PRICE $2.00

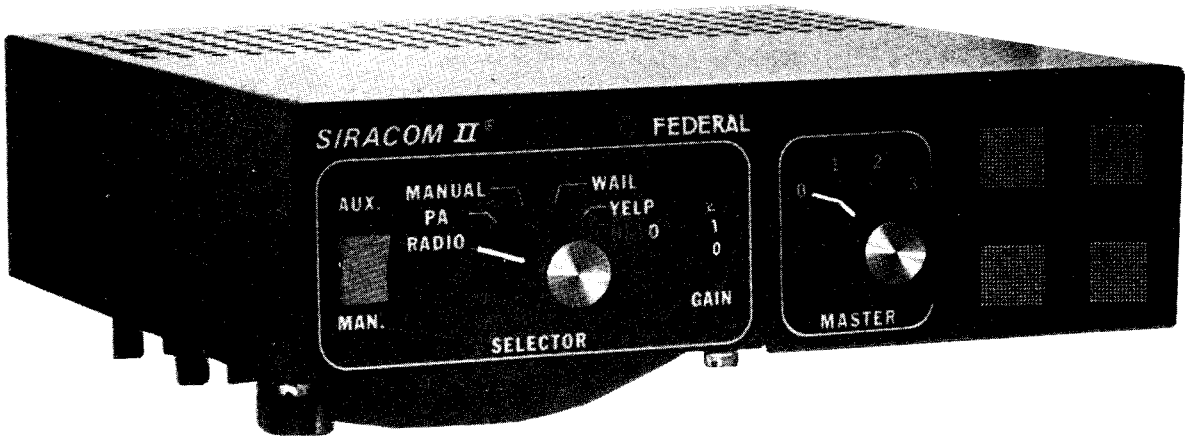
SIGNAL DIVISION
Federal Signal Corporation

MODEL PA2100

Series B

SIRACOM III T.M.

ELECTRONIC SIREN



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.

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SECTION I
GENERAL DESCRIPTION

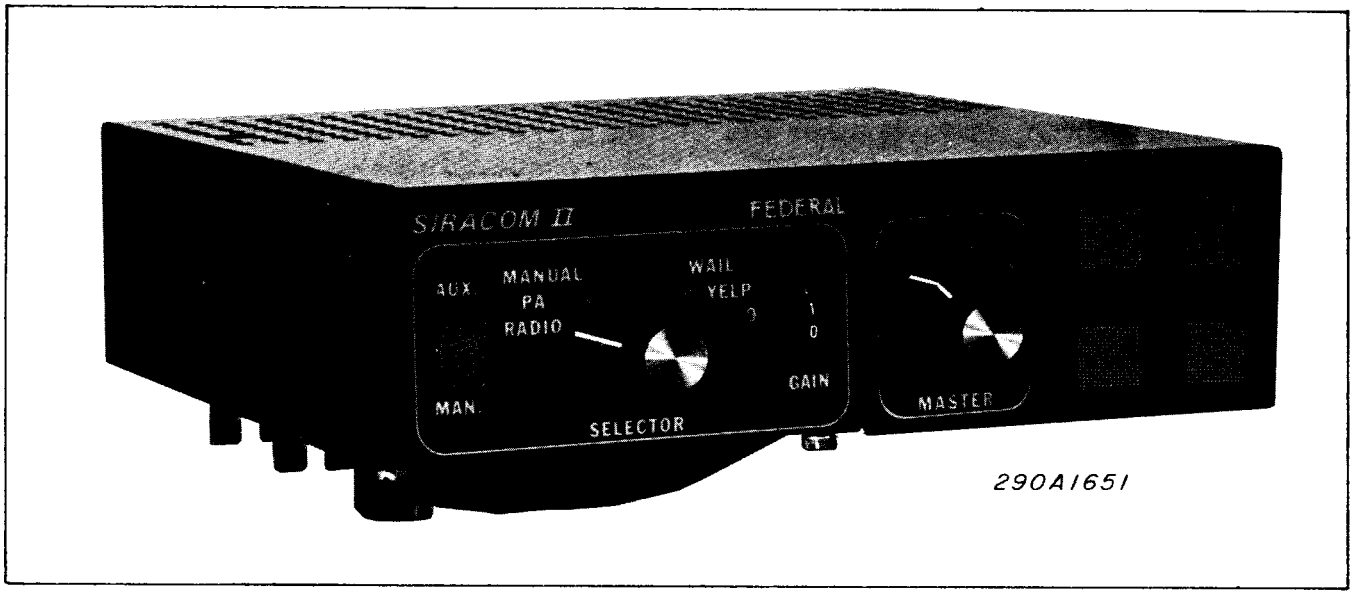


Figure 1-1 Model PA2100SB Siren/Control System.

1-1 GENERAL

The Federal SIRACOM II Model PA2100SB siren (figure 1-1) is a compact, precisely-built Electronic Siren/Control System of advanced design. It consists of a Siren Module and a Control Module. It has provision for accommodating optional lighted pushbutton switches.

The siren is designed to operate from a nominal 12VDC negative ground electrical system. The speaker terminals, on the rear panel in conjunction with a slide switch on the rear of the siren module, inside the housing, allow the use of two 58 watt or two 100 watt speakers or a single 200 watt speaker.

The Siren Module has provisions for public address (PA), amplification of radio messages (radio rebroadcast), manual siren operation and an optional user-installed Auxiliary Sound Board.

The Siren Module can be easily removed from the vehicle without disturbing the wiring to the control switches and without disabling the vehicle accessories such as horn, lights, radio, etc.

The Control Module contains all of the circuitry and devices necessary to control the entire vehicle warning light system and accessories. It also routes power to the Siren Module.

An external 50 ampere, automatic reset circuit breaker is supplied to protect the vehicle warning light system. A panel light and a pilot light are illuminated whenever the vehicle ignition is on.

1-2 SIREN MODULE

Most of the solid state electronic circuitry in the Model PA2100SB Siren Module is mounted on printed circuit boards. This circuitry provides a high level of performance and reliability over a wide range of environmental conditions. The circuitry incorporates feedback that maintains high audio quality for the radio and PA functions. The electronic circuitry in the siren module is protected by a 20 ampere fuse.

The Siren Module produces three siren sounds: WAIL, YELP and HI-LO. In addition, it has provisions for public address (PA) and radio rebroadcast. A

light emitting diode (LED) indicator illuminates when the SELECTOR is set to RADIO (radio rebroadcast). A MAN (manual) rocker switch is also included for control of the Peak and Hold signal.

If it is desired to make use of the provisions for PA and Radio Rebroadcast, a Federal Model MNCT microphone or the vehicle's two-way radio microphone and the appropriate adapter module are required. The Model MNCT microphone and a line of adapter modules to fit most popular makes of two-way radio microphones are available as options from Federal. The adapter modules include the wiring required to interconnect the siren with the microphone and the two-way radio.

The siren can also be operated by an auxiliary switch such as the vehicle horn switch or a foot switch. The unit can still operate manually by depressing the MAN switch if an auxiliary switch is installed.

The TAP II Instant Yelp feature provides push-on, push-off operation when the auxiliary switch is operated while the MASTER switch is in position 3 and the SELECTOR switch is in the MANUAL, WAIL, YELP or HI-LO position.

Model PA2100SB can be used with a Model MNCT microphone or in common with the microphone included with the two-way radio installed in the vehicle. The optional Model MNCT Microphone is a transistorized, noise cancelling microphone that has the characteristics necessary to effectively drive the audio amplifier in the siren.

In common microphone operation, an optional adapter module connects the siren directly to the two-way radio. The common microphone is electrically connected to the two-way radio in all SELECTOR switch positions except PA. When the SELECTOR switch is set to the PA position, the microphone is electrically connected to the siren amplifier so that messages can be announced over the siren speaker system.

1-3 CONTROL MODULE

A. General

The Control Module is designed to be used as a central connection and control location for all vehicle emergency warning devices along with the distribution of power and control of other emergency and safety devices commonly found in an emergency vehicle.

B. MASTER Switch

The four position MASTER rotary switch is used to control the emergency warning light system and the siren. Any combination of lights can be controlled by the MASTER switch. For example, position 1 can be used to operate the vehicle's flashing lights; position 2 can control the rotating lights and the siren is controlled by position 3. (Position 3 also transfers the horn ring circuit from the horn to the siren). Position 0 is the "OFF" position.

A maximum of three switched circuits can be controlled by any given position of the MASTER switch. The actual devices controlled by a given position of the MASTER switch can be programmed by means of a nine section miniature rocker switch inside the Control Module. The switched circuits can be re-programmed if requirements change.

C. Accessory Control Switches

A maximum of four optional, lighted, pushbutton type switches can be provided by Federal for installation on the front panel of the Control Module. These switches can be used for controlling the spotlight, gunlock, trunk lid, etc. These switches are available in two types. The switch types and their typical applications are shown in Chart 1-1.

D. Terminal Positions

Most electrical connections to the siren are made by 16 screw terminals.

MODEL	TYPE / CONTACT ARRANGEMENT	TYPICAL APPLICATION
AS1	DPDT, PUSH-PUSH, 15AMP, LIGHTED RED	AUXILIARY LIGHTS ALLEY LIGHTS BRAKE LIGHT OR BACK-UP LIGHT CUT-OFF
AS2	DPST, MOMENTARY, 15AMP, LIGHTED RED	GUN LOCKS TRUNK LOCK DOOR LOCKS MECHANICAL SIREN BRAKE
NOTE: THE MODEL CLK ACCESSORY KIT IS ALSO AVAILABLE. THIS LENS KIT CONTAINS ONE EACH OF THE FOLLOWING: RED, YELLOW, GREEN, AND BLUE LENSES. THE STANDARD RED LENS PROVIDED WITH EACH SWITCH IS FACETED, WHEREAS ALL LENSES IN THE KIT ARE TRANSLUCENT.		

Chart 1-1

As indicated in figure 1-2, all terminal positions on the rear panel of the Control Module are clearly labeled on a legend plate. The function and current capacity of each terminal are listed in Chart 1-2.

E. Flasher Option

An optional internal alternating flasher is available for use with the siren. This flasher is capable of switching a maximum of 12 amperes. The flasher can also be used as a single light flasher. The flash or alternating rate is approximately 90 flashes or alternations per minute. The flash or alternating rate is independent of voltage, load and temperature.

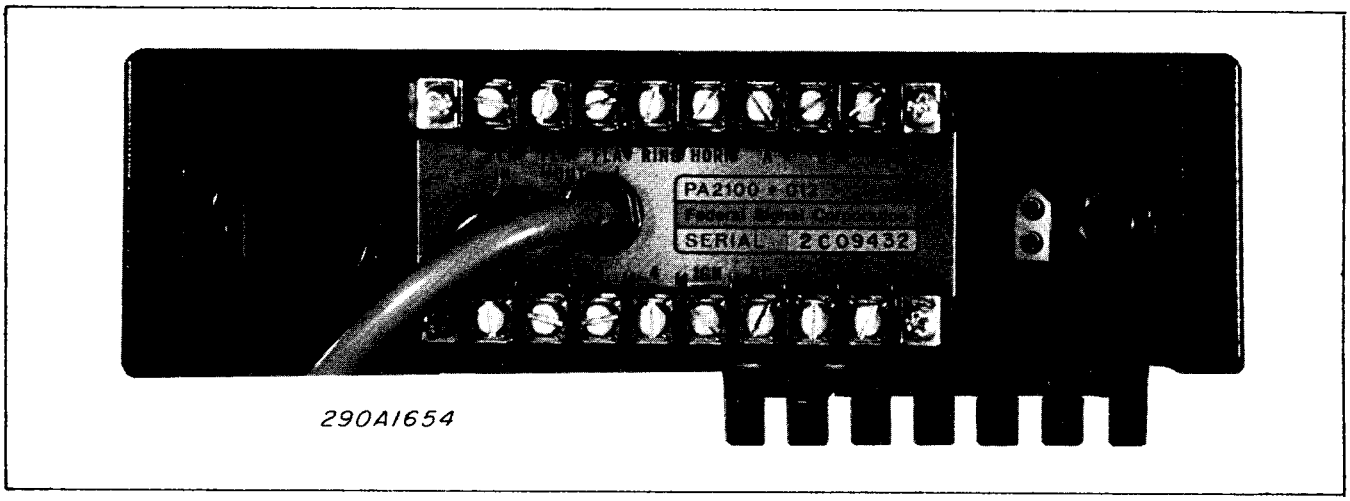


Figure 1-2 Model PA2100SB Rear View.

Terminal	Function	Current Capacity
FLA IN	Flasher input	12A
FLA OUT (2)	Flasher output	12A
RING	Vehicle horn ring	2A
HORN	Vehicle horn	2A
A	Flasher Off override	-
B	Flasher On override	-
C	Not connected	-
1	MASTER Circuit 1	30A
2	MASTER Circuit 2	30A
3	MASTER Circuit 3	30A
4	Not connected	-
IGN	Ignition switch connection	.5A
RC	Radio Control (for radio rebroadcast)	30A
SPKR	Speaker Terminals	-

Chart 1-2

SECTION II
SPECIFICATIONS

2-1 GENERAL

Input Voltage	10VDC to 16VDC (16VDC operation limited to 15 min.)
Polarity	Negative ground only
Standby Current (MASTER switch set to position 0)	0 mA. (not including panel lamp)
Operating Temperature Range	-30°C to +65°C
Dimensions (HWD - excluding heat sink, knob and rear trim)	2-3/8" x 7-7/8" x 8" (6cm x 20cm x 20.3cm)
Weight (approx.)	6-1/2 lb. (21 kg.)

2-2 SIREN

Operating Current (14.0VDC - WAIL)	
1 Low Power Speaker	5 amperes
2 Low Power Speakers or 1 High Power Speaker	10 amperes
2 High Power Speakers	15 amperes
Frequency Range	550 to 1500Hz
Cycle Rate	WAIL - 10 cycles/min. YELP - 180 cycles/min. HI-LO - 50 cycles/min.
Voltage Output (approx.)	
1 Low Power Speaker	45V P-P
2 Low Power Speakers	40V P-P
1 High Power Speaker	64V P-P
2 High Power Speakers	60V P-P

2-3 AUDIO

NOTE

14.0VDC supply voltage. Radio potentiometer and GAIN control at maximum.

Frequency Range	300 to 10,000Hz
Harmonic Distortion	10% max. at all power levels from .5 to 70 watts (frequency response ±3dB)
Input Impedance	Radio - 3.6K ohms Carbon Mic. - 3.6K ohms
Signal input voltage required obtain 20 Vrms across a 5.5 ohm load	Radio - 1.0 Vrms Carbon Mic. - 1.0 Vrms

2-4 ACCESSORIES (OPTIONAL)

Model FN1001	Federal Model MNC or MR Microphone Adapter Module
Model FN1003	Motorola Microphone Adapter Module
Model FN1004	Motorola Micor Microphone Adapter Module
Model FN1006	RCA 500 Microphone Adapter Module
Model FN1007	GE Microphone Adapter Module
Model FN1008	GE Master II Microphone Adapter Module
Model FN1011	Aerotron MPAC 6, 7, or 8 Adapter Module
Model FN1013	Motorola "Converta-Com" Microphone Adapter Module
Model FN1014	Motorola Maxar 80 using TMN6134B Microphone
Model FN1015	RCA VEETAC, TAC200 and TAC400 using MI-59400 Microphone

SECTION III
INSTALLATION

3-1 UNPACKING

After unpacking the siren, 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 damage. Carefully check all envelopes, shipping labels and tags before destroying them. If an adapter module was ordered, it is packed in a separate carton.

3-2 GENERAL

Before connecting any wires to the siren, install all revolving and flashing lights, gunlocks, trunk locks and other devices that will be controlled by the siren. Route all wiring to the mounting location, allowing 8 to 12 inches of extra wire at the siren location. Install the vehicle speakers and route the speaker leads (18AWG wire) to the siren location. Run leads to the vehicle's horn ring circuit. Install the 50 ampere circuit breaker provided between the battery and firewall, as close as to the battery as practical. Install leads between the battery and the circuit breaker and the siren location using wire no smaller than 10AWG. Install the wiring between the ignition switch and the siren installation site. If desired, all leads at the siren may be terminated with crimp-on spade connectors.

3-3 CONTROL MODULE ACCESSORY SWITCHES

A. General.

The Siren Control Module can accomodate up to four optional customer-installed pushbutton switches that allow the user to control various devices that are mounted on or in the vehicle. There are two types of switches available. The switches that meet the customer's requirements are selected at the placement of the order. Switch types, their descriptions and typical applications are listed in Chart 1-1.

B. Installation.

If no accessory switches are to be installed in the front panel of the Control Module, disregard the procedure that follows:

CAUTION

When installing the optional accessory switches, do NOT change any factory wiring in the siren. Any change in the existing wiring may overload the circuitry and damage the unit.

1. In order to wire the accessory switches, it is necessary to remove the top cover from the chassis. To remove the cover, loosen the two hex head captive screws on the bottom of the unit and slide the cover off.

2. Remove one hole plug for each switch to be installed on the front panel of the Control Module. Push the plugs out from the inside of the unit.

3. Install the switches by inserting them into the desired holes in the front panel following the instructions provided with the switches. Press the switches into the front panel until they snap in place.

4. Pass all wiring to the accessory switches through the 1" hole in the rear panel of the Control Module. Wiring to each switch is determined by the device that the switch controls. Use the 8 position terminal block as a convenient tie point for B+ and ground. Follow the installation instructions included with the devices and ensure that the device is properly fused.

3-4 BRACKET MOUNTING

The siren is shipped with a swinging mounting bracket that makes it possible to mount the unit in a variety of positions. Positioning the bracket above the unit allows mounting on the underside of the dash. Positioning the bracket below the unit permits mounting on any horizontal surface or, in conjunction with Federal's TU 70 Tunnel Mount, on the vehicle's transmission hump.

Mount the siren where it won't interfere with the safe operation of the vehicle. Keep visibility and accessibility of controls in mind when choosing a location. To install the bracket under the dash, determine the mounting location and proceed as follows (see figure 3-1):

CAUTION

The unit must be installed in an adequately ventilated area. Never install the siren near heater ducts.

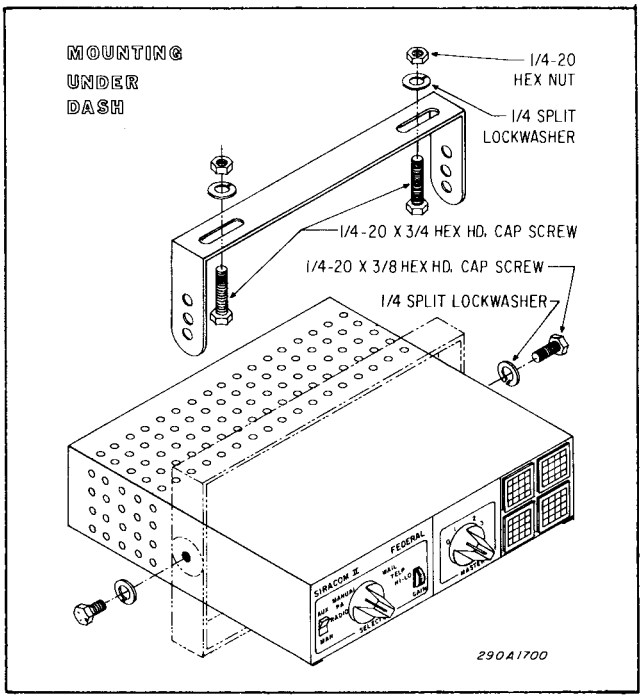


Figure 3-1 Installation of Siren Under the Dash

A. Use the mounting bracket as a template and scribe two drill positioning marks at the selected mounting location under the dash.

B. Drill two 1/4-inch diameter holes at the position marks.

C. Secure the mounting bracket to the dash using two each of the following: 1/4 - 20 x 3/4 hex head screws, 1/4" split lockwashers and 1/4 - 20 nuts as shown in figure 3-1.

D. Set the siren on the floor of the vehicle as close as possible to its final mounting location. Do NOT secure the siren to the mounting bracket at this time.

When installing the siren on the transmission hump, a Federal Model TU70 Tunnel Mount is recommended. The TU70 is drilled and tapped to accept the siren mounting bracket. Follow the installation instructions packed with each unit.

3-5 POWER CONNECTIONS

A. Install the 50 ampere circuit breaker provided in the vehicle engine compartment.

Mount the circuit breaker as close as practical to the battery.

NOTE

The Model PA2100SB siren can be installed only in vehicles that have a negative ground electrical system.

B. Connect the red power lead of the siren to one side of the circuit breaker. If necessary, splice additional 8AWG, or heavier, wire to the heavy red lead using the splice connector supplied.

C. Use 8AWG, or heavier, wire to connect the other side of the circuit breaker to the vehicle battery.

D. Connect the black wire directly to the vehicle frame as close as possible to the siren.

3-6 SPEAKER CONNECTIONS

Either 58 watt or 100 watt speakers may be used with the siren. Both models are also capable of driving a single 200 watt speaker such as the Federal TS200.

If one or two 58 watt speakers such as Federal's CP25 or TS24 are being installed, set the speaker HI/LOW switch SW301, to LOW. See figure 3-2 for the location of SW301. Connect the speaker leads to the SPKR terminals with 18AWG wire, as shown in figure 3-3.

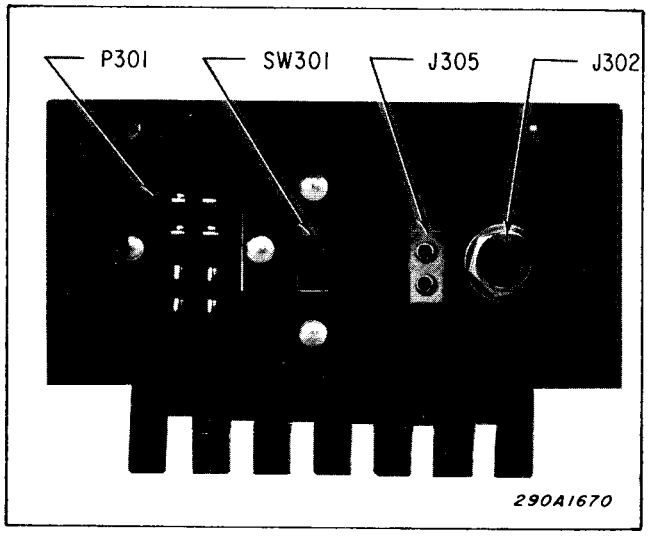


Figure 3-2 Siren Module Rear View

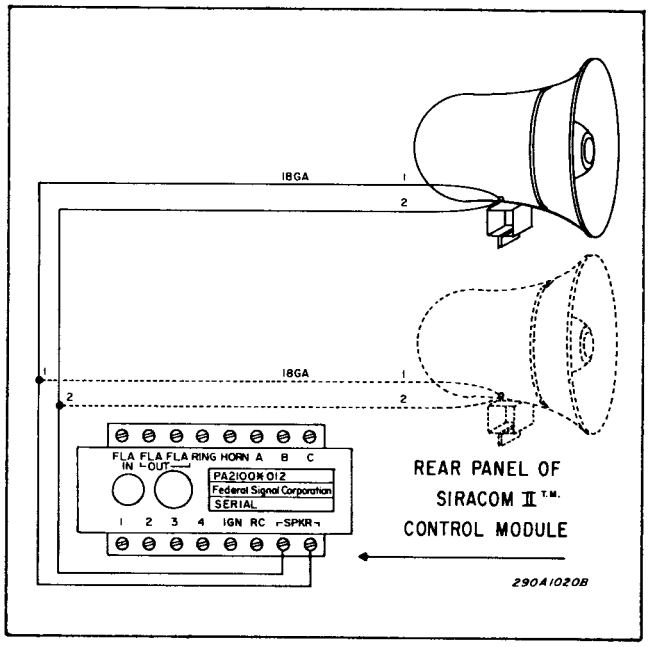


Figure 3-3 58 Watt and 100 Watt Speaker Connections

CAUTION

When using 58 watt speakers, ALWAYS be sure the speaker switch is set to LO. If the switch is set to HI, the 58 watt speakers will probably be destroyed.

When 100 watt speakers such as Federal's CP100 or TS100 are being installed, set SW301 to HI before connecting the speakers to the siren. Use 18 AWG wire as indicated in figure 3-3.

When two speakers are used with the PA2100SB, it is necessary to connect the speakers in phase and in parallel for optimum performance. This can be accomplished by connecting the speaker leads marked "1" to the same SPKR terminal on the siren and the two leads marked "2" to the other SPKR terminal (see figure 3-3).

The Model PA2100SB siren is capable of driving only one TS200 speaker. Therefore, if a TS200 is to be used with the siren, do NOT connect any other speaker to the siren. Follow the instructions packed with the TS200 and be sure to set the speaker switch to HI before connecting the TS200 speaker to the siren with 18AWG sire (see figure 3-4).

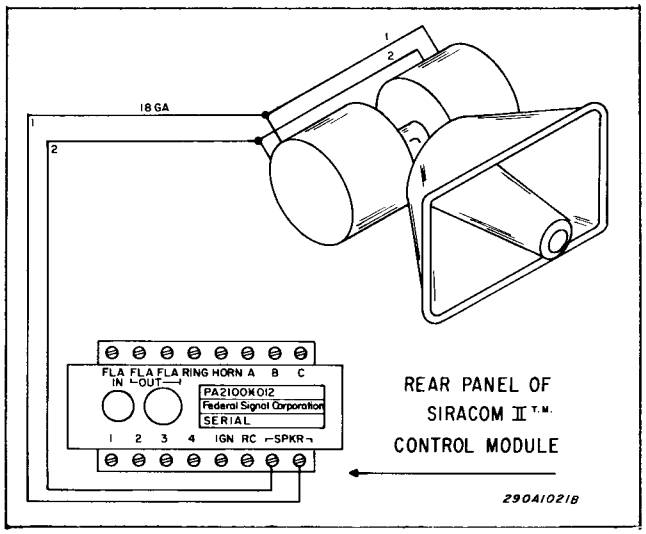


Figure 3-4 TS200 Speaker Connections

3-7 RADIO CONNECTIONS

NOTE

Refer to Section IV for a description of the operation of the PA override and common microphone features. The siren can be easily set for operation in either of these modes. If required, the mode of operation can be changed at a future date.

A. PA Override Connections.

To take advantage of the PA override feature, separate microphones are required for the two-way radio and the siren PA function. If PA override operation with rebroadcast of radio messages is desired, proceed as follows:

1. Locate the two-conductor "zip" cord, two-position connector assembly in the accessory kit. Connect the wires across the two-way radio speaker voice coil terminals.

2. Plug the two-position connector into the rear of the Siren Module.

3. Plug the Model MNCT Microphone into the rear of the Siren Module. The siren is now set for PA override operation.

B. Common Microphone Connections

1. Obtain the Adapter Module that is appropriate for the make of two-way radio in the vehicle. Install the Adapter Module in accordance with the instructions supplied with the module.

See Section 3-12.1 for instructions on removing the Main Circuit Board from the Siren Module.

2. Cut JU2, on the front of the Main Circuit Board (See figure 3-5).

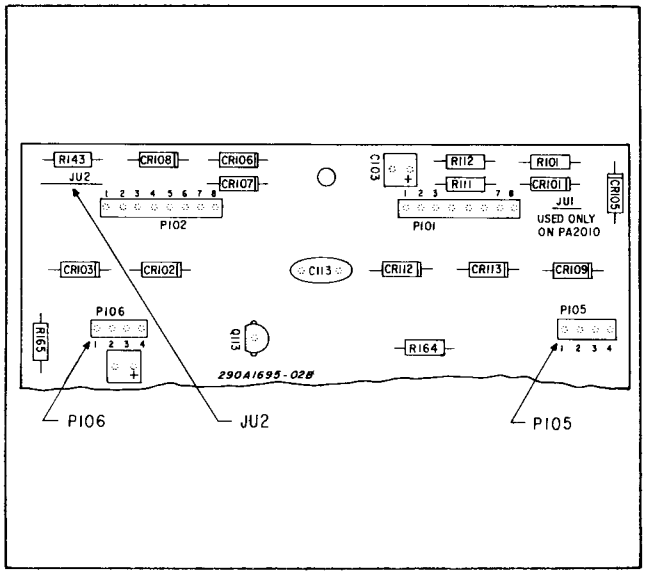


Figure 3-5 Location of JU2, P105 and P106

3-8 IGNITION CIRCUIT

Connect the IGN terminal to the vehicle ignition or accessory circuit using 22AWG wire. This terminal supplies power to the panel lights and pilot light as well as activating the radio control circuit.

3-9 HORN RING CIRCUIT

To connect the vehicle's horn ring circuit so that the horn ring controls the siren's TAP II operation in MANUAL, WAIL, YELP and HI-LO, proceed as follows (See figure 3-6).

A. Locate the wire that connects the horn ring to the horn relay or the horns. Cut this wire and, if necessary, splice additional wire to each end so that these wires can be terminated on the rear of the siren.

B. Connect the wire that is connected to the horn ring switch to the RING terminal on the rear of the Siren Module.

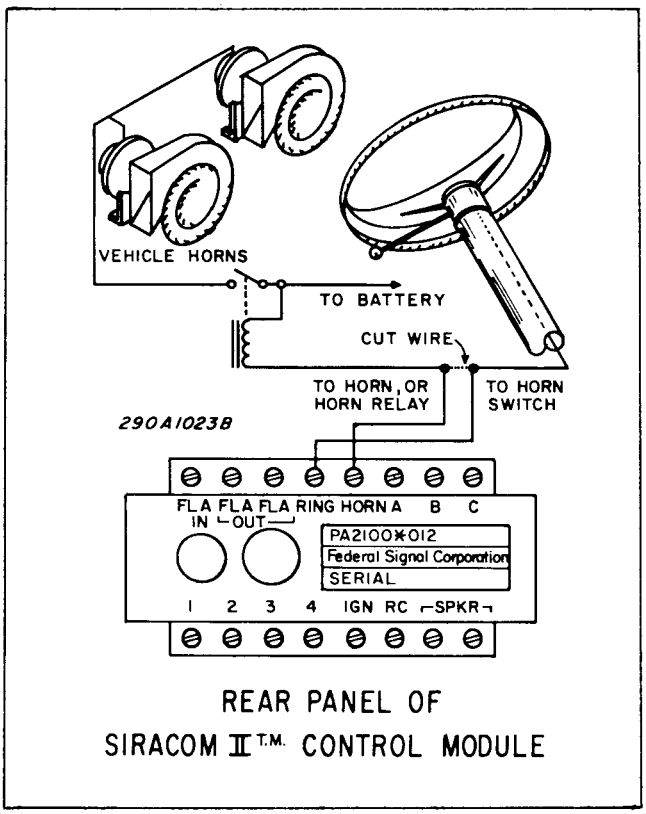


Figure 3-6 Horn Ring Connections

C. Connect the wire from the horn relay or horn(s) to the HORN terminal on the rear of the siren. The siren automatically compensates for both positive and negative horn ring circuits without any adjustments.

3-10 RADIO CONTROL CIRCUIT

NOTE

Before performing the procedure in this paragraph, ensure that the instructions in paragraph 3-8 have been performed.

Proper connection of the radio control circuitry allows power to be supplied to the two-way radio whenever the vehicle's ignition is on or when the SELECTOR switch is set to RADIO (radio rebroadcast). To perform this connection, proceed as follows (see figure 3-7).

A. Connect a wire from the two-way radio relay control circuit in the vehicle to the RC terminal on the rear of the 2100SB. If necessary, refer to the two-way radio service manual to locate this wire in the radio.

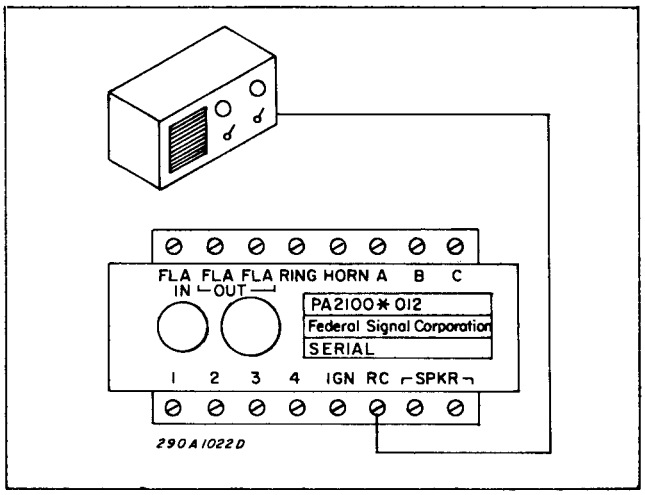


Figure 3-7 Radio Control Connections

NOTE

FCC Rules and Regulations require the use of a key-lock switch to control the power to a mobile transmitter. Therefore, wire the relay to control the power to the receiver only. Wiring to accomplish this type of control varies with the type of two-way radio. Refer to the radio manufacturer's service manual.

3-11 MASTER SWITCH

Terminals 1, 2 and 3, on the rear panel of the siren are controlled by the MASTER switch, which can, by a given position, control any combination of terminals. The actual terminals controlled by a given position of the MASTER switch are programmed by means of SW501, the DIP nine-section rocker switch inside the Control Module. To make use of this capability, proceed as follows:

A. Connect the devices to be controlled by the MASTER switch, SW401, to terminals 1, 2, or 3 on the rear of the unit (terminal 4 is NOT connected to SW401). For example, flashing lights may be connected to terminal 1; rotating lights to terminal 2; and the optional flasher to terminal 3. If desired, several devices may be connected to a given terminal, provided that the 30 ampere current capacity of the terminal is not exceeded.

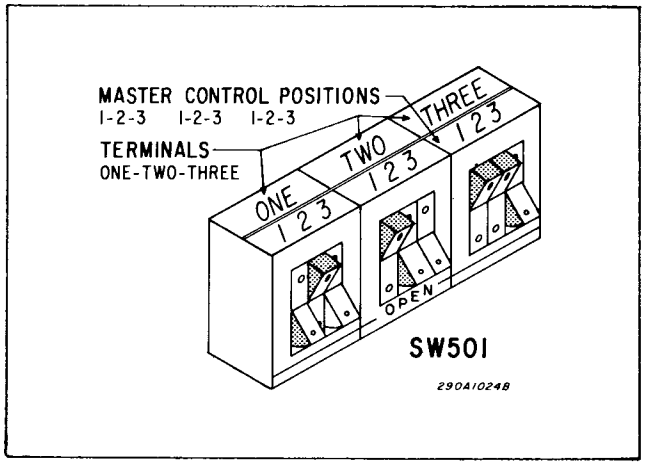


Figure 3-8 Master Switch Programming

NOTE

The MASTER switch is programmed by means of the nine section miniature rocker switch, SW501. As shown in figure 3-8, each section of the switch is labeled to indicate the terminal and the MASTER position that it programs. ONE, TWO and THREE indicate the terminal programmed by each group of three switch sections. The numerals "1", "2" and "3" denote the MASTER position controlled by the individual rocker switch sections. For example, the close contact of ONE-1 programs terminal 1 for MASTER Position 1, the ONE-2 contact programs terminal 1 for MASTER position 2; etc. Therefore, when ONE-1 is depressed, the device(s) connected to terminal 1 is(are) energized when the MASTER switch is set to position 1; when ONE-2 is depressed, the device(s) connected to terminal 1 is(are) energized in MASTER position 2; etc.

B. Determine which device(s) is (are) to be controlled by each MASTER switch position. Using the example in step A, it may be desired to activate the flashing lights in MASTER switch position 1, rotating lights in position 2, and all three devices in position 3.

To program the example described in steps A and B of this paragraph, close switches ONE-1 and ONE-3 to program terminal 1 (flashing lights) for MASTER positions 1 and 3, respectively.

Close TWO-2 and TWO-3 to program terminal 2 (rotating lights) for positions 2 and 3 respectively. Close THREE-3 to program terminal 3 (optional flasher) for MASTER position 3 (see figure 3-8).

C. Remove the top cover of the chassis by loosening the hex head captive screws and sliding off the cover.

D. Program the MASTER switch by depressing the appropriate sections of SW501 with a pencil point or similar pointed tool. As indicated in figure 3-8, the switch contacts are closed when the upper half of the rocker is pressed. Any combination of terminals can be controlled by any given MASTER switch position.

E. Replace the chassis top cover.

3-12 OPTIONAL AUXILIARY SOUND BOARD

If an optional Auxiliary Sound Board will NOT be installed, disregard the procedure in this paragraph. However, if it is desired to install an optional Sound Board, proceed as follows:

1. To remove the top cover from the chassis, loosen the two hex head captive screws on the bottom of the unit and slide the cover off.

2. Remove the three Phillips head screws that hold the Main Circuit Board in the Siren. Disconnect P104 and J104. Lift off the Main Circuit Board, rotating it to the left, as viewed from the front of the Siren Module. Use caution to avoid damaging circuit wires.

3. Install the optional Auxiliary Sound Board on P105 and P106, as shown in figure 3-5. Make sure the component side of the Sound Board is toward the rear of the Main Circuit Board.

4. Insert the 6-32 screw, supplied with the optional Auxiliary Sound Board into the sound board L bracket from the foil side of the Main Circuit Board. Tighten the screw.

5. Reassemble the siren, following the procedure in steps 1 and 2 of section 3-12, in reverse.

3-13 FLASHER OPTION

The Model designated PA2100*012 FSB on the rear legend plate includes a factory-installed Flasher option. If your siren is NOT so "designated", disregard Section 3-13. The flasher circuitry has "ON" and "OFF" Override features. When a positive voltage is applied to terminal B, on the siren rear panel, the lamp(s) connected to the FLA OUT terminals are illuminated continuously regardless of the voltage present at FLA IN or terminal A.

A. Single Flasher Operation.

1. Connect a flasher control switch that is capable of controlling 12VDC such as a Control Module Accessory Switch or a MASTER CONTROL switch terminal, to the FLA IN terminal on the rear of the Control Module.

2. Connect the circuits to be flashed to the FLA OUT terminal closest to the FLA IN terminal.

B. Alternating Flasher Operation.

1. Connect a flasher control switch that is capable of controlling 12VDC such as a Control Module accessory switch or a MASTER switch terminal to the FLA IN terminal on the rear of the Control Module. (Note: This terminal does not actually supply flasher output load current so 22AWG wire may be used).

2. Connect the circuit to be alternated to the FLA OUT terminals, one circuit to each of the terminals.

3. If override operation is desired, refer to paragraph 3-13.C.

C. Override Connections.

1. For "OFF" override operation, connect a 12VDC control circuit to the "A" terminal on the rear terminal strip. The warning lamps connected to the FLA OUT terminals will be extinguished whenever this circuit is activated regardless of the voltage applied to the FLA IN and B terminals.

2. For "ON" override operation, connect a 12VDC control circuit to the B terminal on the rear terminal strip. Warning lamps connected to FLA OUT terminals illuminate steadily whenever this circuit is activated regardless of conditions of the FLA IN circuit.

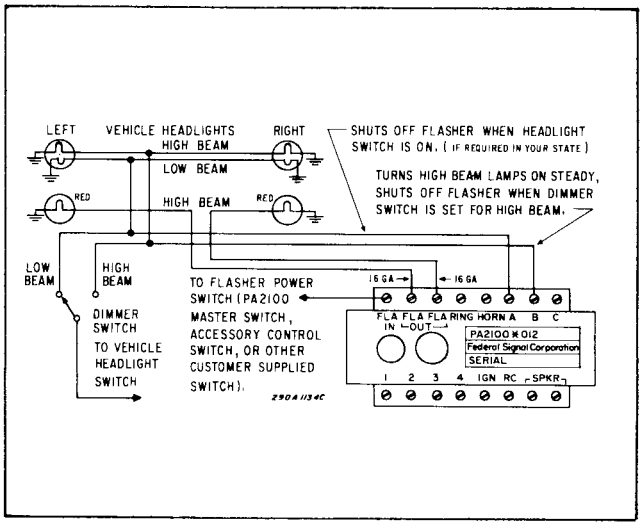


Figure 3-9 Typical Headlight Flashing Circuit

Figure 3-9 shows a typical headlight flashing circuit, including both "ON" and "OFF" overrides. If wired as shown, the vehicle's high beam headlamps will provide alternating headlight action only during the day. Anytime the vehicle's headlight switch is "ON", the high beam headlights will operate normally, as if the flasher were not in the circuit. If night-time suppression of alternating headlight operation is not required or permitted in your jurisdiction, omit the wire to terminal A.

3-14 RELATIVE PA LOUDNESS ADJUSTMENT

When the electrical wiring is completed, set the SELECTOR switch to PA. Depress the microphone push-to-talk switch, speak in a normal voice, and adjust the front panel GAIN control to set the desired sound level outside the vehicle. Turn on the two-way radio and adjust the volume for a comfortable listening level inside the vehicle. Set the SELECTOR switch to RADIO. Stand outside the vehicle and note the radio rebroadcast loudness. If too loud, or too soft, adjust R142 for the desired sound level (see figure 3-10). Access to R142 is through a hole in the top of the unit.

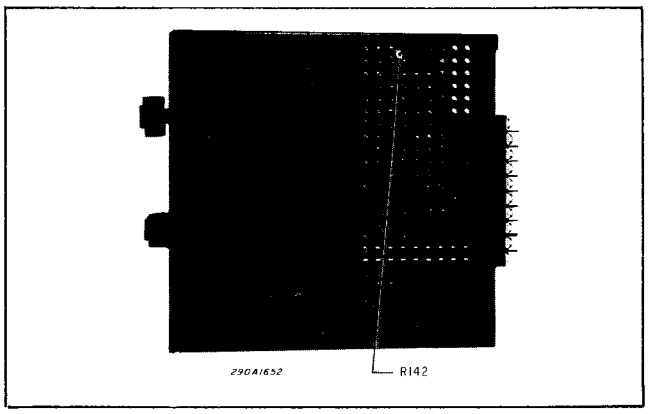


Figure 3-10 Siren Top View

Clockwise rotation of R142 will increase the sound level. Counterclockwise rotation will decrease the sound level. When this adjustment is completed, the loudness of the radio rebroadcast and public address may be controlled with the front panel GAIN control.

Secure the siren to the mounting bracket with 1/4 - 20 x 3/4" hex head screws and 1/4" split lockwashers. Tilt the siren to the desired position and tighten the 1/4 - 20 x 3/4" hex head screws.

SECTION IV
OPERATION

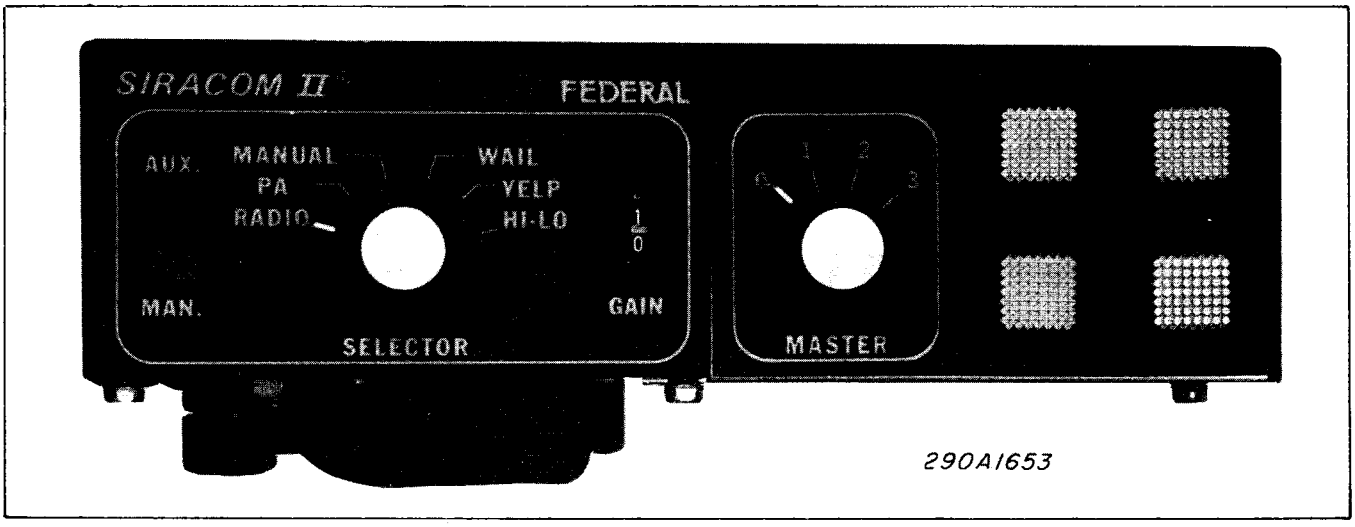


Figure 4-1 Model PA2100SB Front View.

4-1 GENERAL

As shown in figure 4-1, all siren operating controls are located on the front panels of both the Siren Module and the Control Module.

A line of optional adapter modules available from Federal Signal is designed to allow the user the option of using the siren's own microphone (PA override)or the two-way radio microphone (common microphone).

The optional Model MNCT Microphone is required when the siren is set to PA override operation. When the siren is connected for PA override operation, the two-way radio and the siren each have their own microphone.

In addition, the public address is available in any SELECTOR switch position, except RADIO, when the microphone push-to-talk switch is depressed.

In common microphone operation, the radio microphone is used for both the siren and the two-way radio in the vehicle. An adapter (available from Federal), that is designed to accomodate the two-way radio microphone connects the siren directly to the radio. The common microphone is electrically connected to the two-way radio in all SELECTOR switch positions except PA. When the SELECTOR switch is set to PA, the two-way radio microphone is connected to the siren amplifier so announcements can be made over the siren speaker system.

4-2 MASTER SWITCH

The MASTER switch is a four position rotary switch that is used to control the vehicle's emergency warning light system and the electronic siren. The equipment controlled by a given MASTER switch position depends upon the configuration of the individual installation.

In a typical installation, secondary warning lights (flashing lights) are energized when the MASTER switch is set to position 1. Revolving lights are ordinarily installed so that they function in position 2. In position 3, the siren can be activated when the siren's SELECTOR switch is set to one of the siren positions. In addition, any combination of warning lights that are activated in positions 1 or 2 or additional warning lights can be energized when the MASTER CONTROL is in position 3.

The MASTER switch position is indicated by three red LED's (light emitting diodes) on the front panel of the Control Module. The 0 position of the switch is the "Off" position and all of the LEDS are extinguished. When the MASTER switch is in position 1, one of the LEDs illuminate; in position 2, two LEDs are illuminated, and in position 3, all three LEDs illuminate.

If your installation was wired as described in paragraph 3-9 of this manual, the horn ring activates the vehicle's horn when the MASTER switch is set to position 0, 1 or 2. However, when the MASTER switch is set to position 3, the horn ring or other auxiliary switch operates the TAP II feature if the SELECTOR switch is set to MAN, WAIL, YELP OR HI-LO. The TAP II feature is operated by actuating the auxiliary switch, causing the siren to "Wail" if the SELECTOR switch is set to MANUAL, until the auxiliary switch is operated again. However, if the SELECTOR switch is set to WAIL or HI-LO, the siren produces "Yelp" until the auxiliary switch is operated a second time. If the SELECTOR switch is in YELP, the siren will Hi-LO until the switch is operated again.

The Manual Peak and Hold signal is operational in all four MASTER switch positions.

When the MASTER switch is in positions 1 or 2, and SW202, the SIREN switch is depressed, the siren sounds until SW202 is released. When SW202 is released, the siren signal ceases immediately. The operation of the Manual Wail signal when the MASTER switch is in position 3 is similar, except that when SW202 is released, the frequency of the siren signal "coasts down" to approximately 550Hz before it ceases.

If your installation has been wired as described in paragraph 3-10, power is applied to the two-way radio whenever the vehicle ignition switch is on. In addition, the front panel of the PA2100SB is illuminated and the green LED above the MASTER switch is lit, indicating that power is applied to the siren.

4-3 GAIN CONTROL

The loudness of sound output from the siren speaker(s), when the siren is being used as a public address or radio re-broadcast amplifier, is determined by the GAIN control. Downward rotation of the GAIN control increases the sound level from the speaker. The GAIN control does not control the siren volume.

The maximum usable setting of the GAIN control is determined by the sound level at which "squeal" (acoustic feedback) occurs. This level depends upon microphone gain, speaker placement, the proximity of reflective surfaces, etc. Adjust the GAIN control to the position just below the point at which feedback occurs, or as desired.

4-4 SELECTOR SWITCH

The SELECTOR switch is a six-position rotary switch that selects the siren function. The following describes the positions of the SELECTOR switch:

A. RADIO

When the SELECTOR is in this position, incoming radio messages are amplified by the siren amplifier and re-broadcast over the siren speaker system. Volume is controlled by the GAIN control. An indicator (LED) illuminates to indicate that the SELECTOR switch is set to RADIO.

If the system is wired as described in paragraph 3-10, power is always supplied to the two-way radio when the SELECTOR switch is set to RADIO, even if the ignition switch is off.

B. PA

When the SELECTOR switch is set to the PA position, the siren amplifier may be used as a public address amplifier. In those installations where the siren and the two-way radio share the same microphone, the PA position is the only SELECTOR switch position that connects the microphone to the siren amplifier.

C. MANUAL

This position of the SELECTOR switch allows operation of the siren with the AUX./MAN. rocker switch located on the front panel. The siren can also be activated by an auxiliary switch, such as a foot switch or horn ring switch.

D. WAIL

In this position the siren produces a continuous "wailing" sound, up and down in frequency.

E. YELP

This position of the SELECTOR switch causes the siren to produce a rapid "warbled" tone.

F. HI-LO

In this switch position, the siren produces a two-tone signal. This distinctive signal may be reserved for special indications or situations.

4-5 TAP II INSTANT YELP

If the Siren is set to WAIL or HI-LO SELECTOR switch positions, an auxiliary switch such as a foot switch or the vehicle's horn ring will operate the TAP II Instant Yelp siren signal. To operate in this mode, momentarily push the auxiliary switch or horn ring to change the siren to Yelp operation. A second momentary "tap" will change the operation of the siren back to either the "WAIL" position or the "HI-LO" position, whichever is appropriate.

4-6 ROCKER SWITCH

If the SELECTOR switch is set to MAN (manual), WAIL or YELP positions, moving the rocker switch on the front panel downward produces the Peak and Hold signal. In the HI-LO position, it will cause the siren to YELP. When the rocker switch is moved upward, it activates the Auxiliary Sound, providing that the sound board is installed. If the Auxiliary Sound Board is NOT to be installed, upward rotation of the rocker switch will kill all sound output. The Auxiliary Sound overruns all other siren signals.

SECTION V
SIREN MODULE CIRCUIT DESCRIPTION

5-1 GENERAL

Refer to the Siren Module Functional Block Diagram, figure 5-1, and the Siren Module Schematic Diagram, figure 6-3, while reading the circuit description that follows.

5-2 POWER SUPPLIES and CIRCUIT INITIALIZATION

A. Power Supplies.

Power is first applied to the Siren Module when the MASTER switch, on the Control Module, is set to position 3, applying a low (ground potential) to P301-8. P301-8 then applies this low to J303-3 and P103-3 (MASTER) and through R119 to the base of Q107, allowing Q107 to conduct.

The conduction of Q107 applies unregulated 12VDC from the vehicle battery to the 5V Supply, Q108, and the 8V Supply CR110. The 5V Supply uses zener diode CR111 to regulate the voltage at the emitter of Q108 to 5V. C106 and C107 filter the regulated 5V output.

CR110 is an 8.2V zener diode that, along with R120, produces a regulated nominal 8 volts. C104 and C105 filter noise and other transients.

B. Initialization.

The siren circuitry uses two nearly identical circuits to prevent false and annoying signals from being produced when power first is applied. Q103 and associated components initialize the bistable TAP II flip flop IC-2. Similarly, Q113 and associated components initialize the circuitry in IC4, which is responsible for the production of siren signals.

When power first is applied, Q103 begins to conduct. As a result, the voltage at the collector of Q103 goes high. This high is then applied to IC2-4 to ensure that IC2-1 is low. Simultaneously, C103 begins to charge through R111.

Approximately 5ms. after power is applied, the voltage on C103 cuts off Q103, allowing the collector of Q103 and IC2-4 to return low, resulting in high reset voltage of IC2-4 for about 5 ms. The operation of Q113 and its associated components is similar to that of Q103, except that the initializing voltage is present at IC4-24 for about 50 ms.

5-3 SIREN SIGNAL CONTROL

A. WAIL

When SW201 (the SELECTOR switch) is set to the WAIL position, SW201B applies a low to P101-2. This low is applied through the 10K ohm pull up network, R123, which consists of several 10K resistances connected to the regulated 5V supply on one end and to the signal control lines on the other end. This arrangement ensures that all IC3 inputs are held high ("pulled up") with no control applied. The low from P101-2 is then applied to IC3-4.

B. YELP

The Yelp signal is initiated by a low at P101-3. This low is coupled through R123 to IC3-7.

C. HI-LO

Setting SW201 to the HI-LO position applies a low from SW201B-6 through CR202 to SW201B-5 and P101-3. The low is coupled through CR203 to SW201B-4 and P101-2 simultaneously. These two lows are then applied to IC3-7 and IC3-4.

D. TAP II

The TAP II circuitry can be activated by either a positive or negative horn ring circuit. Operation of the horn ring causes a high or low, depending upon horn ring circuit polarity to be applied from P301-4 through J303-1 and P103-1 to CR102 and CR103. If a high is present, CR102 couples the voltage to the Q101 emitter, turning it on.

Mount the circuit breaker as close as practical to the battery.

NOTE

The Model PA2100SB siren can be installed only in vehicles that have a negative ground electrical system.

B. Connect the red power lead of the siren to one side of the circuit breaker. If necessary, splice additional 8AWG, or heavier, wire to the heavy red lead using the splice connector supplied.

C. Use 8AWG, or heavier, wire to connect the other side of the circuit breaker to the vehicle battery.

D. Connect the black wire directly to the vehicle frame as close as possible to the siren.

3-6 SPEAKER CONNECTIONS

Either 58 watt or 100 watt speakers may be used with the siren. Both models are also capable of driving a single 200 watt speaker such as the Federal TS200.

If one or two 58 watt speakers such as Federal's CP25 or TS24 are being installed, set the speaker HI/LOW switch SW301, to LOW. See figure 3-2 for the location of SW301. Connect the speaker leads to the SPKR terminals with 18AWG wire, as shown in figure 3-3.

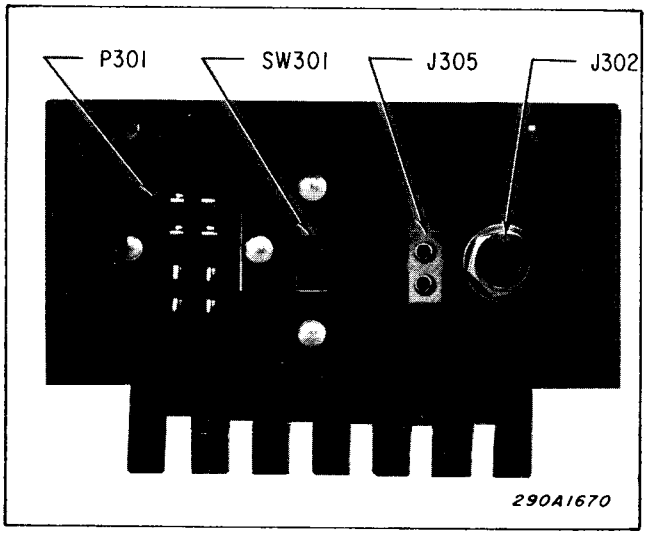


Figure 3-2 Siren Module Rear View

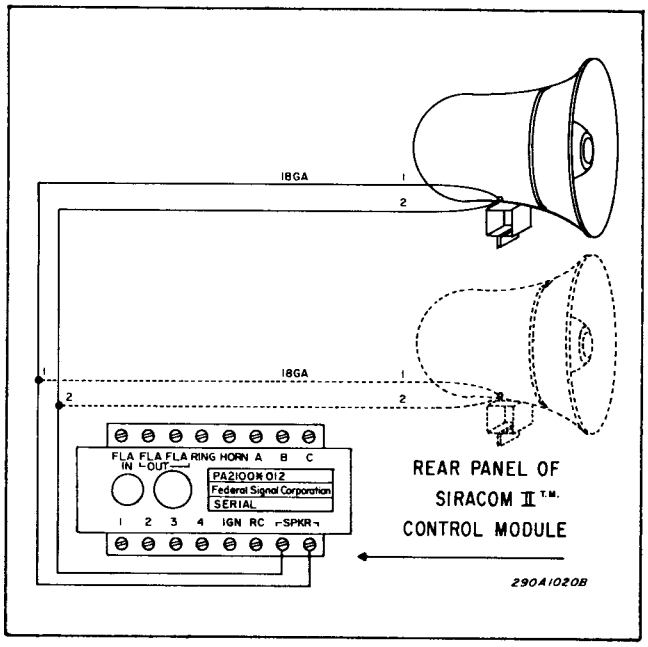


Figure 3-3 58 Watt and 100 Watt Speaker Connections

CAUTION

When using 58 watt speakers, ALWAYS be sure the speaker switch is set to LO. If the switch is set to HI, the 58 watt speakers will probably be destroyed.

When 100 watt speakers such as Federal's CP100 or TS100 are being installed, set SW301 to HI before connecting the speakers to the siren. Use 18 AWG wire as indicated in figure 3-3.

When two speakers are used with the PA2100SB, it is necessary to connect the speakers in phase and in parallel for optimum performance. This can be accomplished by connecting the speaker leads marked "1" to the same SPKR terminal on the siren and the two leads marked "2" to the other SPKR terminal (see figure 3-3).

The Model PA2100SB siren is capable of driving only one TS200 speaker. Therefore, if a TS200 is to be used with the siren, do NOT connect any other speaker to the siren. Follow the instructions packed with the TS200 and be sure to set the speaker switch to HI before connecting the TS200 speaker to the siren with 18AWG sire (see figure 3-4).

Some of the circuitry responsible for signal production is external to IC4. R128 and C108 are connected to IC4-16. These two components control the frequency of the rate oscillator in IC-4 to approximately 360Hz. The rate oscillator controls the cycle rate of the WAIL, YELP and HI-LO signals.

R129 and R131 control the frequency of the tones in the Hi-Lo signal.

R132, R133, R134, R140 and R141 control the waveshape of the Wail and Yelp signals. C112 is an integrating capacitor that determines the signal envelope. R137 sets the gain of an amplifier internal to IC4. The gain controls the frequency range of the output signal.

5-6 PREAMPLIFIER and OUTPUT STAGES

The preamplifier section ; Q114, Q115, Q116, and Q117 amplifies all audio signals to the level necessary to drive the output stages. After the preamp amplifies the signal, it is coupled from the emitters of Q114 and Q115 through C118 to the primary of T102. T102 applies a paraphase input to the push-pull amplifier stages. The network consisting of R157, R158, CR114 and RT1 is a biasing circuit that improved amplifier linerarity. The power amplifier consists of Q111, Q112, Q301 and Q302. These stages amplify the signal power to the level required to drive the speaker(s). This amplified signal is coupled through T301 through SW301, the OUTPUT POWER SELECTOR SWITCH, then to P301.

SECTION VI
SERVICE AND MAINTENANCE

6-1 GENERAL

Except for the custom chip and the programmed PROM, most of the electronic components in the PA2100SB are standard parts that are available at most electronic supply outlets.

The Federal factory can and will service your equipment or provide technical assistance with any problems that cannot be handled locally with satisfaction or promptness.

If any unit is returned to Federal for adjustment or repair, it can be accepted only if we are notified by mail or phone 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.

When requesting information or service, address all communications and shipments to:

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

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

Fig.
6-1 Siren Module Printed Circuit Board Removal
6-2 Siren Module Internal View
6-3 Siren Module Schematic Diagram
6-4 Siren Module Main Circuit Board Parts Location Diagram
6-5 Siren Module Front Circuit Board Parts Location Diagram
6-6 Siren Module Bottom View
6-7 Control Module Schematic Diagram
6-8 Control Module LED Circuit Board Parts Location Diagram
6-9 Control Module Relay Circuit Board Parts Location Diagram
6-10 Control Module Internal View
6-11 Control Module Optional Flasher Circuit Board Schematic Diagram
6-12 Control Module Optional Flasher Parts Location Diagram

6-2 SIREN

A. General

Any competent electronic technician should have little difficulty in tracing and correcting a malfunction.

When trouble-shooting the PA2100SE Table 6-1 may be useful for isolating a malfunction.

When replacing small components, use care when soldering. Heat easily damages integrated circuits, transistors, capacitors and circuit boards. Therefore, it is advisable to use longnose pliers or similar heat sink on the components lead being soldered.

When replacing the Driver Amplifier transistors, Q111 and Q112, or the Output Amplifier transistors, Q301 and Q302, insure that a matched pair is used. In addition, always replace the SIL-PAD insulators. Ensure that they are properly installed. Improper installation of the insulator could cause a short circuit.

Always adjust the symmetry of the output waveform when Q111 and Q112 or Q301 and Q302 are replaced. To perform this adjustment, disconnect the speaker(s) and connect a 5.5 ohm 200 watt dummy load across the speaker terminals. Connect an oscilloscope across the dummy load and activate the Yelp signal. Adjust R156 for the best possible square wave. See figure 6-4 for the location of R156.

B. Removal for Servicing.

To remove Siren, loosen two hex head screws on the bottom of the unit, and slide the Siren out (see figure 6-6).

C. Circuit Board Removal.

1. To remove the Main Circuit Board remove the three screws that hold the board in the Siren (see figure 6-1). Disconnect the two connectors at the rear of the board and lift the board out of the chassis. Also be sure that the two plugs on the front of the circuit board mate properly with sockets on the Front Circuit Board.

2. To remove the Front Circuit Board, remove the Main Circuit Board as described in sub-paragraph 6-2.C.1. Loosen the control knob set screw and slide the knob from its control shaft. Remove the spanner nut that holds the SELECTOR control to the front panel of the siren. Remove the two screws from the bottom of the Siren that screw into the front PC Board L-brackets. Lift out the Front PC Board.

6-3 CONTROL MODULE

To gain access to the interior of the Control Module, loosen two hex head screws on the bottom of the siren (see figure 6-6). Slide cover off the unit.

Most of the circuitry in the Control Module is used to control power to vehicle accessories. If a malfunction occurs in a circuit, the problem is probably external to the Control Module. However, before trouble-shooting the external circuitry be sure the rear panel of the Control Module is properly wired.

If a malfunctioning device is controlled by the MASTER switch, SW401, make sure that SW401 is properly programmed by the nine section miniature rocker switch, SW501 (refer to paragraph 3-11).

To remove the Control Module from the siren housing, you need only to loosen one hex head screw (see figure 6-6).

If optional accessory switches are installed to control other vehicle accessories always check the switches for proper operation before trouble-shooting the external devices.

The optional Alternating Flasher operates by use of electronic circuitry. If this circuitry fails, see the schematic diagram figure 6-11 and the parts location diagram figure 6-12.

Table 6-1 lists voltages and waveforms that appear on the integrated circuits and transistors in the siren when the SELECTOR switch is set to its various positions. Abbreviations are used to describe the SELECTOR position. These abbreviations and their meanings are as follows:

R = RADIO
W = WAIL
P = PA
Y = YELP
M = MANUAL
H = HI-LO

The Tables below show characteristics of IC-1, which debounces the Horn Ring signal; IC-2, the bistable TAP II flip flop and IC-3, the PROM. On succeeding pages are the characteristics of IC-3 continued; a chart of hexidecimal addresses and outputs; the characteristics of IC-4, which contains most of the circuitry necessary for the production of all siren signals; plus the square wave characteristics of Q111, Q112, Q301 and Q302.

Table 6-1

At the end of these pages are square wave drawings. When a waveform is present at a point, the waveforem is listed by a capital letter of its peak-to-peak voltage. For example, the waveform at IC1-3 corresponds to the drawing labeled B at the end of these pages, which shows that when an oscilloscope is connected to IC1-3, this waveform having an amplitude of 5V should be observed.

IC1

PIN	SELECTOR POSITION	VOLTAGE OR WAVEFORM	NOTES
1	All	OV	
2	All	A	Only as long as Horn Ring is operating.
3		B	
4,8	All	5VDC	
5	All	3VDC	
6,7		C	

IC2

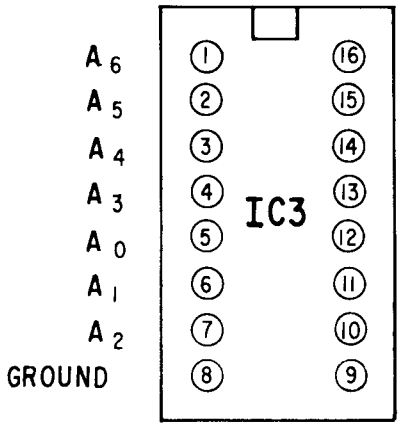
PIN	SELECTOR POSITION	VOLTAGE OR WAVEFORM	NOTES
1	All	5V or 0V on alternate operation of Horn Ring	RESET when ROTARY switch is changed.
3	All	B	While Horn Ring is held down.
4	All	D,E	
5,6,16	All	5VDC	Switched 5V
7,8,9, 10,11, 12,13	All	0VDC	Ground

IC3

PIN	SELECTOR POSITION	VOLTAGE OR WAVEFORM	NOTES
1	All	D	As long as AUX is operated.
2	All	D	As long as PEAK is operated.
3	M	OV	5V in other SELECTOR positions.
4	W	OV	5V in other SELECTOR positions.
5	All	OV or 5V	Alternates as Horn Ring is depressed.
6	All	OV or 5VDC	HIGH as long as Horn Ring is depressed.
7	Y	OV	5V in other SELECTOR positions.
8,13,14	All	OV	
9		See Hex table on next page	
10			
11			
12			
15	All	5V	
16	All	5V	

IC3 ADDRESSES AND OUTPUTS IN HEXADECIMAL

AD	OUT	AD	OUT	AD	OUT	AD	OUT	AD	OUT	AD	OUT	AD	OUT	AD	OUT	AD	OUT	AD	OUT
00	B	1B	F	36	F	51	9	6C	3	87	B	A2	B	BC	F	D7	A	F2	9
01	B	1C	F	37	F	52	9	6D	B	88	B	A3	B	BD	F	D8	A	F3	6
02	B	1D	F	38	F	53	9	6E	3	89	B	A4	B	BE	F	D9	A	F4	9
03	B	1E	F	39	F	54	A	6F	B	8A	B	A5	B	BF	F	DA	A	F5	3
04	B	1F	F	3A	F	55	A	70	9	8B	B	A6	B	C0	B	DB	A	F6	9
05	B	20	B	3B	F	56	A	71	6	8C	F	A7	B	C1	B	DC	A	F7	3
06	B	21	B	3C	F	57	A	72	9	8D	F	A8	B	C2	B	DD	A	F8	6
07	B	22	B	3D	F	58	A	73	6	8E	F	A9	B	C3	B	DE	A	F9	9
08	B	23	B	3E	F	59	A	74	9	8F	F	AA	B	C4	B	DF	A	FA	6
09	B	24	B	3F	F	5A	A	75	3	90	F	AB	B	C5	B	E0	B	FB	9
0A	B	25	B	40	B	5B	A	76	9	91	F	AC	F	C6	B	E1	B	FC	F
0B	B	26	B	41	B	5C	A	77	3	92	F	AD	F	C7	B	E2	B	FD	F
0C	F	27	B	42	B	5D	A	78	6	93	F	AE	F	C8	B	E3	B	FE	F
0D	F	28	B	43	B	5E	A	79	9	94	F	AF	F	C9	B	E4	B	FF	F
0E	F	29	B	44	B	5F	A	7A	6	95	F	B0	F	CA	B	E5	B		
0F	F	2A	B	45	B	60	B	7B	9	96	F	B1	F	CB	B	E6	B		
10	F	2B	B	46	B	61	B	7C	A	97	F	B2	F	CC	A	E7	B		
11	F	2C	F	47	B	62	B	7D	A	98	F	B3	F	CD	A	E8	B		
12	F	2D	F	48	B	63	B	7E	A	99	F	B4	F	CE	A	E9	B		
13	F	2E	F	49	B	64	B	7F	A	9A	F	B5	F	CF	A	EA	B		
14	F	2F	F	4A	B	65	B	80	B	9B	F	B6	F	D0	9	EB	B		
15	F	30	F	4B	B	66	B	81	B	9C	F	B7	F	D1	9	EC	3		
16	F	31	F	4C	A	67	B	82	B	9D	F	B8	F	D2	9	ED	B		
17	F	32	F	4D	A	68	B	83	B	9E	F	B9	F	D3	9	EE	3		
18	F	33	F	4E	A	69	B	84	B	9F	F	B0	F	D4	A	EF	B		
19	F	34	F	4F	A	6A	B	85	B	A0	B	BA	F	D5	A	F0	9		
1A	F	35	F	50	9	6B	B	86	B	A1	B	BB	F	D6	A	F1	6		



A_7 = BURGLAR ALARM
A_6 = AIR HORN INPUT
A_5 = PEAK AND HOLD INPUT
A_4 = MANUAL INPUT
A_3 = 1 INPUT
A_2 = 2 INPUT
A_1 = +/−/AUXILIARY INPUT
A_0 = TAP II INPUT

290B1698

DESCRIPTION OF OPERATION

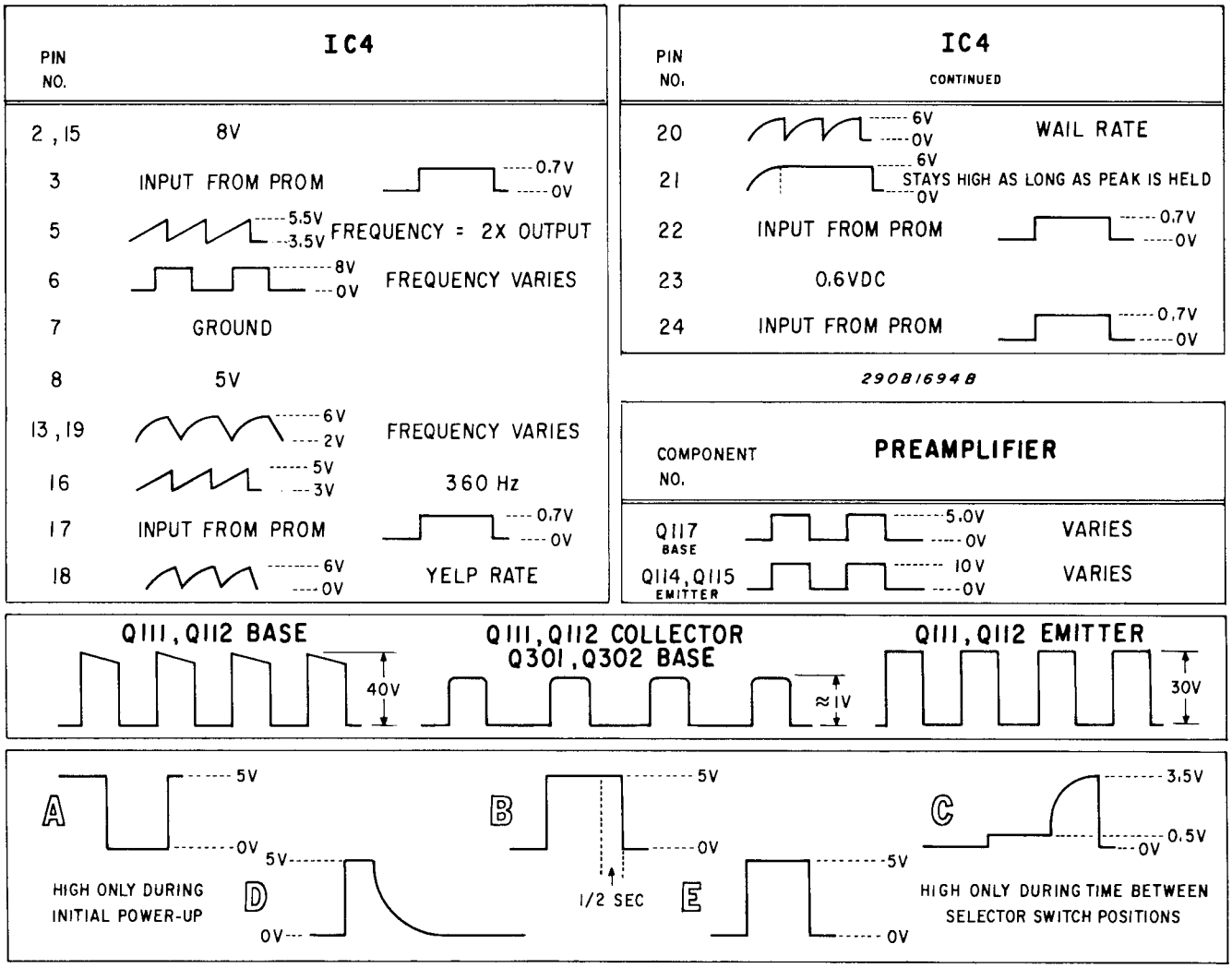
HIGHS are 3.7V or Above to 5V
LOWS are .7V or Below

All Inputs are active lows

1. Air Horn Active - Output is always off (Hexadecimal Code - F).
2. Accidental triggering or malfunction of burglar alarm will not interfere with normal operation.
3. PEAK and HOLD button always causes Peak in MAN (manual), WAIL or YELP. In HI-LO it causes Yelp.
4. HORN RING activation causes Tap II to engage WAIL if in manual mode, YELP in all other modes.

OUTPUT CODING

B = 1011	COAST
F = 1111	OFF
A = 1010	PEAK
9 = 1001	YELP
3 = 0011	WAIL
6 = 0110	HI-LO



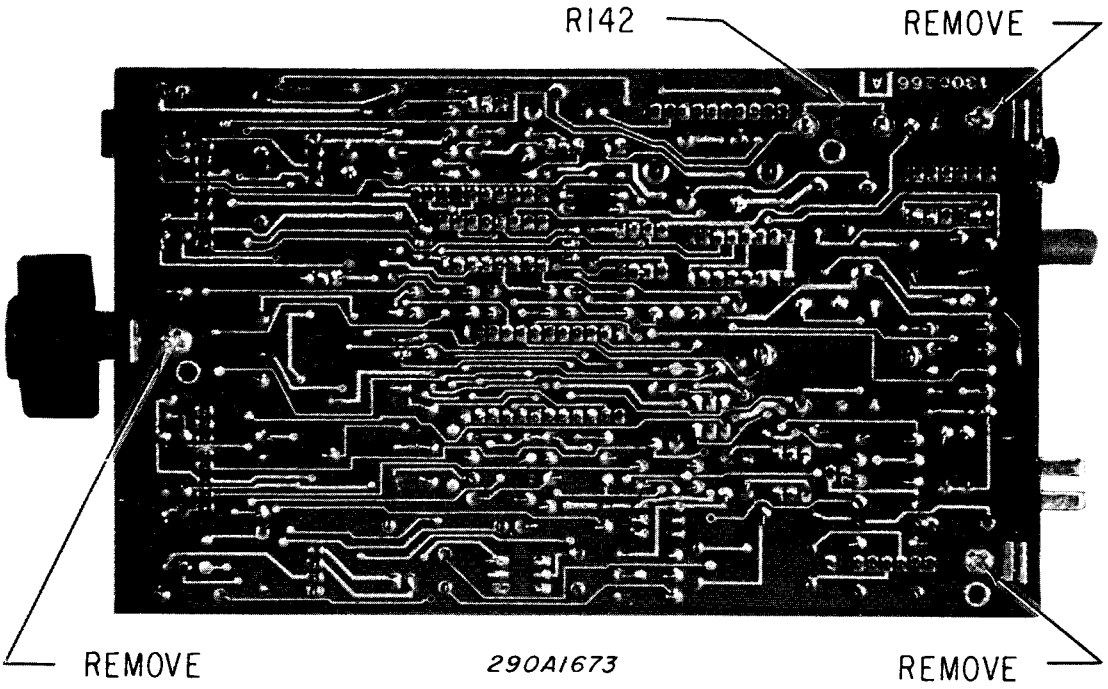


Figure 6-1 Siren Module Printed Circuit Board Removal

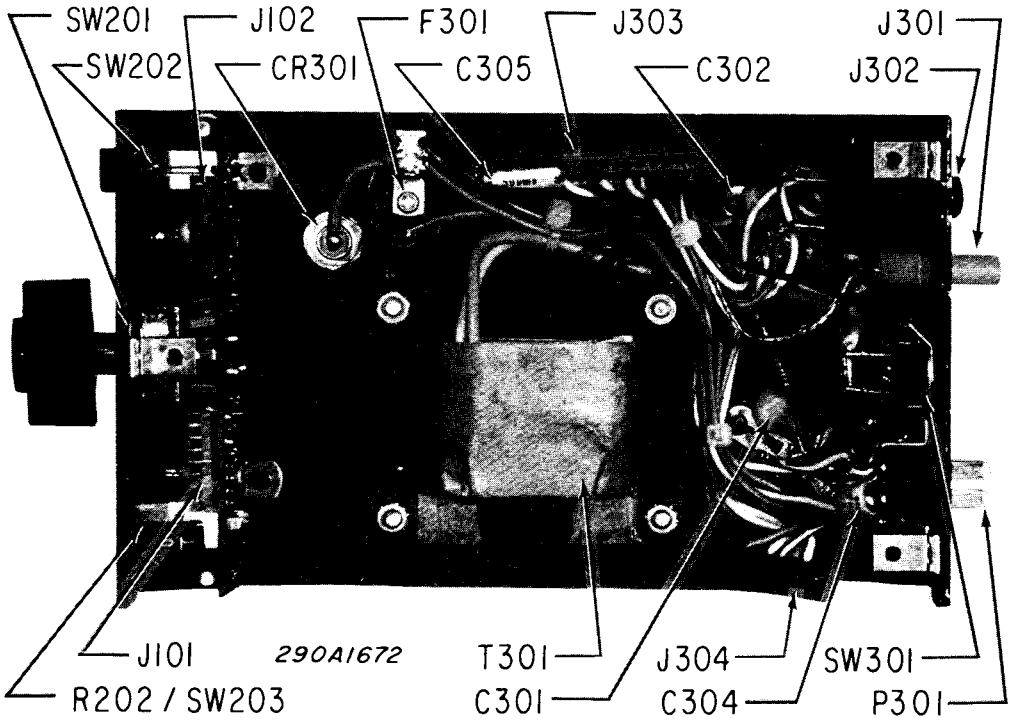
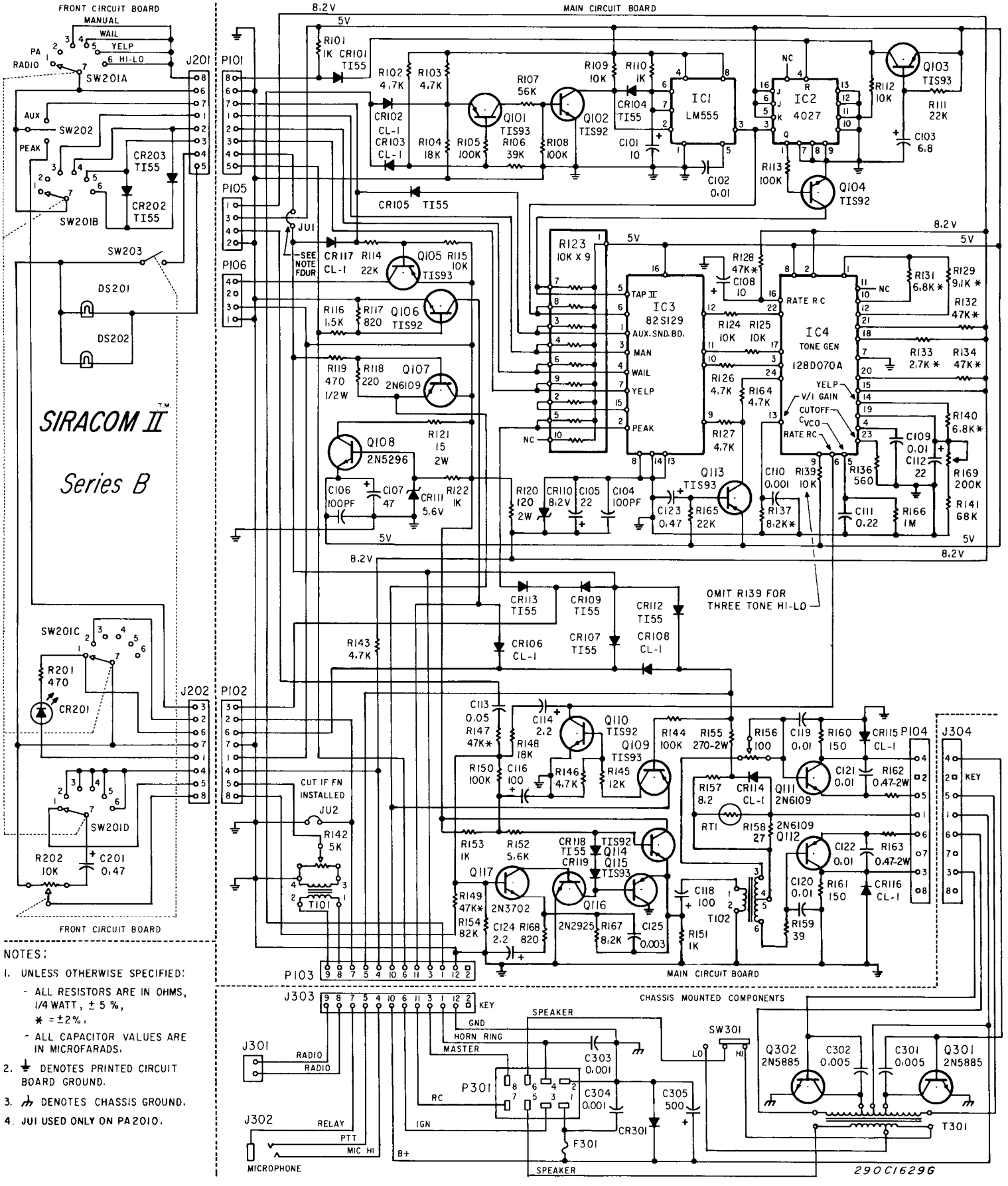


Figure 6-2 Siren Module Internal View



NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   - ALL RESISTORS ARE IN OHMS, 1/4 WATT, ± 5 %, * = ±2%.
   - ALL CAPACITOR VALUES ARE IN MICROFARADS.
2. ⏚ DENOTES PRINTED CIRCUIT BOARD GROUND.
3. ⏚ DENOTES CHASSIS GROUND.
4. JU1 USED ONLY ON PA2010.

Figure 6-3 Siren Module Schematic Diagram

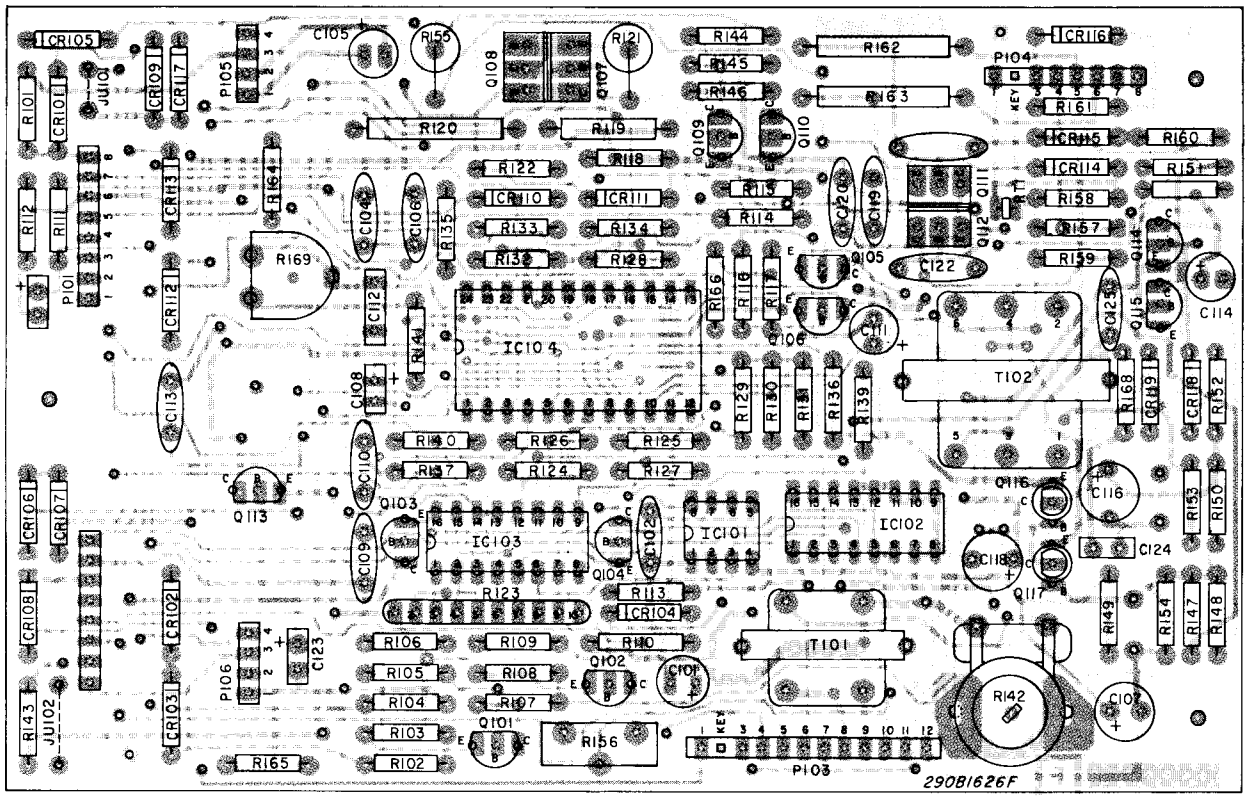


Figure 6-4 Siren Module Main Circuit Board Parts Location Diagram

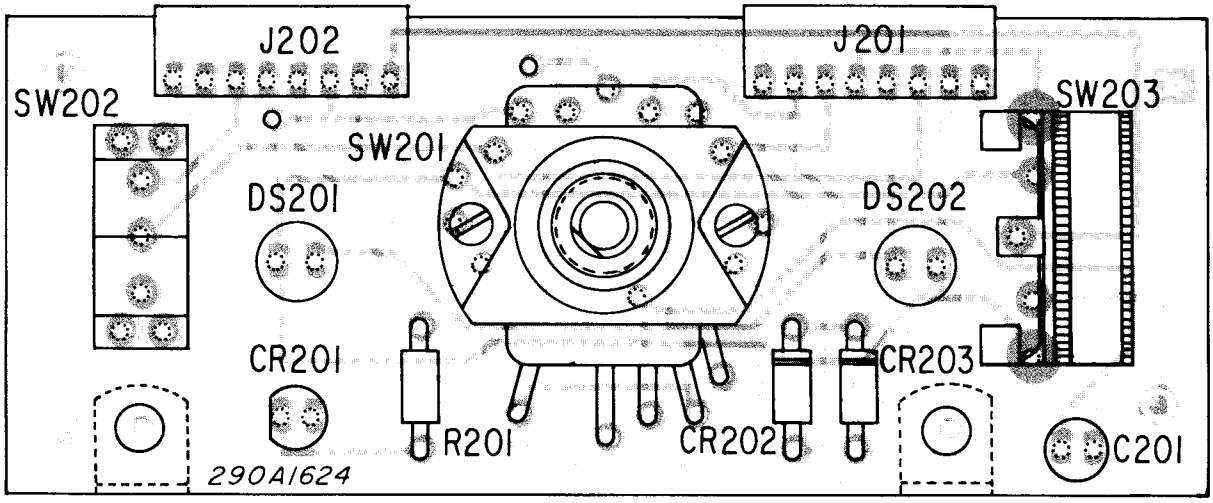


Figure 6-5 Siren Module Front Circuit Board Parts Location Diagram

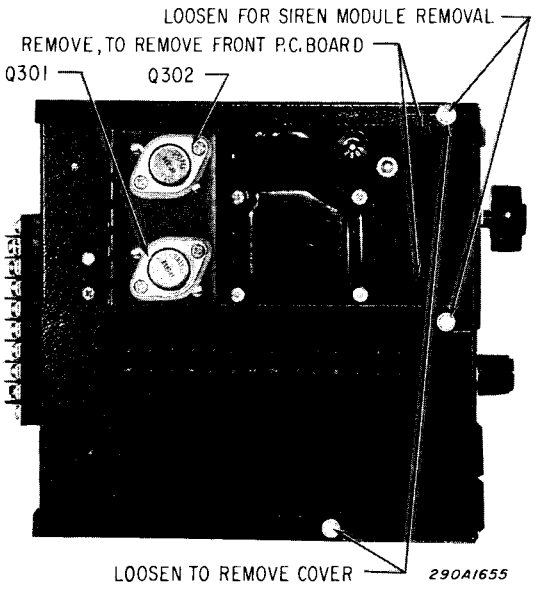


Figure 6-6 Siren Bottom View

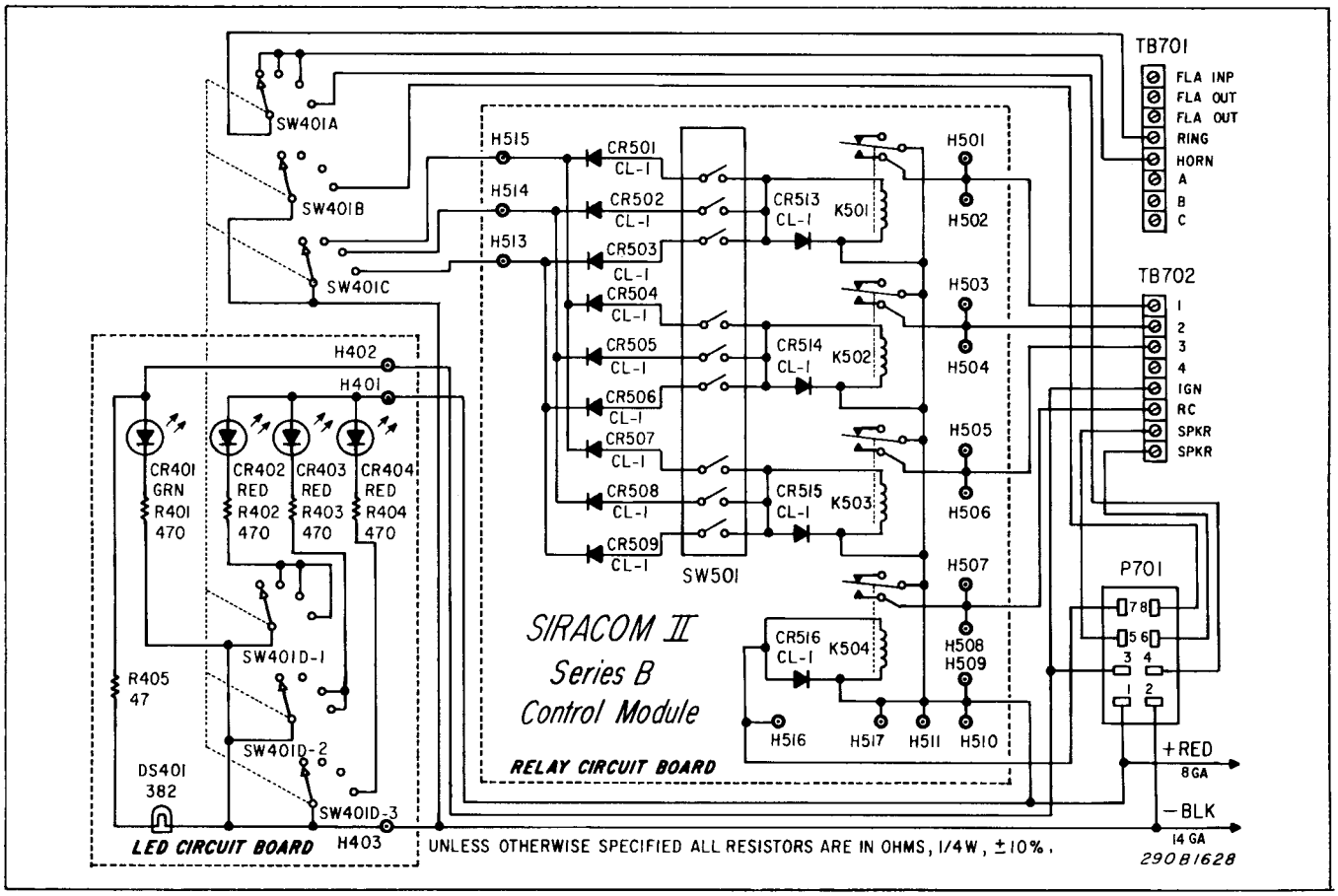


Figure 6-7 Control Module Schematic Diagram

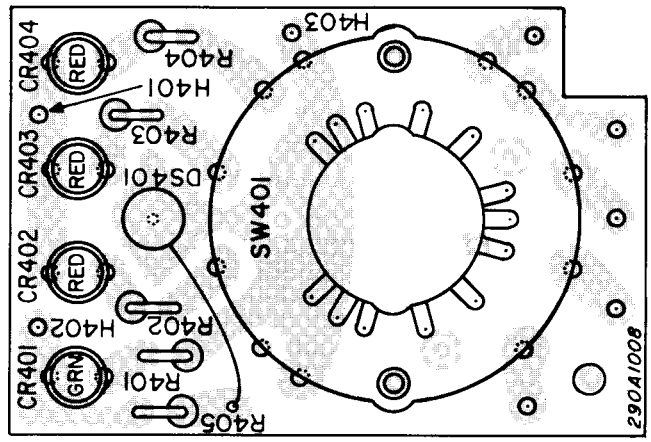


Figure 6-8 Control Module LED Circuit Board Parts Location Diagram

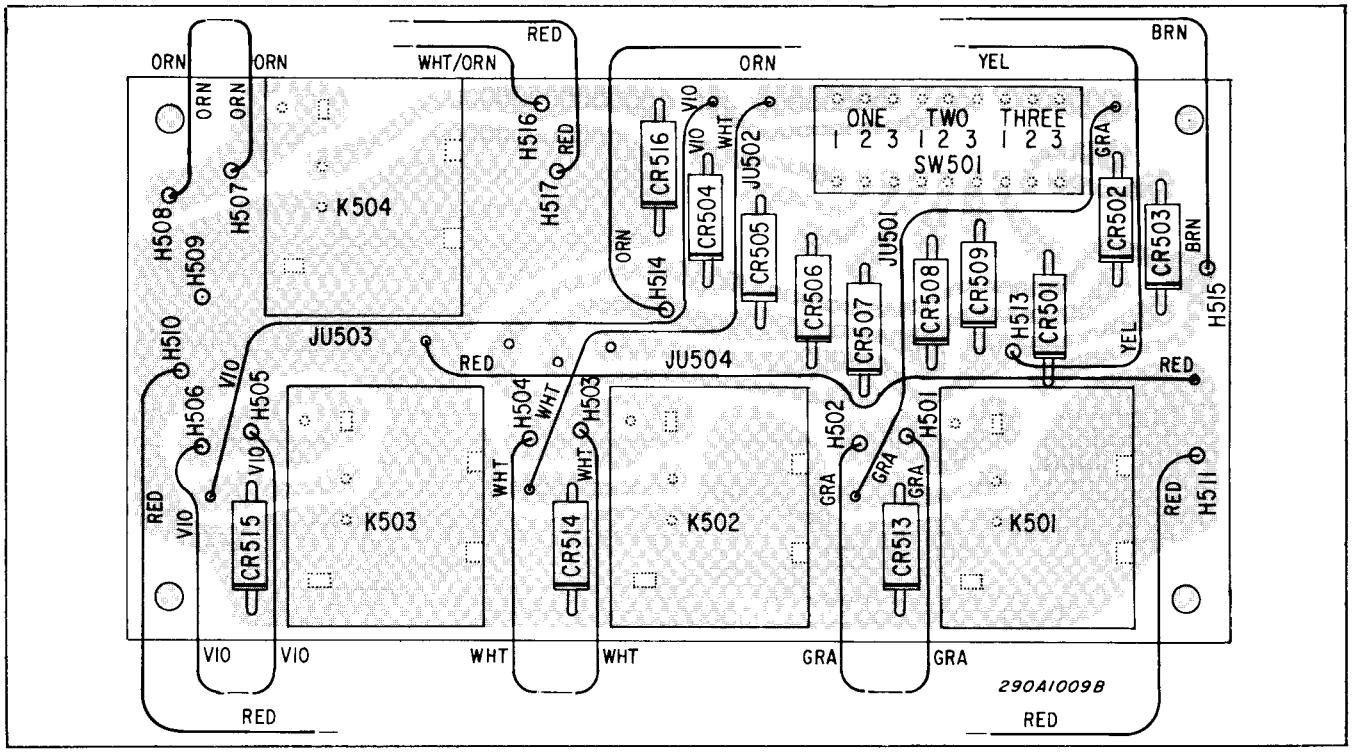


Figure 6-9 Control Module Relay Circuit Board Parts Location Diagram

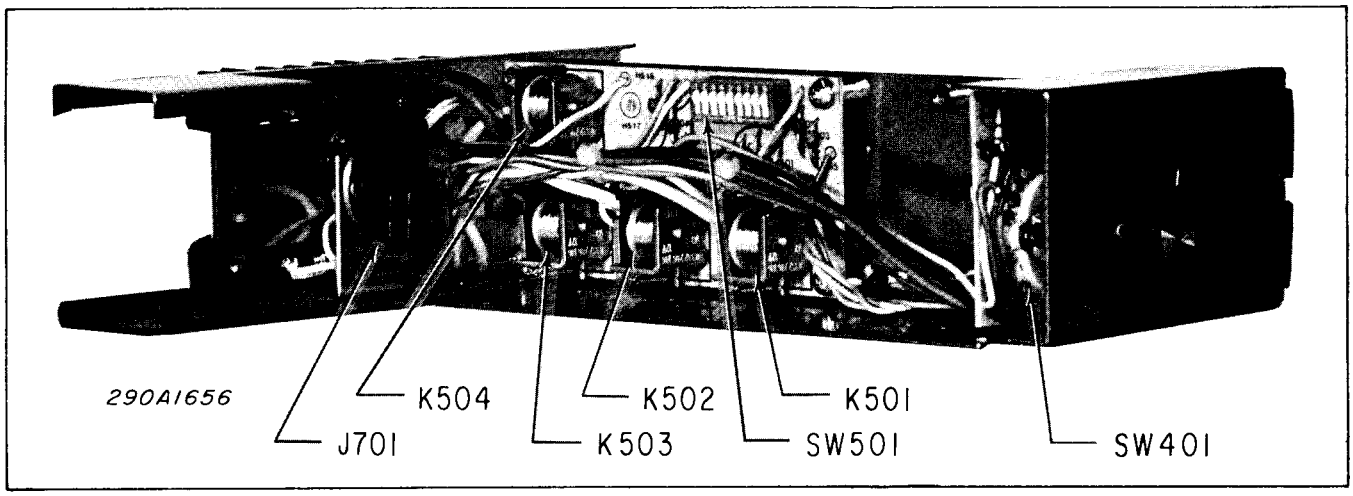


Figure 6-10 Control Module Internal View

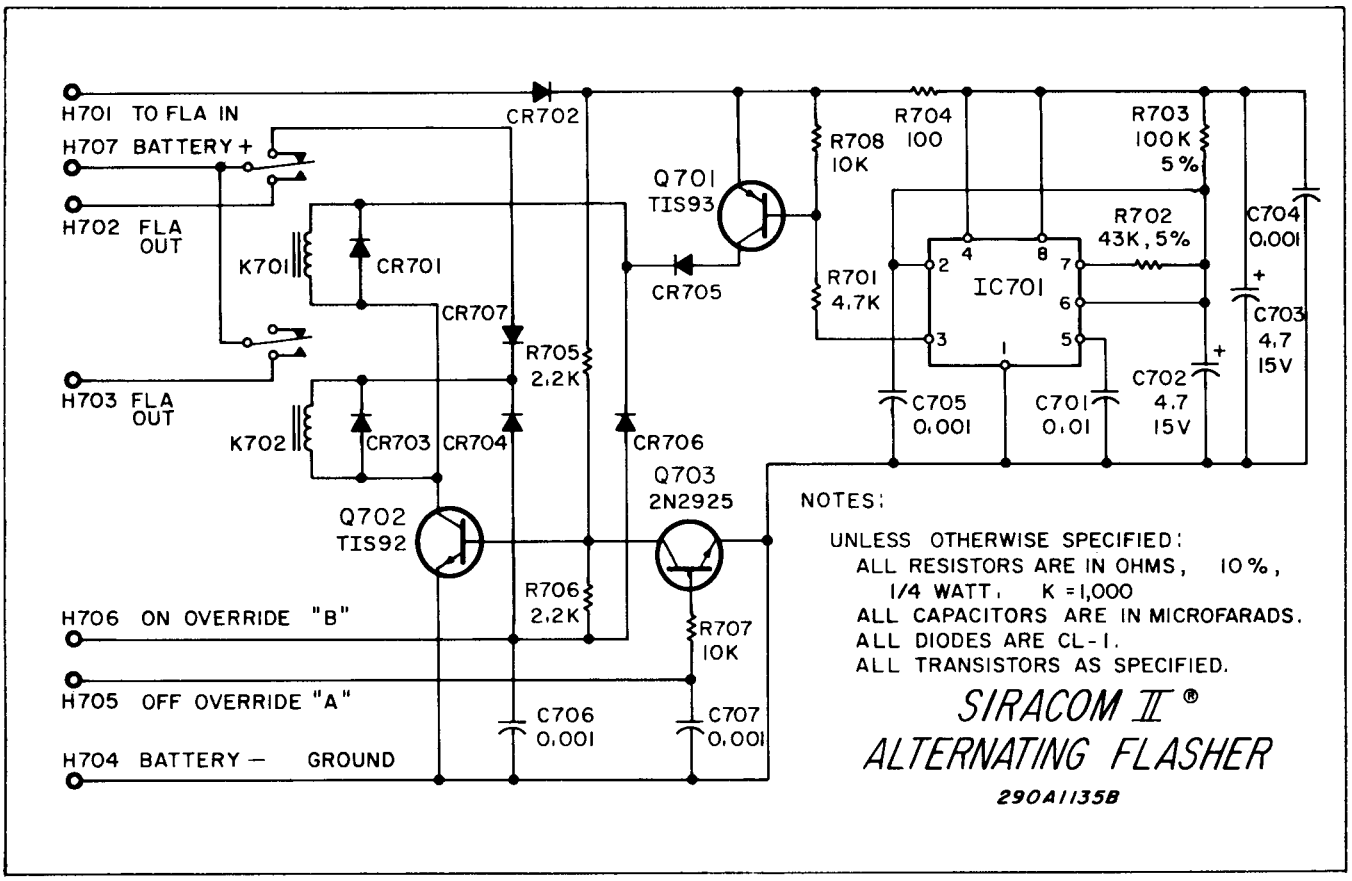


Figure 6-11 Control Moduel Optional Flasher Board Schematic Diagram

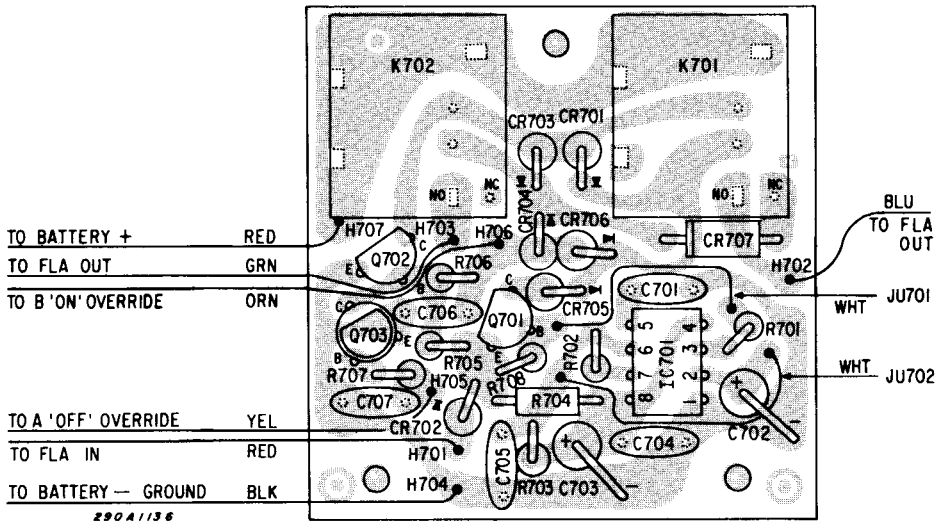


Figure 6-12 Control Module Optional Flasher Circuit Board Parts Location Diagram

MAIN CIRCUIT BOARD PARTS LIST

Schematic Symbol	Description	Part No.
	RESISTORS (See Note)	
R101,110,122,151, 153	1K Ohm	100A233
R102,103,126,127, 143,146,164	4.7K Ohm	100A298
R104,148	18K Ohm	100A258
R105,108,113,144, 150	100K Ohm	100A262
R106	39K Ohm	100A260
R107	56K Ohm	100A229
R109,112,115,124, 125, 139	10K Ohm	100A257
R111,114,165	22K Ohm	100A259
R116	1.5K Ohm	100A220
R117,168	820 Ohm	100A247
R118	220 Ohm	100A219
R119	470 Ohm, 1/2 W.	100A311
R120	120 Ohm, 2W., WW	103A105
R121	15 Ohm, 2W.	103A116
R123	Resistor Network 9x10K Ohm	100A801
R128,132,134,147, 149	47K Ohm, 2%	100A778
R129	9.1K Ohm, 2%	100A781
R131,140	6.8K Ohm, 2%	100A762
R133	2.7K Ohm, 2%	100A773
R136	560 Ohm	100A274
R137	8.2K Ohm, 2%	100A715
R141	68K Ohm	100A261
R142	Potentiometer, 5K Ohm	105B204
R145	12K Ohm	100A297
R152	5.6K Ohm	100A253
R154	82K Ohm,	100A230
R155	270 Ohm, 2W., WW	103A128
R156	Potentiometer, 100 Ohm	105A244
R157	8.2 Ohm,	100A234
R158	27 Ohm,	100A290
R159	39 Ohm	100A286
R160,161	150 Ohm	100A238
R162,163	0.47 Ohm, 2W.,WW	103A130
R166	1 Megohm	100A215
R167	8.2K Ohm	100A223
R169	Potentiometer, 200K Ohm	106A203-03
RT1	Thermistor, 200 Ohm	104A111
	CAPACITORS	
C101	10UF,16V, electrolytic	108A143
C102,109,119,120	0.01UF, 25V, disc	107A226
C103	6.8UF,35V,tantalum	107A604
C104,106	100pf, 100V, disc	107A235
C105	22UF, 16V, electrolytic	108A144
C107	47UF, 16V, electrolytic	108A145
C108	10UF, 10V, tantalum	107A634
C110	0.001UF, 500V, disc	107A263
C111	0.22UF, 35V, tantalum	107A1101
C112	22UF, tantalum	107A667-02
C113	0.05UF, 35V, disc	107A227
C114,124	2.2UF, 25V, electrolytic	108A142
C116,118	100UF, 16V, electrolytic	108A146
C121,122	0.01UF, 100V, disc	107A223
C123	0.47UF, 35V, tantalum	107A645
C125	0.0033UF, 100V, disc	107A271
	SEMICONDUCTORS	
IC1	Integrated Circuit, LM555	128A043A-02
IC2	Integrated Circuit, 4027AE	128A044
IC3	Integrated Circuit, 82S129	128A055-01
IC4	Integrated Circuit, tone generator	128D070
Q101,103,105,109, 113,115	Transistor, PNP, TIS93	125B133
Q102,104,106,110, 114	Transistor, NPN, TIS92	125B132
Q107,111,112	Transistor, PNP, 2N6109	125B431
Q108	Transistor, NPN,2N5296	125B415
Q116	Transistor, NPN	125A119
Q117	Transistor, PNP, 2N3702	125A113
CR101,104,105, 107,109,112,113, 118,119	Diode, TI55	115B101
CR102,103,106, 108,114,115,116, 117	Diode, CL1 (ED3002S)	115B301
CR110	Diode, Zener,8.2V,IN4738	115A232
CR111	Diode, Zener, 5.6V, IN5232B	115A254
	MISCELLANEOUS	
T101	Transformer, Audio	120B123
T102	Transformer, Driver	120B145
	Circuit Board (without parts)	130D266F
	Circuit Board (complete with parts installed)	200D789F
P101,102,104	Connector, Wafer	140A170
P103	Connector, Wafer	140A195
P105,106	Connector, Interlocking	140A186
	Insulator, Thermal	235A124A
	SCR, Mach. Rd.Hd.SLT STL	7000A055-05
	Nut, Hex Ext. Keys STL	7058A001
JU-1,JU-2	Wire, Buss 22	R301A022-00

Note: Unless otherwise specified, all resistors are carbon film, 5%, 1/4 watt.

LED CIRCUIT BOARD PARTS LIST

Schematic Symbol	Description	Part No.
R401,402,403, 404	Resistor, 470 Ohm	100A248
R405	Resistor, 47 Ohm	100A237
CR401	Pilot Light LED, Green	147A113A-02
CR402,403,404	Pilot Light, LED, Red	147A113A-01
DS401	Lamp, Clear, 14V, CM382	8469A665
SW401	Switch, Rotary	122B166
	LED Circuit Board (without parts)	130C226
	LED Circuit Board (with parts installed)	200C701

MISCELLANEOUS

Description	Part No.
Bracket, Mounting	8536B458A
Accessory Kit (PA2100)	8536A405A

CHASSIS MOUNTED COMPONENTS
PARTS LIST

Schematic Symbol	Description	Part No.
C301,302	Capacitor,0.005 UF,100V,disc	107A211
C303,304	Capacitor,0.001 UF,100V,disc	107A263
C305	Capacitor,500 UF,15V,electrolytic	108A122
Q301,302	Transistor, NPN, 2N5885	125B432A
CR301	Diode, 368AR	115A311
T301	Transformer Output	120C158A
J301	Connector, 2 contact	140A197
J302	Jack, Microphone	142A118A
J303	Connector, 12 contact, AMP MTA	233A139
J304	Connector, 8 contact, AMP MTA	233A138
P301	Connector, 8 contact, cinch Jones	140A114
SW301	Switch, Slide, DPDT	122A144
	Fuseholder, 342002	143A106
	Polarizing Keys - 2 required	231A141A
	Transformer Cover	8536C605
	Foam Pad - 2 piece	230A133
F301	Fuse, 20 ampere, 3AG	148A127

FRONT CIRCUIT BOARD
PARTS LIST

R201	Resistor, 470 Ohm	100A248
C201	Capacitor, 0.47 UF. 35V, tantalum	107A645
CR201	Light Emitting Diode, red	147A113A-01
CR202,203	Diode, T155	115B101
SW201	Rotary Switch, 4 pole, 6 pos.	122B198
SW202	Rocker Switch, SPST, center-off	122B191
SW203/ R202	Switch/Thumbwheel potentiometer	104B116A
DS201,202	Lamp, subminiature	149A117
	Front Circuit Board (without parts)	130C265
	Front Circuit Board (with parts installed)	200C788
	Right Angle Connector	139A161

RELAY CIRCUIT BOARD
PARTS LIST

CR501-509, 513-516	Diode, CL1 (ED30025)	115B301
K501,502, 503,504	Relay, SPDT, 12Vdc	8536A401
SW501	Switch, DIP, 9 section	112A115A-02
	Circuit Board (without parts)	130D224A
	Circuit Board (complete with parts installed)	200D809

OPTION F (ALTERNATING FLASHER)
PARTS LIST

R701	Resistor, 4.7K Ohm	100A298
R702	Resistor, 43K Ohm	100A276
R703	Resistor, 100K Ohm	100A262
R704	Resistor,100 Ohm	100A240
R705,706	Resistor, 2.2K Ohm	100A225
R707,708	Resistor, 10K Ohm	100A257
C701	Capacitor,0.01 UF,25V, Disc	107A226
C702,703	Capacitor, 4.7 UF, 15V, Tantalum	107A678
C704,705,706, 707	Capacitor, 0.001UF, 500V, Disc	107A263
IC701	Integrated Circuit, LM555C	128A043-02
Q701	Transistor, PNP, T1S93	125B133
Q702	Transistor, NPN, T1S92	125B132
Q703	Transistor, NPN, 2N2925	125A119
CR701,702,703, 704,705,706,707	Diode, ED3002S	115B301
K701,702	Relay, SPST, Bosch	131A125
	Printed Circuit Board (without parts)	130C239
	Printed Circuit Board (with parts installed)	200C722

255A187
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