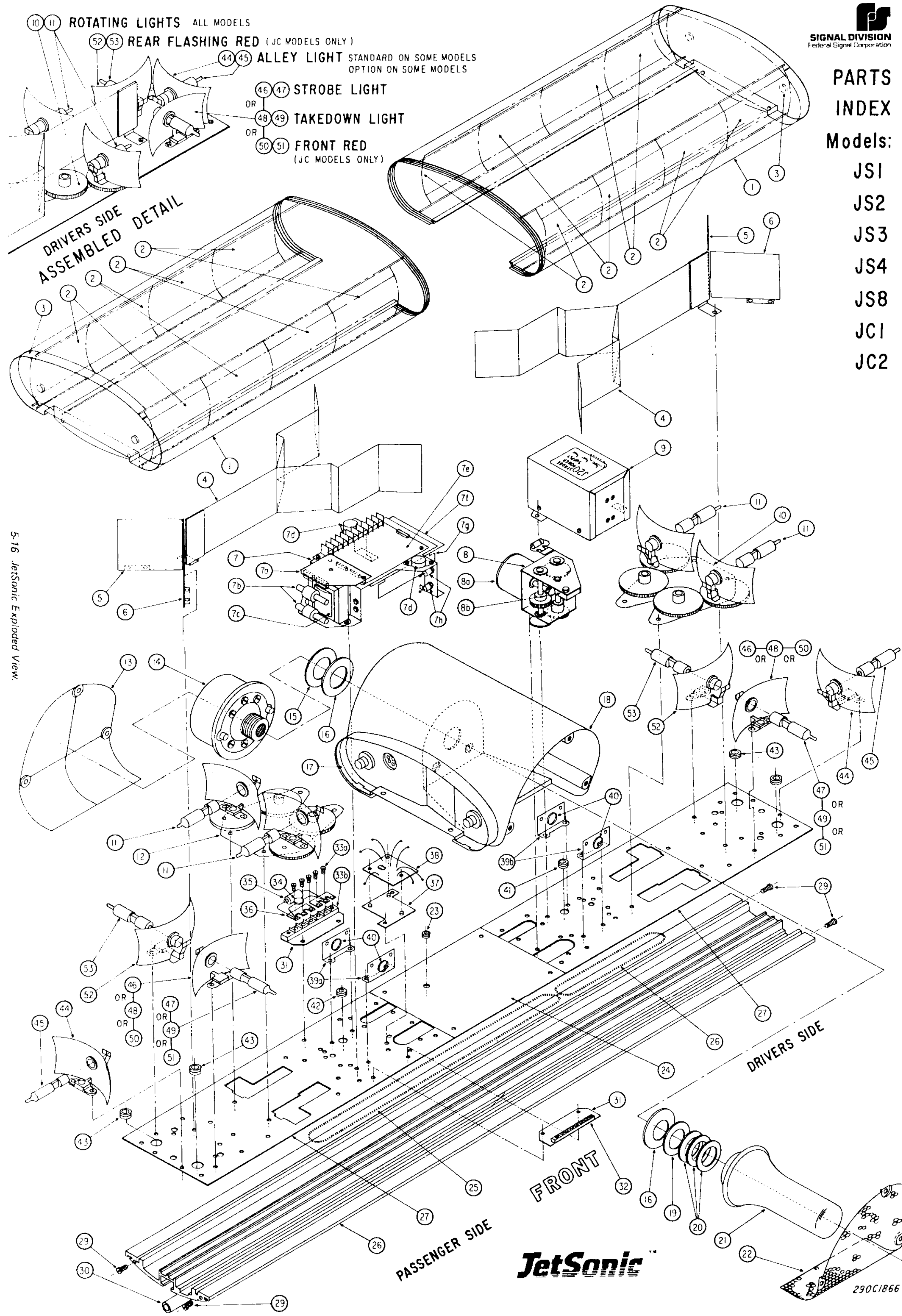
Schematic Symbol	Description	Part No.
R1	Resistor, 68K Ohm, 10%, 1/4 watt	100A235
R2	Potentiometer, 2000 Ohm	106A203A-01
R3	Resistor, 100K Ohm, 10%, 1/4 watt	100A222
R4	Resistor, 100 Ohm, 10%, 1/4 watt	100A236
R5	Resistor, 4700 Ohm, 10%, 1/4 watt	100A224
R6	Resistor, 470 Ohm, 10%, 1/4 watt	100A255
R7	Resistor, 470K Ohm, 10%, 1/4 watt	100A249
R8,11,12,14	Resistor, 10K Ohm, 10%, 1/4 watt	100A207
R9,10,13	Resistor, 15K Ohm, 10%, 1/4 watt	100A203
C2,4,6	Capacitor, 0.001UF, 500V, Disc	107A263
C3	Capacitor, 0.1UF, 100V, Mylar	107A406
C5	Capacitor, 10UF, 10V, Tantalum	107A634
CR1,2	Diode, IN198	115B102
CR3,4,8,9,10	Diode, TI55	115B101
CR5,6,7,11,12	Diode, CL1 (ED3002S)	115B301
IC1	Integrated Circuit, LM358	128B045
IC2	Integrated Circuit, UA78M08CKC	128A097
Q1	Transistor, PNP, TIS93	125B133
Q2,3,4	Transistor, NPN, TIS92	125B132
K1	Relay, DPDT, 280 Ohm, 12-volt	131A130A-01
J2,3	Connector, 8-pin Molex	140A192
P2,3	Connector, Wafer	140A170
	Printed Circuit Board (with parts)	200C873

SIGNAL DIVISION
Federal Signal Corporation

PARTS INDEX

Models:

JS1
JS2
JS3
JS4
JS8
JC1
JC2



5-16 JetSonic Exploded View.

JetSonic™

Light & Sound System

PPL 0189
PARTS LIST

Models : JS1 , JS2 , JS3 , JS4 , JS8 , JC1 , and JC2

JUNE 1983

Item No.	Description	Part No.	JS1	JS1 W/S	JS1 W/T	JS2	JS2 W/S	JS2 W/T	JS3	JS4	JS8	JC1 W/S	JC1 W/T	JC2
	SCHEMATIC REFERENCE: 290A1777-XX		-01	-17	-02	-20	-19	-14	-03	-15	-16	-08	-09	-12
1	Dome , Clear	8552D054-00	2AR	2AR	2AR	2AR	2AR	2AR	2AR	2AR	2AR	2AR	2AR	2AR
	Dome , Red	8552D054-01												
	Dome , Amber	8552D054-02												
	Dome , Blue	8552D054-03												
	Dome , Green	8552D054-04												
2	Insert , Clear	8552C048-00	16AR	16AR	16AR	16AR	16AR	16AR	16AR	16AR	16AR	16AR	16AR	16AR
	Insert , Red	8552C048-01												
	Insert , Amber	8552C048-02												
	Insert , Blue	8552C048-03												
	Insert , Green	8552C048-04												
3	Insert , End , Clear	8552D058-01	2AR	2AR	2AR	2AR	2AR	2AR	2AR	0	0	2AR	2AR	2AR
	Insert , End , Red , W/Cutout	8552D058-02												
	Insert , End , Red	8552D058-03												
	Insert , End , Amber , W/Cutout	8552D058-04												
	Insert , End , Amber	8552D058-05												
	Insert , End , Blue , W/Cutout	8552D058-06												
	Insert , End , Blue	8552D058-07												
	Insert , End , Green , W/Cutout	8552D058-08												
	Insert , End , Green	8552D058-09												
	W/Cutout used with Alley Lights													
4	Mirror Assembly , Long (dbl.)	8552C075	2	2	2	2	2	2	0	0	2	2	2	2
	Mirror Assembly , Long (single)	8552D020	0	0	0	0	0	0	1	1	0	0	0	0
5	Mirror Assembly , Short (rear) Omit on JC Models	8552A023	2	2	2	2	2	2	0	0	2	0	0	0
6	Mirror Assembly , Short (front) Omit with Strobe and Takedown	8552A023	2	0	0	2	0	0	0	0	2	0	0	0
7	Amplifier Chassis Assembly	8552C100	0	0	0	1	1	1	0	1	0	0	0	1
7a	Noise Inhibitor P. C. Board	200C873	0	0	0	1	1	1	0	1	0	0	0	1
7b	Fuse Holder	143A110	0	0	0	2	2	2	0	2	0	0	0	2
7c	Transformer , Output , 100W	120C154-01	0	0	0	1	1	1	0	1	0	0	0	1
	Transformer , Output , 58W	120B124	0	0	0	0	0	0	0	0	0	0	0	0
7d	Transistor , 2N5885	125B432	0	0	0	2	2	2	0	2	0	0	0	2
7e	Interface P. C. Board	200D842	0	0	0	1	1	1	0	1	0	0	0	1
7f	Siren Module P. C. Board	200D775-02	0	0	0	1	1	1	0	1	0	0	0	1
7g	Air Horn P. C. Board (optional)	200C794	0	0	0	OP	OP	OP	0	OP	0	0	0	OP
7h	Rectifier , 368AR , 15A , 50V	115A311	0	0	0	2	2	2	0	2	0	0	0	2
8	Motor , Cam , & Switch Assembly	8552C076B	1	1	1	1	1	1	1	1	1	1	1	1
8a	Motor (replacement)	8422B111-25	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR
8b	Switch , Micro (replacement)	8552A112	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR
9	JS20 , Strobe Power Supply	8552B088	0	1	0	0	1	0	0	0	0	1	0	0
10	Gear Cluster Mechanism Assembly :													
	Drivers Side (2 rotating lights)	855C089	1	1	1	1	1	1	0	0	1	1	1	1
	Drivers Side (1 rotating light)	8552C089-01	0	0	0	0	0	0	1	1	0	0	0	0
11	Lamp , T4 Halogen	8107A119	4	4	4	4	4	4	2	2	4	4	4	4
12	Gear Cluster Mechanism Assembly :													
	Passenger Side (2 rotating lights)	8552C090	1	1	1	1	1	1	0	0	1	1	1	1
	Passenger Side (1 rotating light)	8552C090-01	0	0	0	0	0	0	1	1	0	0	0	0
13	Door , Speaker Housing	8552D059	1	1	1	1	1	1	1	1	1	1	1	1
14/21	Optional Equipment													
14	Driver , Speaker , SA70	8283B433	1	1	1	1	1	1	1	1	1	1	1	1
15	Washer , Steel	7072A137	1	1	1	1	1	1	1	1	1	1	1	1
16	Washer , Velutex	8283A451	2	2	2	2	2	2	2	2	2	2	2	2
17	Gasket , Bulkhead	8552A055	2	2	2	2	2	2	2	2	2	2	2	2
18	Housing , Speaker	8552D057	1	1	1	1	1	1	1	1	1	1	1	1
19	Washer , Velutex	8283A453	1	1	1	1	1	1	1	1	1	1	1	1
20	Washer , Neoprene Rubber	8283A452	3	3	3	3	3	3	3	3	3	3	3	3
21	Cone , Long , Atlas	8283B1001	1	1	1	1	1	1	1	1	1	1	1	1
22	Grille , Speaker	8552C053	1	1	1	1	1	1	1	1	1	1	1	1
23	Grommet	8108A014	1	1	1	1	1	1	1	1	1	1	1	1
24	Plate , Center	8552C042	1	1	1	1	1	1	1	1	1	1	1	1
25	Chain , Drive , Passenger Side	8552A015	1	1	1	1	1	1	1	1	1	1	1	1
26	Chain , Drive , Drivers Side	8552A014	1	1	1	1	1	1	1	1	1	1	1	1
27	Plate , Mounting	8552D022	2	2	2	2	2	2	2	2	2	2	2	2
28	Extrusion , Machined	8552D050	1	1	1	1	1	1	1	1	1	1	1	1
29	1/4-20 x 5/8 Screw, Trs. Hd. Slt. , S.S.	7000A460-10	4	4	4	4	4	4	4	4	4	4	4	4
30	Tubing , Extrusion Gasket	8552A104	1	1	1	1	1	1	1	1	1	1	1	1
31	Bracket	8552A068	2	2	2	2	2	2	2	2	2	2	2	2
32	Terminal Strip , 6 pos.	8552A071	1	1	1	1	1	1	1	1	1	1	1	1
33a	Screws (part of terminal strip)													
33b	Terminal Strip , 5 pos.	8542A080	1	1	1	1	1	1	1	1	1	1	1	1
34	Capacitor , 0.001 mf , Z5U	107A263	1	1	1	1	1	1	1	1	1	1	1	1
35	Capacitor , 500mfd , 15V	108A122	1	1	1	1	1	1	1	1	1	1	1	1
36	Jumper Bracket	8552A079	2	2	2	2	2	2	2	2	2	2	2	2
37	Plate Assembly (flasher board)	8552A082	1	1	1	1	1	1	1	1	1	1	1	1
38	Flasher P.C. Board	200C722-02	1	1	1	1	1	1	1	1	1	1	1	1
39a	Bracket	8552A028	2	2	2	2	2	2	2	2	2	2	2	2
39b	Bracket (not used with item 9)	8552A028	2	0	2	2	0	2	0	0	2	0	2	0
40	Bushing , Snap	8552A072	4	2	4	4	2	4	2	2	4	2	4	4
41	Bushing , 3/8 ID x 9/16 OD	231A144	1	1	1	1	1	1	1	1	1	1	1	1
42	Bushing , Snap , 2836	8552A064	1	1	1	1	1	1	1	1	1	1	1	1
43	Bushing , Snap , 2827	8552A041	4	4	4	4	4	4	4	4	4	4	4	4
44	Reflector Assembly Alley Light	8552A087	OP 2	2	2	OP 2	OP 2	OP 2	0	0	0	OP 2	OP 2	OP 2
45	Lamp , Alley Light	8107A119	2	2	2	2	2	2	0	0	0	2	2	2
46	Reflector Assembly Strobe Light (when used omit mirror, item 6)	8552A087	OP 2/1/0	2	0	OP 2/1	1	0	OP 2	OP 2	0	OP 1	0	OP 1
47	Lamp , Strobe Light	8107A127	2/1/0	2	0	2/1	1	0	2	2	0	1	0	1
48	Reflector Assembly Takedown Light (when used omit mirror, item 6)	8552A087	OP 1/0	1	1	OP 1/0	1	1	0	0	0	0	1	0
49	Lamp , Takedown Light	8107A119	1/0	1	1	1/0	1	1	0	0	0	0	1	0
50	Reflector Assembly Front Red requires red insert , 8552C048-01 in dome. (when used omit mirror, item 6	8552A087	0	0	0	0	0	0	0	0	0	1	1	1
51	Lamp , Front Red	8107A119	0	0	0	0	0	0	0	0	0	1	1	1
52	Reflector Assembly Rear Flashing Amber requires amber insert , 8552C048-02 in dome. requires flasher board 200C722-02, item 38. when used omit mirror , item 5	8552A087	0	0	0	0	0	0	0	0	0	2	2	2
53	Lamp, Rear Flashing Amber	8548A028	0	0	0	0	0	0	0	0	0	2	2	2

KEY: W/S With/Strobe , W/T With/Takedown

AR AS REQUIRED , OP OPTIONAL , O NOT REQUIRED

2/1/0 2 OR 1 OR 0 (OPTIONAL)

2/1 2 OR 1 (OPTIONAL)

DO NOT ORDER PARTS BY ITEM NUMBER.
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