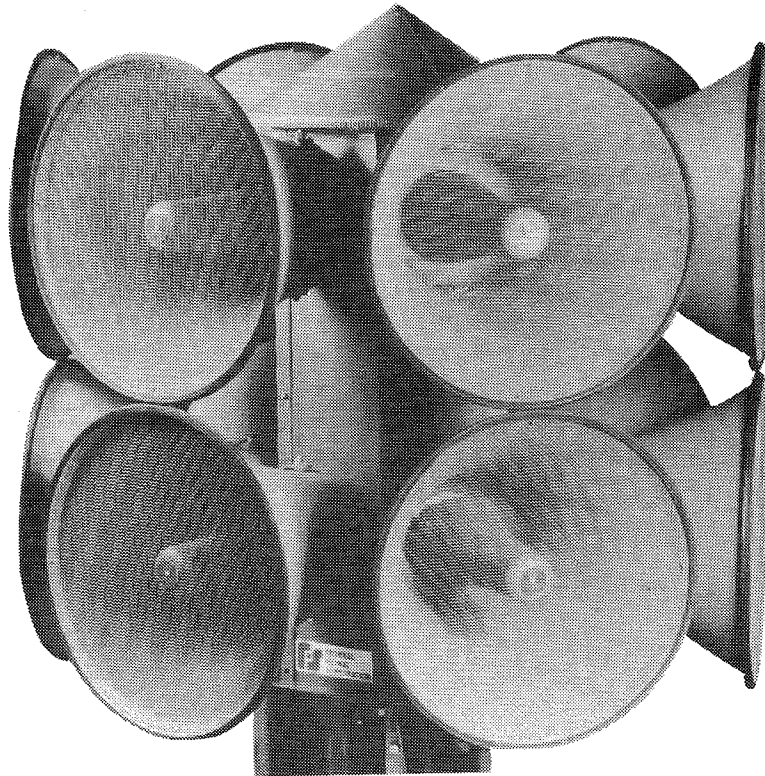




SIGNAL DIVISION
Federal Signal Corporation

Model EOWSX

SiraTone®



Warranty

Federal Signal Corporation (Federal) warrants outdoor warning sirens of its manufacture to be free from defective material and workmanship at the time of delivery to the user. Federal will repair or replace, without charge to user other than transportation, removal and reinstallation costs, any of its outdoor warning sirens and controls, or part thereof which Federal shall determine, in its sole discretion, to be defective in material or workmanship provided written notice of such defect shall have been given to Federal within two years from the date of delivery as to such defects in electrical components, such as motors and controls, and within three years from date of delivery as to all other such defects, such as mechanical components. Additionally, Federal's obligations hereunder shall be conditioned upon the user, at its cost, making the outdoor warning siren available to Federal for its inspection at such location as Federal may designate. This warranty shall not extend to any outdoor warning siren which has been improperly installed or inadequately maintained according to instructions supplied by Federal or which has been subjected to misuse, negligence, accident, tampering or alteration. The sole remedy for breach of the foregoing warranty shall be repair or replacement as aforesaid, or in Federal's sole judgment, refund of the purchase price paid for such outdoor warning siren, and every other form of liability for direct or consequential damages, cost or loss is expressly excluded or denied. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY, FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, WHETHER EXPRESS OR IMPLIED.



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SECTION I

GENERAL DESCRIPTION

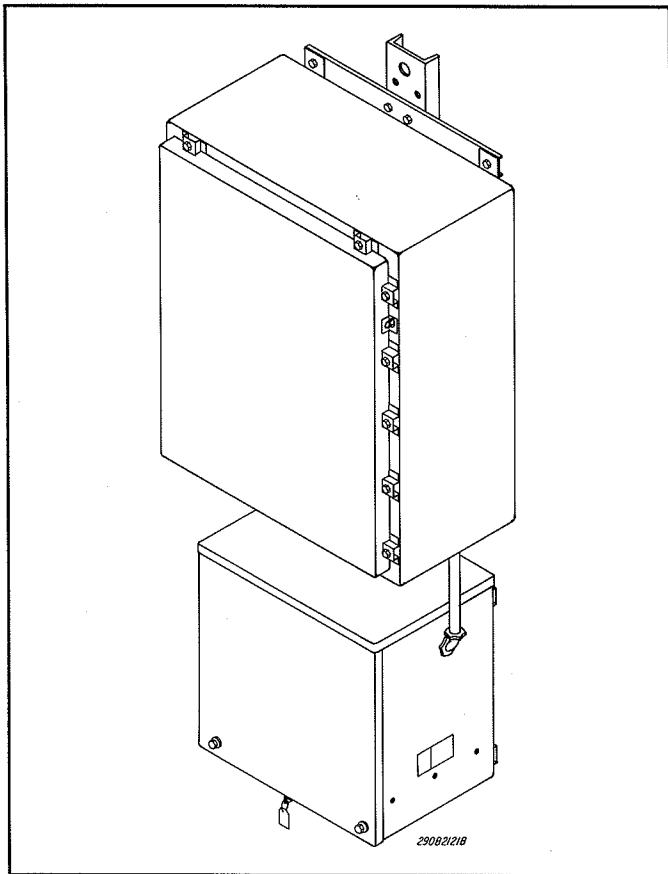


Figure 1-1. Model EOWS* Control Unit and Battery Box.

1-1. GENERAL.

The Federal Model EOWS* SiraTone (Electronic Outdoor Warning Siren) products are a family of dual-tone, electronic sirens that are capable of producing high intensity warning signals and voice communication over a large area. These electronically produced warning signals more nearly resemble the distinctive, penetrating sound of an electro-mechanical siren. A highly efficient circuit design and battery power system enable the siren to produce a high sound level, while making moderate demands on the user provided power source.

1-2. SIREN DESCRIPTION.

The SiraTone system consists of a high power Speaker Array and a Control Unit with batteries. Two types of speaker arrays are presently available. The Model EOWS*1212 is stationary and omnidirectional. Model EOWS*612 is rotating and unidirectional.

The Model EOWS* Control Unit comes equipped with batteries, six amplifiers and tone generation circuitry.

A. Model EOWS* Control Unit.

The Control Unit consists of two cabinets, channel mounted for ease of installation (see figure 1-1). The upper cabinet (NEMA 4 enclosure) houses all the necessary electronics and controls for producing and amplifying up to seven signals (six standard plus one optional) and public address (PA). The amplifier (Amplifier Module) and optional equipment all employ modular construction for easy removal without disconnecting a large number of wires.

Standard features of the Model EOWS* include a low battery cut-off circuit and the SIRALOCK arm/disarm function. If for any reason battery voltage drops below approximately 18-volts, the siren will automatically shut-off. As the batteries are recharged and reach a voltage of approximately 21-volts, the siren will have the capability to operate normally.

The lower cabinet, which complies to a NEMA 3R rating, houses two maintenance free, lead-calcium deep-cycle rechargeable batteries. The lower and upper cabinets are interconnected via conduit, which is sealed to prevent any harmful vapors from entering the control area. The batteries provide primary power to the siren, while the charger in the upper cabinet maintains the charge on the batteries. This arrangement provides power to the siren in the event of a power failure.

B. SIRALOCK.

The SIRALOCK feature removes operating power from the Control Unit until it receives a message which allows it to turn-on. When in a stand-by condition, the siren will not turn-on when activated until it is armed. This removes the possibility of siren activating falsely.

A SIRALOCK jumper (part no. 124A065A) is provided with each unit to bypass SIRALOCK. When needed, the jumper is installed onto pins 1 and 2 of the power distribution board. Refer to paragraph 4-2.D.3.

The purposes of the SIRALOCK jumper (included) are as follows:

1. For maintenance work on the Control Unit.
2. If a radio/decoder is not installed in Control Unit.
3. If landline or push-button control is used.

C. Speaker Array.

Two different speaker arrays are available for use with the EOWS* Control Unit. Each speaker array is supplied pre-wired, ready for installation with 50 feet of speaker cable. The speaker arrays have convenient eyebolts which provide an adequate lifting point for ease of installation. Each speaker array model is the subject of separate installation instructions. The general description of each speaker array is contained in the following paragraphs.

1. Model EOWS*1212 (figure 1-2).

This speaker array is a cluster of twelve exponentially flared re-entrant, spun aluminum speaker projectors which are non-rotating, omni-directional. This speaker array is designed for "long throw" wide area coverage.

2. Model EOWS*612 (figure 1-3).

The Model EOWS*612 rotating uni-directional speaker array uses six exponentially flared re-entrant, spun aluminum speaker projectors. The rotator mechanism rigid bearing assembly, idler bearings, brush and collector rings and

speaker drivers are all located in the sectional protective enclosure. This enclosure has sectional rear panels for easy servicing. Each speaker circuit has four brush contacts which provide continuous reliable energy transfer and stall-free rotation of the array.

This speaker array is designed for "long-throw" wide area coverage. The dual-tone coverage of this unit provides an effective warning signal as well as necessary listening time.

1-3. SIGNAL DESCRIPTION.

Model EOWS is capable of producing six standard signals plus one optional signal for a maximum of seven signals. A graphic representation of the six standard signals is shown in figure 1-4. As indicated in the figure, three of the six signals are either a wailing, dual-tone signal or a variation of a wailing dual-tone signal. Similarly, the remaining three signals are either a steady dual-tone signal or variations of the steady dual-tone signal. In some of the signals, both tones are produced simultaneously, while in others the tones are present alternately.

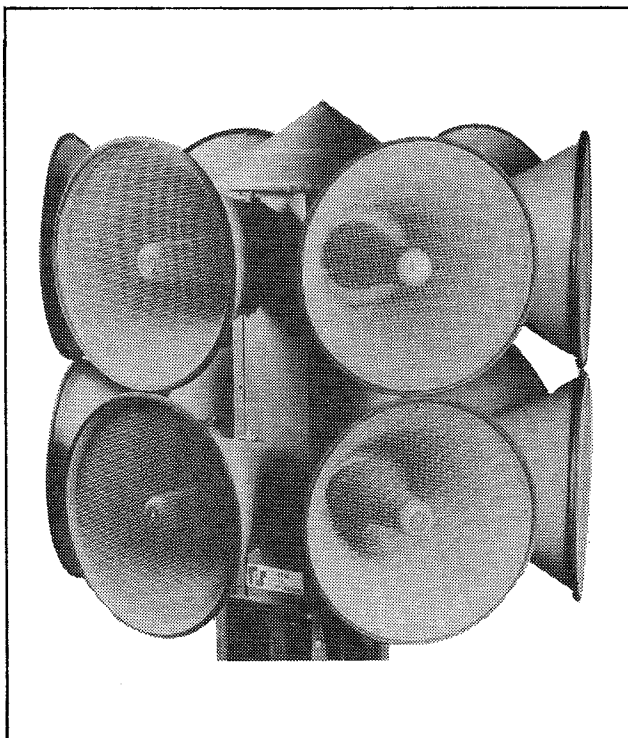


Figure 1-2. Model EOWS*1212 Speaker Array.

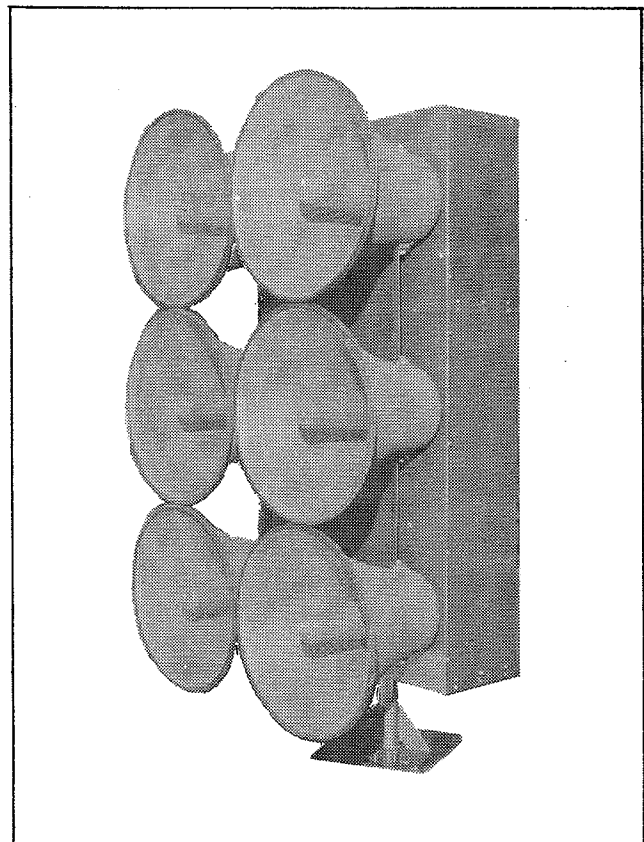


Figure 1-3. Model EOWS*612 Speaker Array.

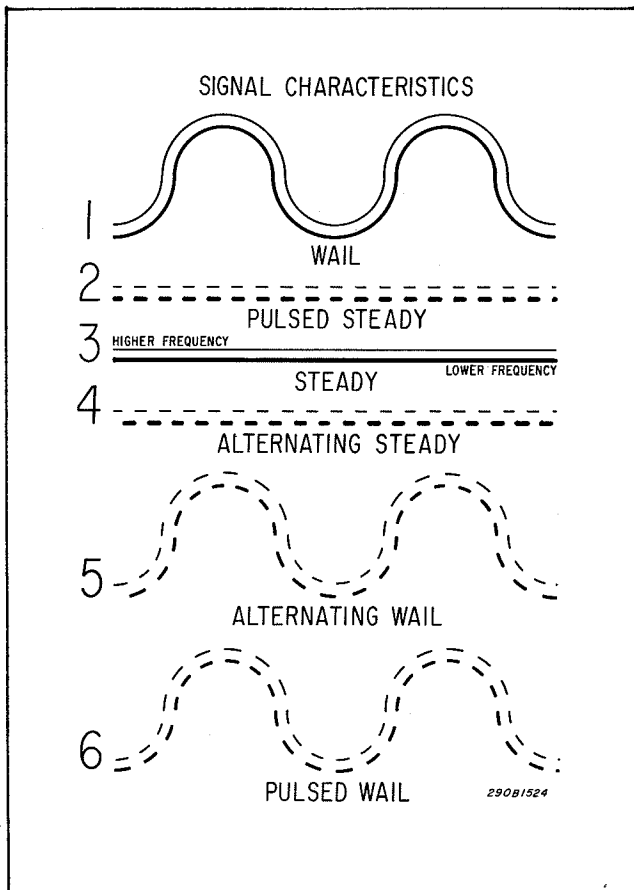


Figure 1-4. Signal Characteristics.

1-4. OPTIONS.

A. Auxiliary Tone.

If required, an optional seventh signal can be added to the SiraTone. The circuitry required for the production of the optional signal is contained in an easily installed tone module. In addition, a tone module can be changed, if signalling requirements change. Optional tone modules available for use with the SiraTone are: Yelp, Yeow, Horn, Slow Whoop, *Temporal Slow Whoop, Bell, Gradual Horn and Westminster Chimes. Westminster Chimes is suggested as a pleasant method of daily scheduled SiraTone testing.

B. Radio Control.

The siren can be activated by a radio signal when an appropriate radio receiver is incorporated into the Control Unit. Activation by radio control has the advantage that control lines are not required between the siren control site and the siren location. Public address and tone signals can be controlled when a suitable receiver is installed in the Control Unit. Refer to the radio instruction

*National Fire Protection Association recommended temporal pattern for the National Standard Fire Alarm evacuation signal.

manual for details concerning installation, operation data and specifications, maintenance, etc.

C. Home/Remote Control Positioning. (Model EOWS*612 only.)

The rotating speaker array can be positioned to operate in selected zones. Up to 4 zones can be selected and set at the time of installation. Radio or land-line activation can then position the speaker array to any desired zone for a specific area announcement. The standard automatic speaker incrementing function will still be operative and will move the speaker array to the next zone after completion of a transmission.

D. Quiet Test.

The Quiet Test option performs a diagnostic test of the siren's operational status. The signal A & B lines, amplifiers and speakers, battery and charger, and rotator are all monitored during a Quiet Test. The status is then displayed via L.E.D.s on the quiet test board and/or on other monitoring systems interfaced to the quiet test board.

E. RemoteScan.

This system contains devices necessary to remotely control and monitor status via switch closures from one or more Central Control Stations (CCS). The CCS can monitor up to 500 remote locations each with control of sixteen (16) functions and interrogation of sixteen (16) results per remote location. Activation can be initiated on an "All-Call", Zoned or Individual remote location basis.

Interrogation on the other hand is performed automatically in a supervisory format. If a change in status occurs between times of normal polling interrogation, a remote site will indicate, to the CCS, that change on an immediate basis.

The RemoteScan System communication link can be radio or dedicated land-line. The CCS unit is a computer with keyboard, printer, monitor and interface unit that can be connected to a base station radio transmitter or landline system.

SECTION II

SPECIFICATIONS

2-1. SYSTEM POWER.*

Operating Voltage	120/240Vac, 47-440Hz, single phase
Current Requirements	4 amps. max. at 120Vac 2 amps. max. at 240Vac
Operating Power*	
Operating Voltage	24Vdc
Operating Current when used with:	
EOWS*612	60 amps. (nom.)
EOWS*1212	60 amps. (nom.)
Standby Current (Control, 6 amplifiers, Radio and Decoder)	0.25 amps.
Continuous Signaling Time (max.)	30 minutes
Standby Time (with minimum 5 minute full signal reserve)	greater than 168 hours (7 days)

2-2. CONTROL UNIT.

Output Power	1200 watts (nom.) RMS
Output Voltage (to speaker drivers)	32Vrms (nom.)
Operating Temperature	-35°C to +85°C**
Dimensions (HWD)	58" x 20" x 15" (1473mm x 508mm x 381mm)
Weight (approx. incl. batteries)	240 pounds (109 kg)
Enclosures	
Upper (Control)	NEMA 4
Lower (Batteries)	NEMA 3R

2-3. CONTROL MODULE.

<u>Signal</u>	<u>Dual-Tone Freq. Range</u>	<u>Sweep Rate</u>
Wail	300/360-850/1020	13 sec.
Pulsed Wail	300/360-850/1020	1.5 sec/13 sec.
Alternate Wail	300/360-850/1020	1.5 sec/13 sec.
Steady	850/1020***	N.A.
Pulsed Steady	850/1020***	1.5 sec.
Alternate Steady	850/1020***	1.5 sec.

2-3. CONTROL MODULE (continued).

Signal Duration (Auto reset)	2-5 minutes (adjustable - factory set at approx. 3 minutes)
Input Impedance	
Local	5K Ohms
Remote	500 Ohms
Signal Output	
Tone	5Vrms
Audio	3.5Vrms
Audio Distortion for output level from 0.1 volt to full rated output . . .	1% maximum
Frequency Response (300 to 4KHz). . .	±2dB (ref. 1KHz)
Maximum Load	50 Ohms
Activation, Minimum Contact Closure .	200ms at 0 Ohms
(See Note)	300ms at 100 Ohms

2-4. AMPLIFIER MODULE.

Operating Current	8.75 amps. at 24Vdc
Input Impedance	33K Ohms
Bias Trigger Level (Max. sensitivity). .	125mVrms
Signal Output	
Tone	32Vrms
Audio	22Vrms
Audio Distortion for output level from 2 volts to full rated output . . .	3% maximum
Frequency Response (300 to 4KHz). . .	±2dB (ref. 1KHz)
Minimum Impedance	2.6 Ohms

2-5. POWER SUPPLY.

Charge Current	6 amps. (max.)
Battery Voltage (at full charge). . .	27.8Vdc
Batteries	
Number	2
Type	Deep discharge (lead-calcium maintenance free chargeable)
Load Test Current	180 amps.
Reserve Capacity	115 minutes at 25 amps.

*System power refers to power supplied to the system from user-supplied commercial power. The operating power is the self-contained primary and back-up power system.

**The siren can operate throughout this temperature range provided the battery temperature is maintained at -18°C or higher.

***Frequencies for steady, pulsed steady and alternate steady are peak frequencies. The signal itself includes "build-up" and "coast down", similar to a mechanical siren.

2-6. SPEAKER ARRAY-PHYSICAL.

Number of Speakers

EOWS*612	6
EOWS*1212	12

Dimensions (HWD)

EOWS*612	81.5" x 51.6" x 32.8" (207cm x 131cm x 83cm)
EOWS*1212	58"H (88" incl.mtg. brckt) x 60" Dia. (147.3cm x 152.4cm)

Weight

EOWS*612	400 lb. (182 kg)
EOWS*1212	380 lb. (173 kg)

Shipping Weight

EOWS*612	640 lb. (291 kg)
EOWS*1212	600 lb. (273 kg)

NOTE: The siren must first be armed before it will react to any siren function signals. To arm the siren apply 0.0 VDC to Pin 5-5 on the power distribution PC board (part no. 200D1036) or connect the SIRALOCK jumper (supplied) onto pins 1 and 2 on the same board.

SECTION III

SYSTEM PLANNING

3-1. CONTROL UNIT.

The information in this section provides the user with guidelines necessary for installation to achieve total benefit of the Control Unit's features.

Control Unit mounting location must first be considered. The Control Unit can be mounted indoors as well as outdoors. In order to avoid losses in speaker power, it is recommended that the speaker array and Control Unit be installed so that the 50-foot interconnecting cable (supplied) will not have to be lengthened. If it is necessary to make a longer cable run, increasing the wire size to 12AWG or larger is recommended.

Whether the Control Unit is installed indoors or outdoors, it should be located out of the reach of vandals. The control and battery enclosures are both supplied with hasp and staple for padlocking security.

The system is operated from 120 or 240VAC which necessitates minimal installation requirements.

Several methods can be used to activate the Control Unit. Land-line control can be used through normally open contact switches. These connections should be made directly to the control module terminal block. The radio can also be remotely activated via the optional radio receiver. When this option is selected, the receiver is pre-wired and located in the Control Unit cabinet.

The entire Control Unit is shipped mounted on an aluminum channel with four mounting holes for 1/2-inch bolts. The total weight of the Control Unit/Battery Box Assembly is approximately 240 pounds (109kg.) including batteries. Therefore, insure that the mounting surface and fasteners can safely sustain the weight of the assembly.

3-2. SIREN LOCATION.

The information in this section provides guidelines to aid the user in the selection of an installation site that makes optimum use of the siren.

Careful consideration of the factors affecting the propagation of sound from the siren and the response of the human ear to the sound will optimize the ability of the siren to effectively warn the community.

The reduction of signal intensity as the distance from the siren increases and the minimum desired signal level at the fringe of the area to be covered are important considerations when choosing a siren installation site. As the distance from the siren increases, sound level losses accumulate. These losses are a result of weather conditions, the terrain, obstructions in the sound path, the pitch of the sound and the height of the siren. Optimum sound propagation conditions exist when there are no obstructions in the sound path, the terrain is flat, and the air is calm. Under these conditions, each time the distance from the siren is doubled, the sound level decreases by approximately 8dB. For example, the sound level 100 feet (30.5m) from the siren is 115dB. At 200 feet (61m), the sound level drops to 107dB; at 400 feet (122m) the sound level drops to 99dB; etc. This is referred to as the "loss per distance doubled".

A loss per distance doubled of 8dB is seldom experienced. This is because buildings and other obstructions are frequently present in the sound path. In addition, the atmosphere is rarely calm, and the terrain may not be flat. As a result, a typical loss per distance doubled in residential areas may be 10dB, and as high as 12dB in areas having tall buildings.

Experience indicates that an individual with normal hearing will probably hear a warning signal whose intensity is at least as high as the ambient noise level. Experience has also shown that the ambient noise level in industrial districts is typically 90dB. Therefore, for a person to hear a warning signal in an industrial area, the sound level intensity of that signal must also be approximately 90dB. In this situation, any point receiving a signal having less than 90dB intensity is considered to be outside the effective range of the siren.

In business districts an ambient noise level of 80dB is common and in residential areas, 70dB of ambient noise is typical. Assuming a 70dB minimum sound level, the effective range of a Model EOWS*1212 SiraTone is approximately 3000 feet (914m). The Model EOWS*612 is effective from 3000 to 6400 feet (914 to 1950m).

Wind speed and direction often affect the propagation of sound from the siren. Consequently, the direction of the prevailing wind may also be a factor to consider when selecting the installation site(s) of a small, one or two-siren system. For example, if the prevailing wind is from the west, it may be desirable to install the siren toward the western edge of the area to be covered.

When planning the siren locations in the system, choose sites where easy access by truck can be made, should service be required. Try to avoid low land where flooding occurs or heavy mud is prevalent.

Other factors to consider before selecting the installation site include the availability of electrical power, the ease of installation and maintenance, and the height of surrounding obstructions.

SECTION IV INSTALLATION

4-1. PHYSICAL.

A. General.

Most SiraTone installations are one of two types: Pole Mount or Flat Surface Mount. These two configurations make it possible to install the SiraTone in almost any situation. If neither of the installations in this paragraph is suitable, modification of one of the configurations described may be practical.

A SiraTone is typically installed 35 to 40 feet (11m. to 12m.) above the ground. If the siren is less than 35 feet (11m.) above the ground, sound intensity at close range may increase but the effective range of the siren is reduced. Conversely, if the siren is located more than 40 feet (12m.) above the ground, the effective range of the siren may increase, but the sound may skip over areas closer to the siren. These variables may make it desirable to test the siren sound coverage at various heights and locations whenever possible.

B. Pole Mounting.

A typical SiraTone pole-mounted installation, using the Model EOWS*1212 Omni-directional Speaker Array, is shown in figure 4-1. Depending upon the sub-surface conditions at a particular speaker array installation site, it may be advisable to use a Class I timber utility pole. The stability of the footing may make the installation of guy wires to the pole necessary. To install the SiraTone on a timber utility pole, proceed as follows:

1. Install the timber utility pole in accordance with accepted standards and practices.
2. Remove rotator relay from speaker and mount the speaker array on the pole following the instructions supplied with the array. The Control Unit and Battery Box are attached to a length of 4" channel. There are five pre-drilled holes in the channel: one 1-1/4" hole and four 5/8" holes. The 1-1/4" hole provides

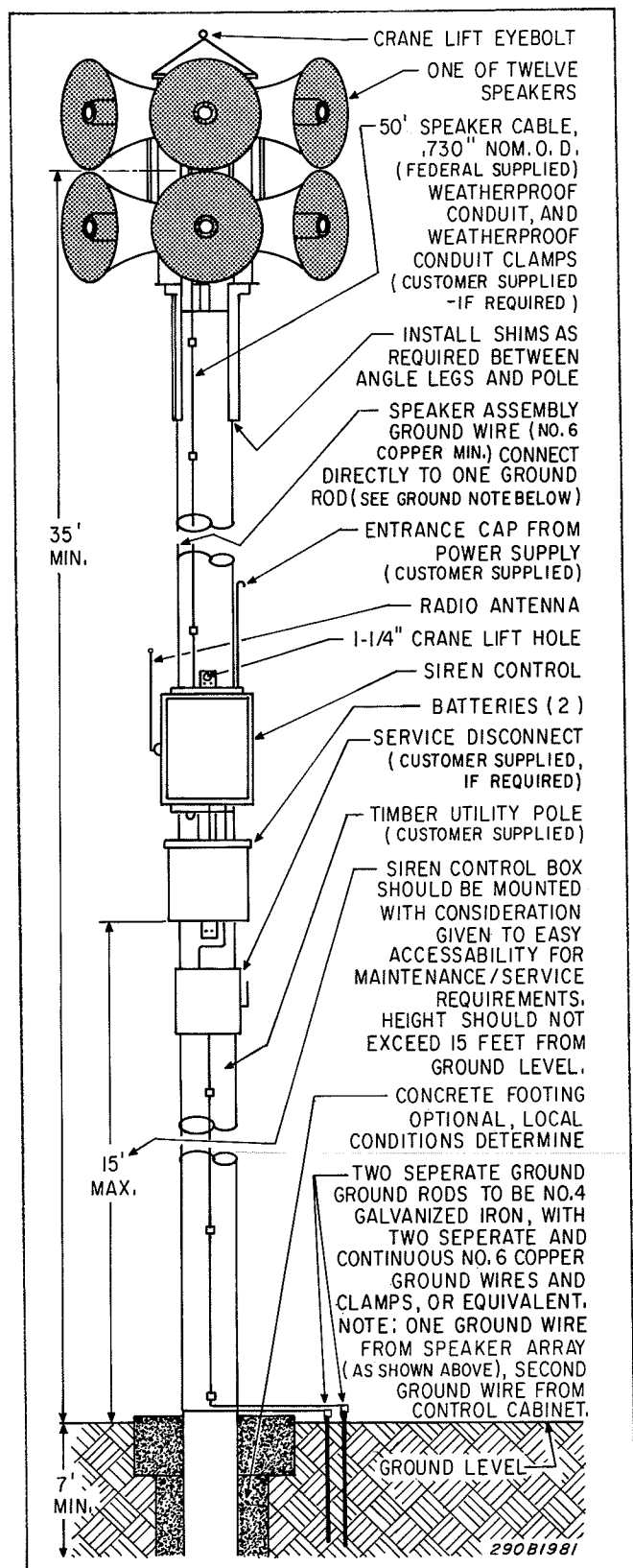


Figure 4-1. Pole Mounted Installation.

a convenient point for lifting the Control Unit/Battery Box assembly. The four 5/8" holes are for attaching the assembly to the pole. To attach the Control Unit/Battery Box to the pole proceed as follows:

3. Remove batteries before up-righting the Control Unit. Use a crane to lift the Control Unit/Battery Box assembly to the desired height along the pole. It is recommended that the assembly be attached to the pole at a height that is accessible to service personnel, but discourages vandalism.

4. Use the crane to hold the Control Unit/Battery Box assembly against the pole. Using the four 5/8" holes in the channel as a template, locate four hole locations on the pole.

5. Drill a 3/8" hole at each of the four locations. Drill each hole at least 3-1/2" (90mm.) deep.

6. Attach the Control Unit/Battery Box assembly to the pole, using four user-supplied 1/2" x 5" lag bolts. Slide a user-supplied 1/2" flat washer onto each bolt before threading the bolt into the pole.

7. Mount a user-supplied fused disconnect switch on the pole beneath or the opposite Control Unit/Battery Box assembly.

C. Flat Surface Mount.

It may be practical to mount the siren on a flat-roofed building, depending on the location of the speaker array. When installing the siren on a flat roof, always be sure that the loudspeakers clear parapets or other obstructions by at least ten feet.

1. Install the speaker array on the roof, following the instructions supplied with the array.

The Control Unit and Battery Box are attached to a length of 4" channel. There are five pre-drilled holes in the channel: one 1-1/4" hole and four 5/8" holes. The 1-1/4" hole provides a convenient point for lifting the Control Unit/Battery Box assembly. The four 5/8" holes are for attaching

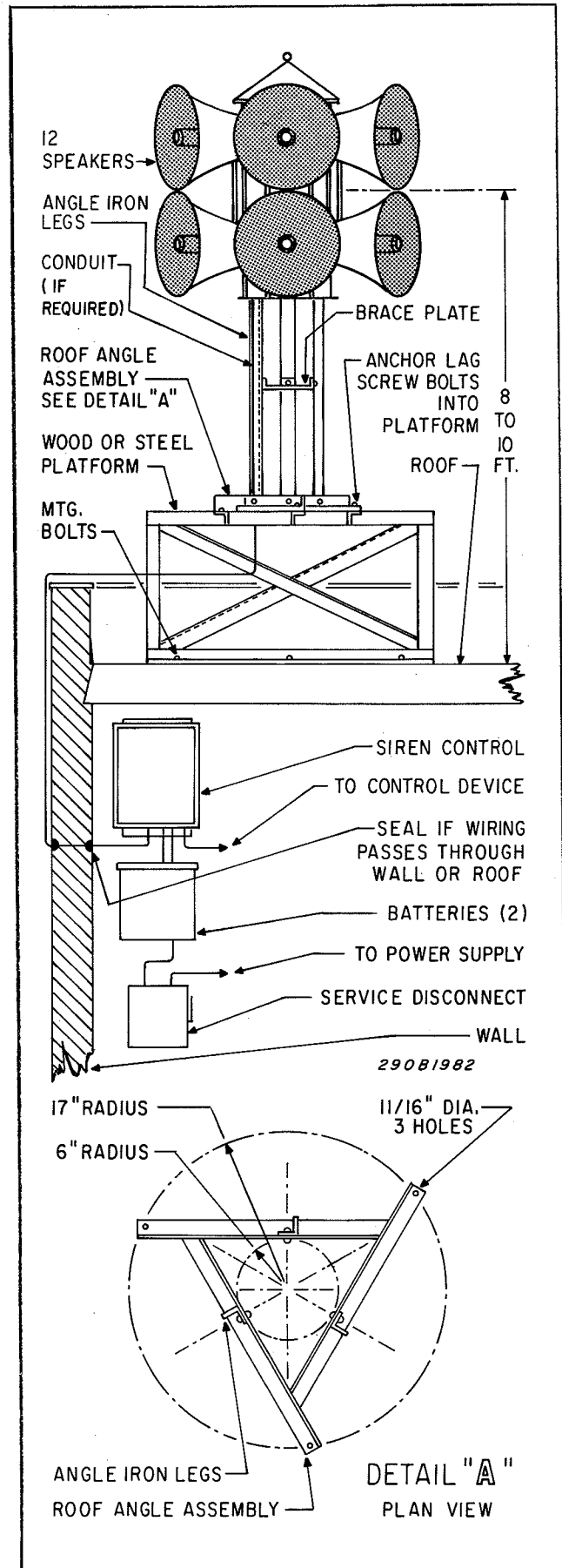


Figure 4-2A. Flat Surface Mount with Platform.

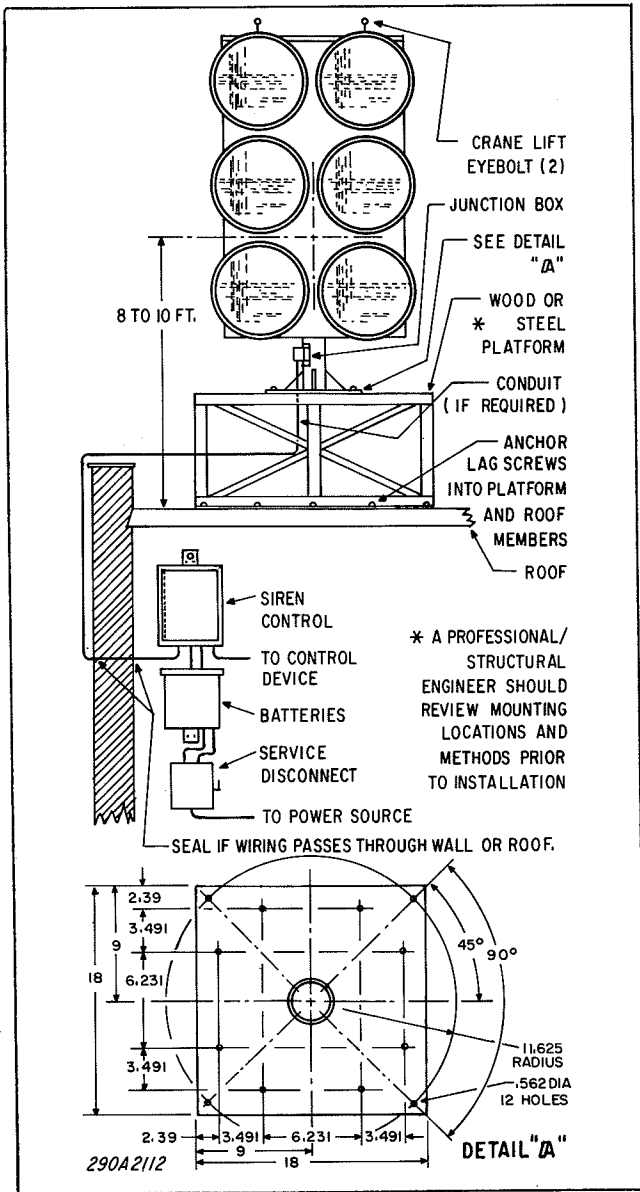


Figure 4-2B. Flat Surface Mount with Platform.

the assembly to a wall or other substantial vertical surface. If the Speaker Array is installed on the roof of the building, it may be desirable to install the Control Unit/Battery Box inside the building, if practical.

Total weight of the Control Unit/Battery Box assembly is approximately 240 lb. (109 kg.) including batteries. Therefore, make sure that the mounting surface and mounting method selected can safely sustain the weight of the assembly. In addition, the mounting method used must be able to withstand external mechanical stresses that may be applied to the assembly.

2. Locate the Control Unit/Battery Box at the installation site. Attach the Control Unit/Battery Box assembly to the mounting surface, using the appropriate user-supplied hardware.

3. Install a user-supplied, fused, disconnect switch.

4-2. ELECTRICAL CONNECTIONS.

A. General.

Install the siren electrical system in compliance with local electrical codes and NEC recommendations.

As a safety precaution to protect both personnel and equipment, it is **HIGHLY RECOMMENDED THAT ALL SIREN UNITS BE SOLIDLY CONNECTED TO AN EARTH GROUND.** If the siren is installed on a building, ground the system to a metallic object known to be grounded. For pole mounted installations, drive a metal rod or bar at least eight feet into the ground, as close as practical to the base of the pole. **FOR MAXIMUM PROTECTION, USE A SEPARATE, CONTINUOUS 6AWG OR LARGER WIRE FROM THE SIREN FRAME TO GROUND AND FROM THE CABINET OF EACH SIREN UNIT TO GROUND.**

B. Signal Connections.

Connect the Speaker Array to the Control Unit, following the instructions supplied with the array.

C. Power Connections.

1. As shipped from the factory, the battery charger, in the Control Unit, is configured for 240Vac operation. However, the battery charger power input circuitry can be configured for 120Vac operation by merely setting the switch on the charger to 120Vac.

2. Route 1" conduit (steel preferred) between user-supplied, fused disconnect switch and the remaining conduit fitting in the bottom of the Control Unit enclosure. Use weatherproof switches, electrical boxes and connectors to prevent water entry and lessen the effect of rust and corrosion.

3. Route two user-supplied wires through the conduit that was just installed between the Control Unit and the fused disconnect switch. Use wires no smaller than 14AWG. Do NOT connect the wires.

4. Connect the power wires and lightning protector (see figure 4-4) to the terminal strip in the Control Unit.

5. Remove the cover from the Battery Box enclosure.

6. Install the batteries in the Battery Box, making sure that the positive terminal of both batteries is toward the front of the enclosure. It may be necessary to temporarily relocate the wiring in the enclosure before installing the batteries. The polarity of the battery terminals is clearly marked on the battery case.

7. Three wires are located in the Battery Box enclosure. A white wire with a lug on each end is packaged with the batteries. The hole in one of the lugs is larger than the hole in the other. A red wire and black wire enter the Battery Box enclosure through the conduit at the upper right of the enclosure. Connect the white wire (small hole in lug) to the negative (rear) terminal of the battery on the left by removing the wing nut and sliding the lugs over the threaded battery terminal. Replace the wing nut and tighten securely. Similarly, connect the lug having the larger hole to the positive (front) terminal of the battery on the right. Connect the red wire to the positive (front) terminal of the battery on the left. Similarly, connect the black wire to the negative (rear) terminal of the battery on the right. Make sure that all lugs are positioned so that they are not short circuited to any metal parts in the enclosure.

D. Control Connections.

1. All control interconnecting wiring can be accessed by sliding out the control module, located at the upper right in the Control Unit. To gain access to the wiring, proceed as follows:

a. Remove the screw which secures the control module.

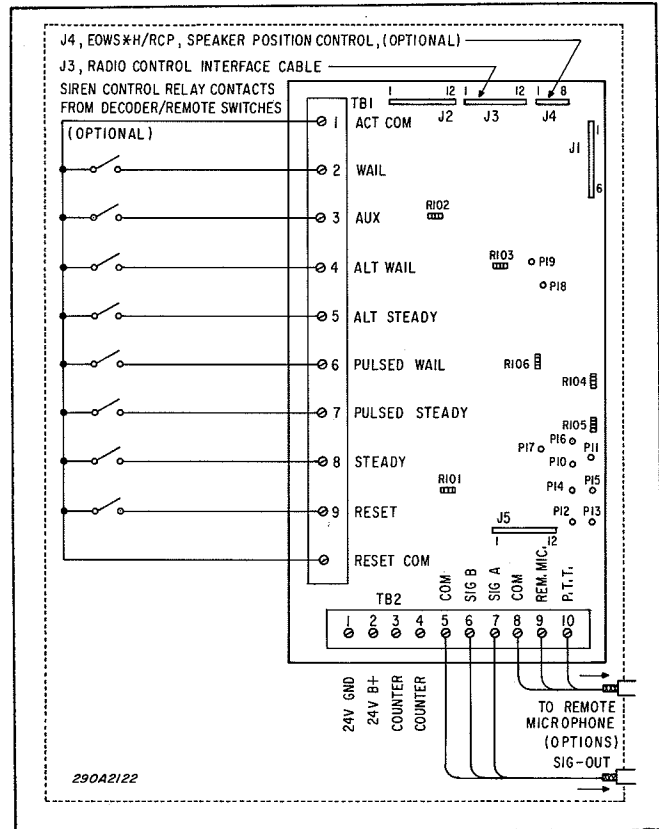


Figure 4-3. Control Unit Wiring Diagram.

b. Slide out the control module until it stops.

NOTE

All control module interconnecting wiring is routed through a grommeted hole at the rear of the control.

2. If desired, a user-supplied remote microphone can be connected to the SiraTone. Connect the microphone to TB2-8, 9 and 10, as shown in figure 4-3.

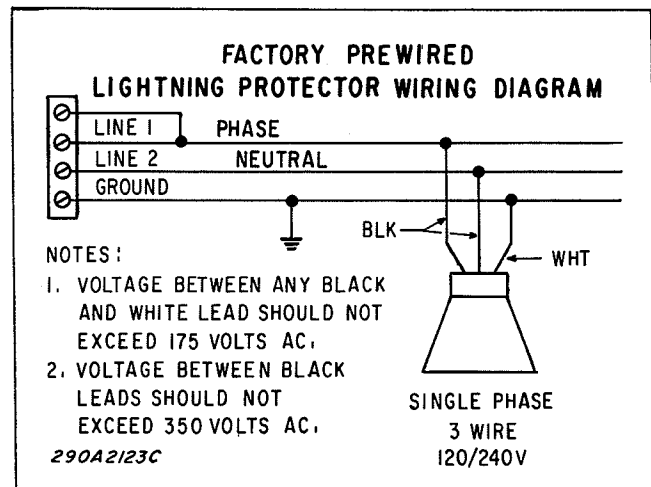


Figure 4-4. Lightning Protector Wiring Diagram.

3. If the SiraTone is to be landline controlled, install one user-supplied pushbutton switch, for each function, at the control site. If the siren control site is greater than 2000 feet (610m.) from the siren installation, install a SPST telephone relay, such as the Federal Model TRC*1020 between the two sites for each function, as indicated in figure 4-5. In addition, a 48Vdc power supply, such as the Federal Model PS, is required for telephone relay operation. Telephone relays and a power supply are NOT required if the length of the control lines is less than 2000 feet (610m.). Connect each push-button directly to the appropriate terminals of TB1, as shown in figure 4-3.

The use of landline control is not necessary if the optional Federal Radiotrol is incorporated into the SiraTone Control Unit. J3 of the control module is dedicated to this purpose. If the optional Radiotrol is included in the siren, all interconnections between the Radiotrol and the SiraTone or Remote Scan 500 are pre-wired. However, the Radiotrol antenna must be installed.

When installing the antenna, make sure that the antenna is at least 3 feet (910mm) from all metal parts. On pole mounted installations, attach the antenna to the side of the pole closest to the control transmitter.

When the siren is going to be controlled by the use of landlines or radio, it will have to be "armed" before it can accept any siren function signals. To arm the siren apply 0.0Vdc to pin 5-5 on the power distribution PC board (part no. 200D1036) or connect a jumper between pin 1 and pin 2 on the same board (see figure 4-6).

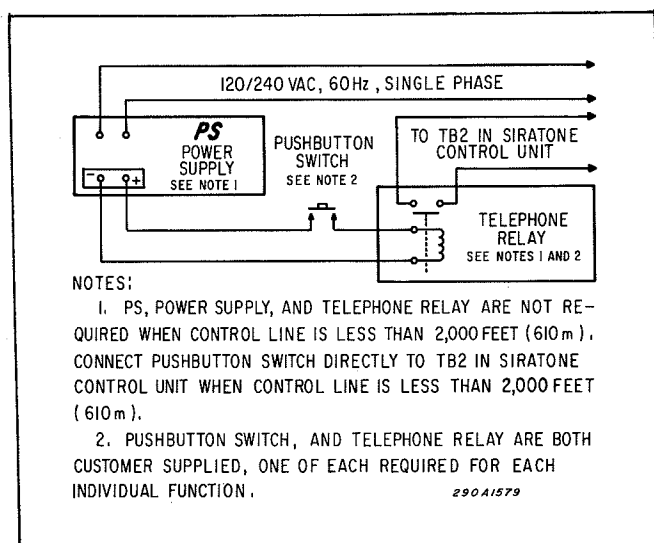


Figure 4-5. Landline Control Circuit.

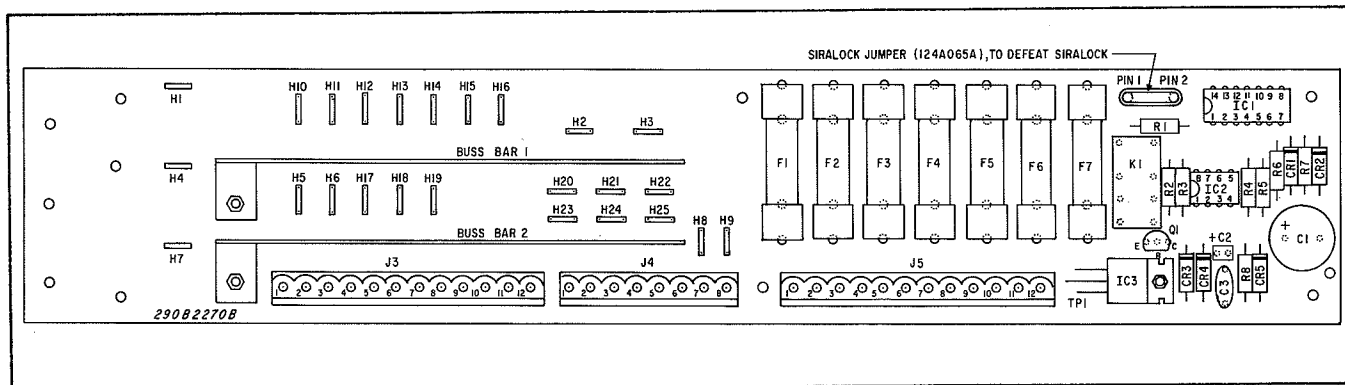


Figure 4-6. RS500 Power Distribution Assembly.

1

SECTION V

PRE-OPERATION CHECKOUT AND TEST

5-1. INITIAL CHECKOUT.

Temporarily remove the fuses from the front panel fuseholder on all amplifier modules. Connect the electrical wiring, previously installed in 4-2.C.3 to the fused disconnect switch. Apply power to the SiraTone. Turn on the charger power switch. The pilot light

on the charger panel should illuminate. If the pilot light is not illuminated, check the panel mounted fuse. Replace if defective.

If the fuse checks good, an electrical problem external to the SiraTone probably exists. If the pilot light is lit, check all Control Unit indicators (figure 5-1).

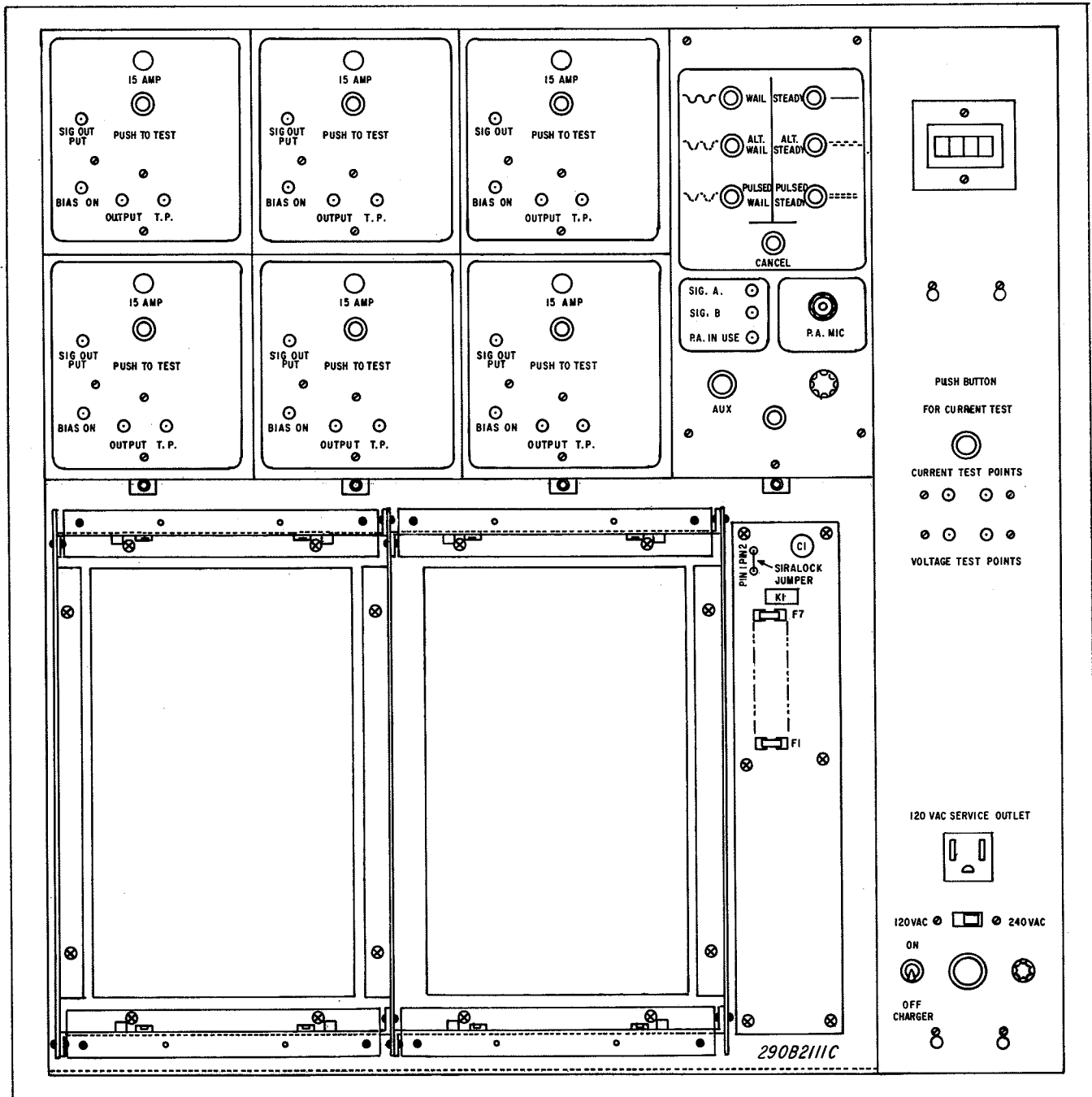


Figure 5-1. Control Unit Front Panel.

In order to operate any of the siren functions, the Siralock feature must be armed. To arm Siralock, either apply 0.0 VDC to Pin 5-5 of the power distribution PC board (part no. 200D1036) or connect the Siralock jumper (part no. 124A065A) onto pins 1 and 2 on the same board. Any siren function can now be activated. Depress the PULSED STEADY push-button. The SIG. A and SIG. B indicators should flash and rotating speaker arrays should rotate. Depress the CANCEL pushbutton. The SIG. A and SIG. B indicators should light continuously for approximately eight seconds and rotating speaker arrays should stop rotating.

With an ohmmeter capable of measuring resistances of less than 10 ohms, depress the push-to-test pushbutton of each amplifier and measure the resistance at the output test points of that amplifier. The resistance should be approximately 2.7 ohms. A different reading indicates a possible wiring error or faulty driver in the speaker array. Since the speaker circuits are comprised of two speaker drivers in parallel, if one of the drivers in a circuit were to open, approximately 5.4 ohms would be measured.

Rotating speaker array systems have an option of either P-T-T override of tone signals during speaker incrementing (signal will not be activated as speaker travels to the next zone) or P-T-T override "on" only when P-T-T is held (dekeying of microphone will immediately sound emergency signal previously activated). The unit comes from the factory with tone signal override during incrementing. If P-T-T override only when P-T-T is held is desired, remove CR21 from control module printed circuit board. Replace the fuses in all amplifiers.

5.2. LEVEL ADJUSTMENT.

Signal duration, frequency, frequency cut-off, increment timing and microphone output level are adjustable from inside the control module. FREQUENCY AND FREQUENCY CUT-OFF ARE FACTORY SET AND SHOULD NOT BE RE-ADJUSTED. DAMAGE TO THE AMPLIFIERS MAY RESULT.

To gain access to these adjustments, open the door of the Control Unit by loosening the screws holding the door clamps. Remove and retain the fuses from the front panel fuseholder on each of the amplifier modules. Most adjustments can be made without activating amplifiers and speakers. Remove and retain the 6-32 screw which secures the control module to the Control Unit. Slide the control module out until it reaches the stops.

For location adjustments refer to figure 5-2. All adjustments involve setting a thumbwheel potentiometer and require no special tools. Technicians making these adjustments must be qualified.

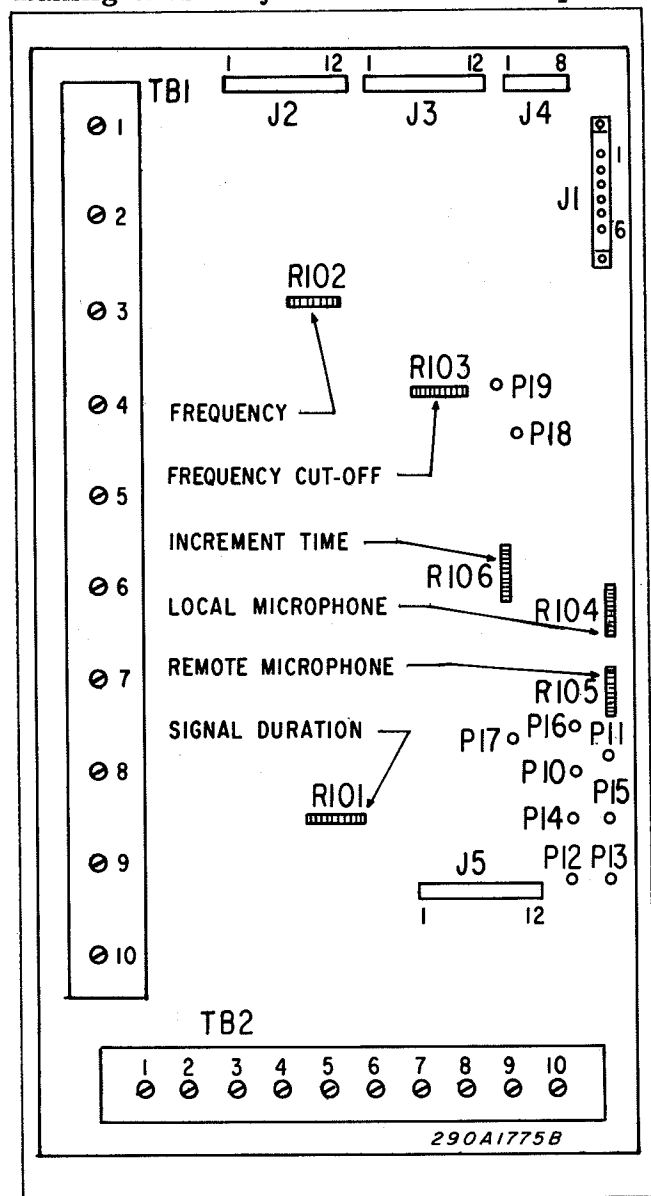


Figure 5-2. Control Unit Adjustment Locations.

A. Frequency.

R102 adjusts the frequency of output tone signals from the control module. The frequency is factory set, but if re-adjustment is necessary, proceed as follows:

1. Connect an audio range frequency counter to the SIG. A or SIG. B output.
2. Activate the steady signal and adjust the output tone signal frequency. SIG. A should be 1020Hz and SIG. B should be 850Hz.

B. Frequency Cut-off.

R103 adjusts the frequency at which the output signal will terminate upon cancelling or automatically resetting (time out) one of the six standard signals. This control is preset at the factory and should not be readjusted unless absolutely necessary. To adjust, proceed as follows:

1. Connect an audio range frequency counter to the SIG. B output.
2. Activate the steady signal and then cancel it. The counter should not indicate a frequency lower than 250Hz.

C. Signal Duration.

R101 adjusts the length of time a signal will continue once activated. Re-activation or activating another signal will automatically restart the time period.

To reset the time, activate the pulsed steady signal and observe that SIG. A and SIG. B indicators flash on the front panel. At the end of the signal cycle, both signal indicators will illuminate steadily for eight seconds. The steady illumination indicates that the signal is "coasting" down. If the signal duration is too long or too short, adjust R101 to increase or decrease the signal duration within the 2-5 minute range. Recheck adjustment by repeating this procedure.

D. Local and Remote Microphone.

R104 and R105 adjust the P.A. output levels for the local and remote microphones, respectively. The local

microphone input is via the panel mounted microphone jack. In order to prevent audio feedback, this jack should only be used when the Control Unit is located in a building, audibly isolated from the speaker array. The remote microphone input is via TB2 terminals.

Adjustment of the P.A. output levels requires two people. An operator must be at the microphone location and a technician at the SiraTone site to perform the adjustments. Radio or telephone communication between the two sites will make the adjustment procedure easier to perform. To perform the adjustment, proceed as follows:

1. Depress the microphone push-to-talk switch and speak into the microphone in a normal voice. The P.A. IN USE indicator lamp will illuminate when the push-to-talk switch is depressed.

2. Adjust R104 or R105 (local or remote microphone inputs) to a level which will begin to cause the SIG. A and SIG. B indicators to flicker. The flickering indicators are an indication of the audio clipping level and should be minimal for low distortion. If any audio inputs are not used, they should be adjusted completely clockwise.

E. Increment Timing (rotating speaker arrays only).

R106 adjusts the time interval for the speaker array to rotate between P.A. announcements. The rotator control relay is activated each time the microphone push-to-talk switch is dekeyed. The relay is held for a period of 4 to 18 seconds while the speaker array rotates to another zone for another announcement.

The number of zones for P.A. announcement must be determined prior to making this adjustment (2,3, up to 8 zones). If the speaker array rotates beyond or short of the next desired zone, adjust R106 and repeat the procedure. A series of activations will best determine the accuracy of the adjustment.

The speaker array can be remotely activated to a desired zone by use of the Model EOWS*H/RCP option, subject to separate instructions.

Slide the control module back into the Control Unit and replace the screw that was previously removed. Replace all amplifier fuses.

5-3. FINAL TESTS.

WARNING

The output sound level of a SiraTone siren is capable of causing permanent hearing damage at short distances. Therefore, ALWAYS wear hearing protection when performing tests or maintenance on the siren.

If the siren is installed in an electrically noisy environment, one or more of the siren amplifiers bias circuits may be activated. Each siren amplifier contains solid-state circuitry to reduce standby current, by de-activating the bias current applied to the amplifier output stages, when signalling has stopped. The BIAS ON light emitting diode (LED) indicates when this circuit is activated, either by illuminating continuously or illuminating erratically while no siren signal or PA audio is being produced. This condition can be eliminated by reducing amplifier sensitivity by slowly rotating R2 (Amp. Module) clockwise until the BIAS ON LED extinguishes. The LED extinguishes approximately 5 seconds after amplifier signal

detection ceases. To avoid excessive reduction of amplifier sensitivity, do not rotate R2 any further than absolutely necessary. If R2 is rotated too far, the amplifier may not be activated by a PA signal.

The SIG OUTPUT LED indicates that the amplifier output signal level is sufficient for siren signal operation.

If desired, all six siren signals can be tested at this time by momentarily depressing the appropriate pushbutton on the control module front panel. If an optional seventh signal is installed, it can be tested by momentarily pressing the AUX switch. The CANCEL switch causes all signals to "coast down" except for the optional auxiliary signal. The optional auxiliary ceases immediately.

Systems using rotating speaker arrays should note speaker rotation upon signal activation. Speaker rotation will halt, when the signal begins to "coast down", upon activation of the CANCEL switch. Momentarily grounding the P-T-T should cause the speaker array to rotate to the next zone.

If included, the optional radio interface should be tested at this time. Follow instructions supplied with the radio interface.

After the installation is complete, and it has been established that the siren is operating properly, Federal recommends that the Control Unit and battery box be padlocked to discourage vandalism.

SECTION VI

This Section left BLANK intentionally.

SECTION VII

MAINTENANCE

7-1. GENERAL.

Federal Electronic Outdoor Warning Sirens are designed to require a minimum of maintenance. However, if a siren failure does occur, Federal will provide technical assistance with problems that cannot be handled locally. A list of all Federal Authorized Service Centers is available from the Service Department. If assistance is needed, contact:

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

It is recommended that the siren be tested for proper operation at least once a month. However, a daily test of the siren at noon curfew, or other selected time, provides a more reliable test of system readiness. In addition, the daily test enhances the usefulness of the siren and instills public confidence in the reliability of the warning system.

It is recommended that a maintenance check be conducted within 30 days of siren installation. Thereafter, it is recommended that the maintenance checks be performed at least once a year. The following paragraphs describe the maintenance checks for the SiraTone system.

7-2. CONTROL UNIT.

A. Amplifier Output.

Each pair of speakers in the Speaker Array is driven by a power amplifier in the Control Unit. Each amplifier module and its associated speaker pair is designated A, B, C, D, E, or F. Each amplifier has test points for testing the resistance of its associated speaker pair.

To measure the resistance of a given speaker pair, proceed as follows:

1. Remove and retain the fuse from the appropriate amplifier.
2. Set an ohmmeter to its lowest resistance range, and connect the ohmmeter to the output test points.
3. Depress the PUSH-TO-TEST button and observe the dc resistance of the speakers. Normal dc resistance of a speaker pair is approximately 2.7 ohms. A dc resistance measurement of less than 2.5 ohms indicates that one or both of the speakers is probably shorted. A reading of approximately 5.4 ohms indicates that one of the speakers in the pair is open; a reading of infinity indicates that both speakers are open.
4. If a resistance is abnormal, perform resistance checks on each speaker individually at the Speaker Array.

If desired, an oscilloscope or digital multimeter (DMM) can also be connected to the amplifier module test points to observe amplifier output. NOTE: DO NOT press PUSH-TO-TEST button. However, do NOT connect a speaker across the test points because damage to the amplifier module could result.

WARNING

The output sound level of a SiraTone siren is capable of causing permanent hearing damage at short distances. Therefore, ALWAYS wear hearing protection when performing tests or maintenance on the siren.

B. Signal Operation Check.

1. Remove and retain fuses from all amplifiers.
2. Activate each of the signals and observe the signal indicators on the control module. Observe counter operation.

3. Insert one of the previously removed amplifier fuses. Depress the PUSH-TO-TEST pushbutton of the fused amplifier. Activate a signal and observe that SIG. OUTPUT and BIAS ON indicators illuminate, indicating amplifier operation. Cancel the signal and allow the signal to coast down and shut off. Release the PUSH-TO-TEST pushbutton and remove the fuse. Test the remaining amplifiers in the same manner.

4. Replace all amplifier fuses.

C. Check the batteries. The voltage of a fully charged set of batteries should be approximately 28Vdc, and charge current should be less than one ampere.

Each battery is equipped with a built-in hydrometer. When the hydrometer "eye" is green, the battery is charged. If the "eye" is dark, the battery needs charging. If the "eye" is light in color, the battery is low on fluid and should be inspected for leaks.

Check the battery terminals for corrosion. Clean connectors and terminals, if necessary.

D. Check rotator incrementation (EOWS*612 Speaker Array only). Activate the P-T-T circuit by momentarily shorting the P-T-T to ground. The Speaker array should rotate to the next speaker zone.

7-3. SPEAKER ARRAYS.

NOTE

Remove the control module fuse prior to checking the Speaker Array. This precaution will prevent any signal from sounding or the speaker arrays from rotating.

A. All Speaker Arrays.

1. Examine Speaker Array mounting for loose bolts or weak supports.

2. Examine cable and terminations for frayed insulation or corrosion.

B. Rotating Speaker Array Model EOWS*612.

Check rotator unit as follows:

1. Remove the Speaker Array upper panel.

2. Check brush alignment to insure that complete contact is made to the collector rings. Insure that the fastening bolts for the collector ring stack are securely fastened.

3. Check brush springs for normal tension. The brushes should move freely in the assembly.

4. Clean any contaminants or dirt from the collector rings. The four brushes can sufficiently maintain clean collector ring contact with regular system testing.

5. Check pulley set screws and belt tension. The belt should be relatively loose. Pinching the belt between the pulleys should draw it to within approximately one-inch of touching.

6. Check to ensure that the gear reducer and bearing housing mounting bolts are secure.

7. Observe the gear case for any leaks, especially around the high speed shaft. Check oil level by removing oil level plug (upper plug on gear ease). If oil level is low, replace with Meropa #2 or equivalent.

8. The motor has permanently lubricated sealed bearings. Remove the brush cap protector and examine the brush and spring assembly.

9. Check the idler bearings at the lower portion of the speaker array. The rollers should be adjusted so that the maximum clearance of any free rollers to the pole is approximately 1/32 inch. Free rollers should spin freely. Lubricate if necessary.

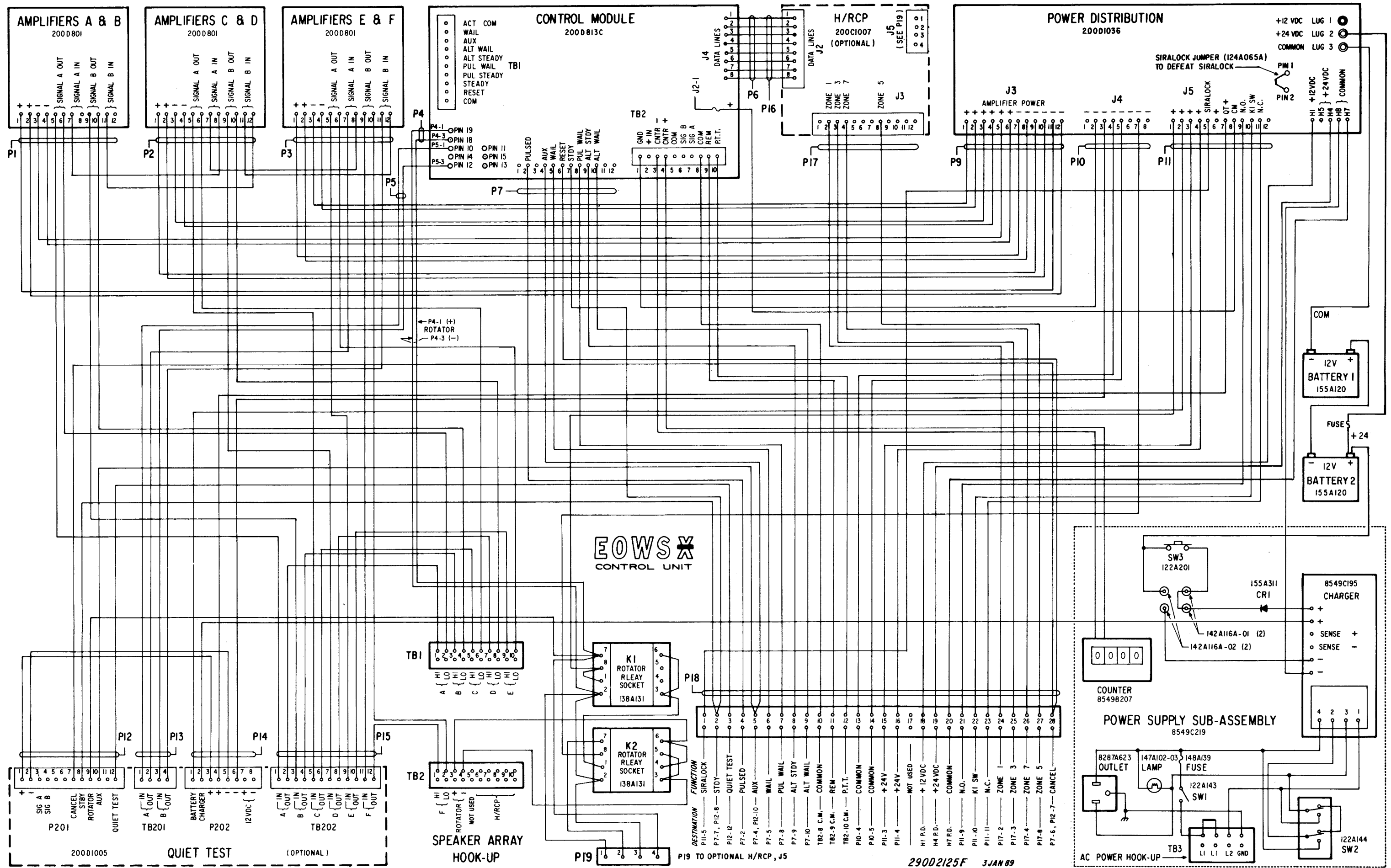


Figure 7-1. Control Unit Wiring Diagram.



SIGNAL DIVISION
Federal Signal Corporation

PARTS INDEX

MODEL

EOWS X

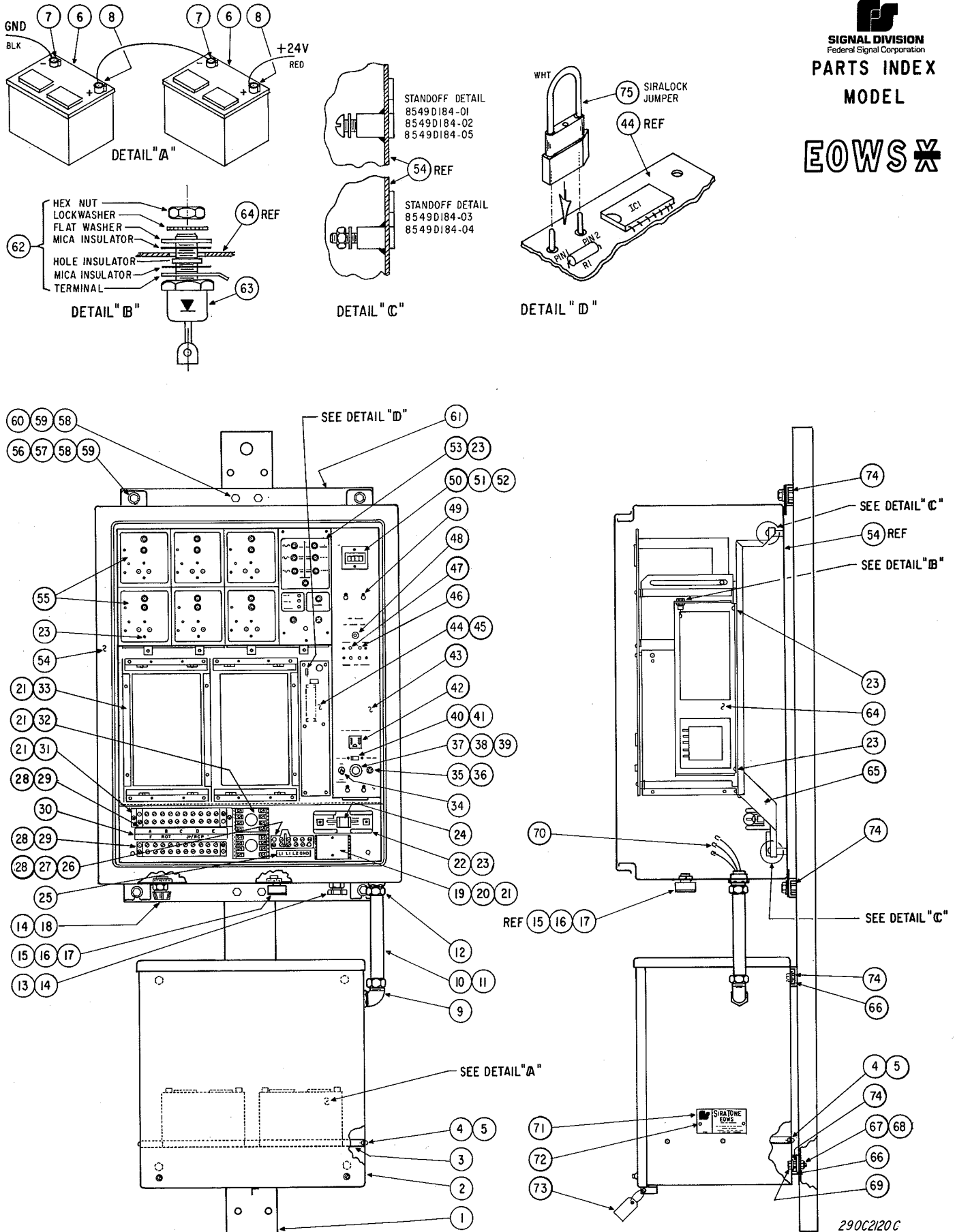


Figure 7-2. Control Unit Component Location Diagram.

ELECTRONIC OUTDOOR WARNING SIREN

PPL 0209

Model EOWS*

FEBRUARY 1989

Item No.	Description	Part No.	Qty.
1	Bracket, Upright Support	8549B190	1
2	Cabinet, NEMA 3R, 18"Hx18"Wx12"D		
	Aluminum, per customer order	8549D192-01	
	Aluminum, Egyptian Gray	8549D192-02	
	Steel, per customer order	8549D192-03	1AR
	Steel, Egyptian Gray	8549D192-04	
	Stainless Steel	8549D192-05	
3	Shelf, Battery	8549C014	1
4	8-32 x 1/2 Mach. Screw Rd. Hd., Slit.	7000A063-08	10
5	8-32 Nut, Hex, Ext. Keps	7058A022	10
6	Battery, 12V, Delco 1059 (sep. carton)	155A120	2
7	Terminal, Battery Post, To 5/16 (NEG)	233A143	2
8	Terminal, Battery Post, To 3/8 (POS)	233A143-01	2
9	Connector, 1" Liq.-Tight, 90°	8549A213	1
10	Conduit, Flex., 1" Liq.-Tight, 7.5"Lg.	8400A561	1
11	Adhesive, RTV 128, Sil. Rub., 2.8oz.	R70-08-01	1
12	Connector, 1" Liquid-Tight	8549A108	1
13	Connector, Thinwall, 1"	8287A200	1
14	Lockwasher, Sealing, 1"	7065A033	2
15	Protector, Lightning	8549A217	1
16	Locknut, Sealing, 1"	7065A033	1
17	Washer, Neoprene Rubber	8283A452	1
18	Connector, Cord Grip 1"	140A198	1
19	Track, Relay, 2" Lg.	288B229-02	1
20	Socket, Octal, 8-pin	138A131	1
21	No. 8 Screw, Thd. Frm., Pan Hd.	7011A069-08	20
22	Fuseholder	143A115	1
23	8-32 x 3/8 Mach. Screw, Pan Hd.	7000A408-06	6
24	Fuse, 100 Amp.	148A140	1
25	Label, Terminal EOWS* RS	161A446	1
26	Block, Terminal, 4-positions	229A198	1
27	Jumper, Terminal Block	233A196	1
28	#8 Type B Screw x 5/8 Pan Hd.	7011A069-10	6
29	Block, Terminal 10-positions	229A197	2
30	Label, EOWS* RS	161A443	1
31	Bracket, Term. Block, EOWS* RS	8549A245	1
32	Socket, Octal, 8-pin	138A131	2
33	Support, PC Board	8549A199	1
34	Switch, Toggle, SPDT	122A143	1
35	Holder, Fuse	143A106	1
36	Fuse, 5 Amp., 3AG	148A139	1
37	Light, Pilot	147A102-01	1
38	Lens, White	147A102-02	1
39	Lamp, Neon	147A102-03	1
40	Switch, Slide, SPDT	122A144	1
41	Rivet, Semi-Tubular, 3/32 Lg.	7079A117-06	2
42	Outlet, Convenience	8287A623	1
43	Panel, Power, EOWS*	8549D205	1
44	Power Distribution Board Assy.	200D1036	1
45	6-32 x 3/8 Mach. Screw, Pan Hd.	7000A404-06	6

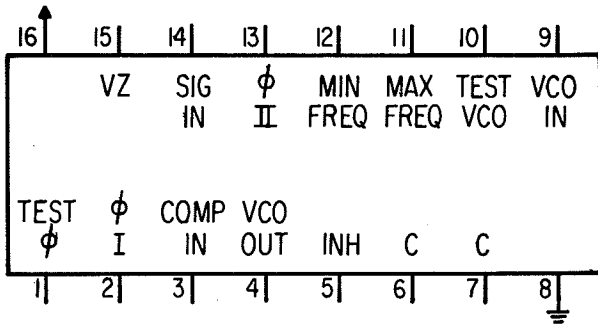
Item No.	Description	Part No.	Qty.
46	Jack, Banana, Red	142A116A-01	2
47	Jack, Banana, Black	142A116A-02	2
48	Switch, Pushbutton, 3 Amp., SPST	122A201	1
49	No. 8 Screw, Thd. Frm. Pan Hd.	7011A069-08	4
50	Counter, 24V, EOWS*C/BSB	8549B207	1
51	6-32 x 3/8 Mach. Screw, Flt. Hd.	7000A250-06	2
52	6-32 Nut, Hex Dbl. Chmf.	7059A004	2
53	Control Assy., EOWS*	8549D051	1
54	Cabinet, NEMA 4, 30"Hx24"Wx12"D		
	Aluminum, per customer ord.	8549D184-01	
	Aluminum, Egyptian Gray	8549D184-02	
	Steel, per customer ord.	8549D184-03	1AR
	Steel, Egyptian Gray	8549D184-04	
	Stainless Steel	8549D184-05	
55	Amplifier Assembly	200D816	1
56	3/8-16 x 1" Bolt, Hex Hd.	7002A009-16	8
57	3/8 Washer, Flat	7072A035	4
58	3/8 Lockwasher, Split	7074A046	8
59	3/8-16 Nut, Hex	7059A063	8
60	3/8-16 x 1-1/4" Bolt, Hex Hd.	7002A009-20	4
61	Bracket, Cabinet Mounting	8549B189	2
62	Kit, Diode Mounting	124A033	1
63	Diode, 368AR	115A311	1
64	Charger, 28VDC, EOWS*	8549B314A	1
65	Main Panel Assy.	8549D210	1
66	Bracket, Cabinet Mounting	8549B034	2
67	1/4 Lockwasher, Split	7074A016	4
68	1/4-20 Nut, Hex	7059A020	4
69	1/4-20 x 1" Mach. Screw Hex Hd.	7000A311-16	4
70	Nut, Wire	8287A165	3
71	Nameplate, EOWS*C/BSB	8146A961	1
72	Rivet, Semi-Tubular, 15/64 Lg.	7099A103-15	2
73	Tag, Caution: Remove batteries before standing upright.	161A303	1
74	Spacer	8549A326	8
75	Siralock Jumper	124A065A	1

DO NOT ORDER PARTS BY ITEM NUMBER. Give model, voltage, description and part number. Refer to PARTS PRICE LIST (Part No. 1001) for prices of parts.

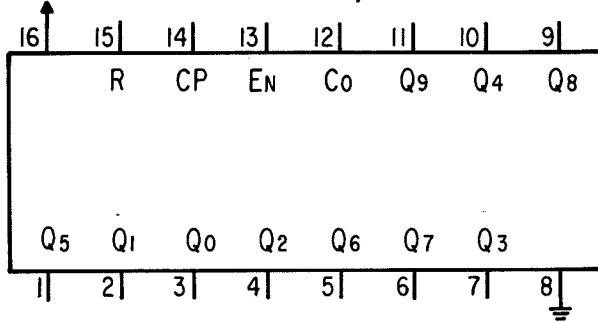
Federal Signal Corporation
Signal Division
2645 Federal Signal Drive
University Park, IL 60466

Printed in U.S.A.

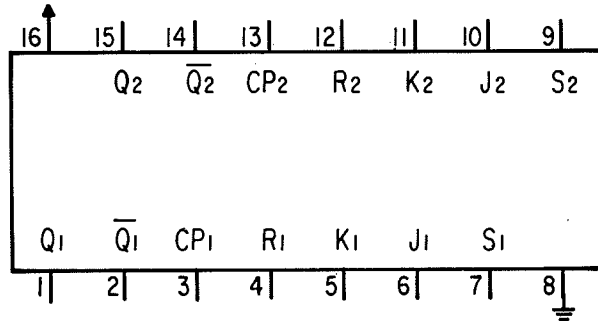
4046 (IC3)



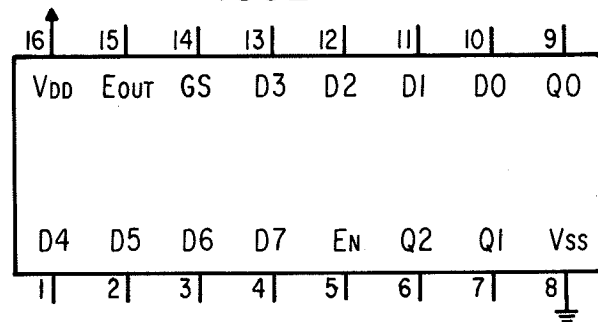
4017 (IC4, & 5)



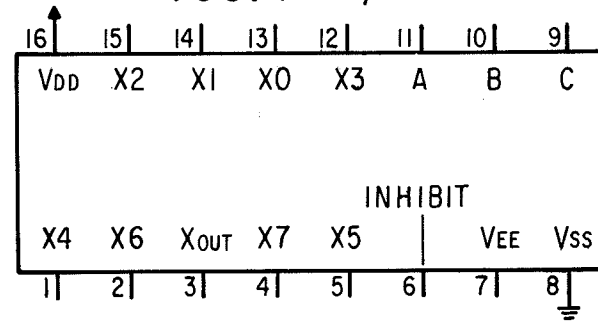
4027 (IC7)



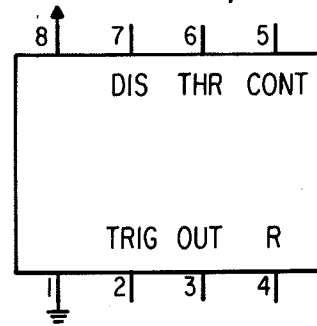
4532 (IC8)



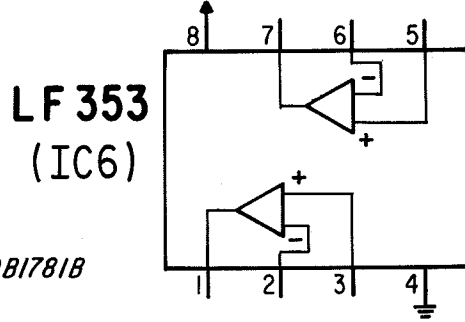
4051 (IC9, & 10)



LM555 (IC2, & 16)



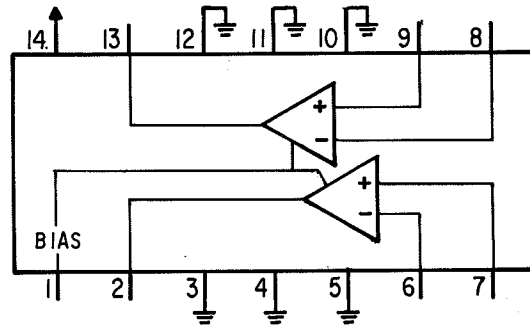
LM358 (IC11, & 14)



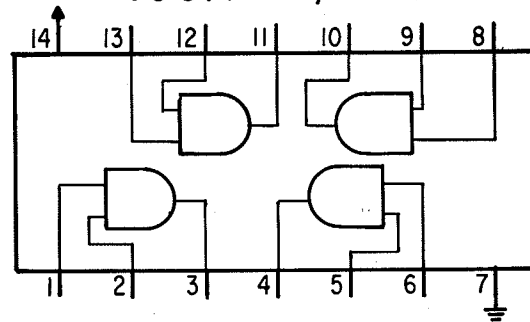
LF 353 (IC6)

290B1781B

LM1877 (IC12)



4081 (IC13, & 15)



4584 (IC17, & 18)

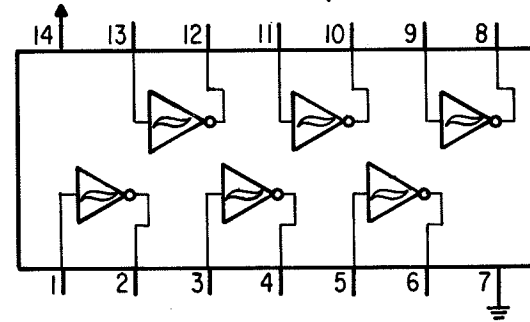


Figure 7-3. IC Pin Legend.

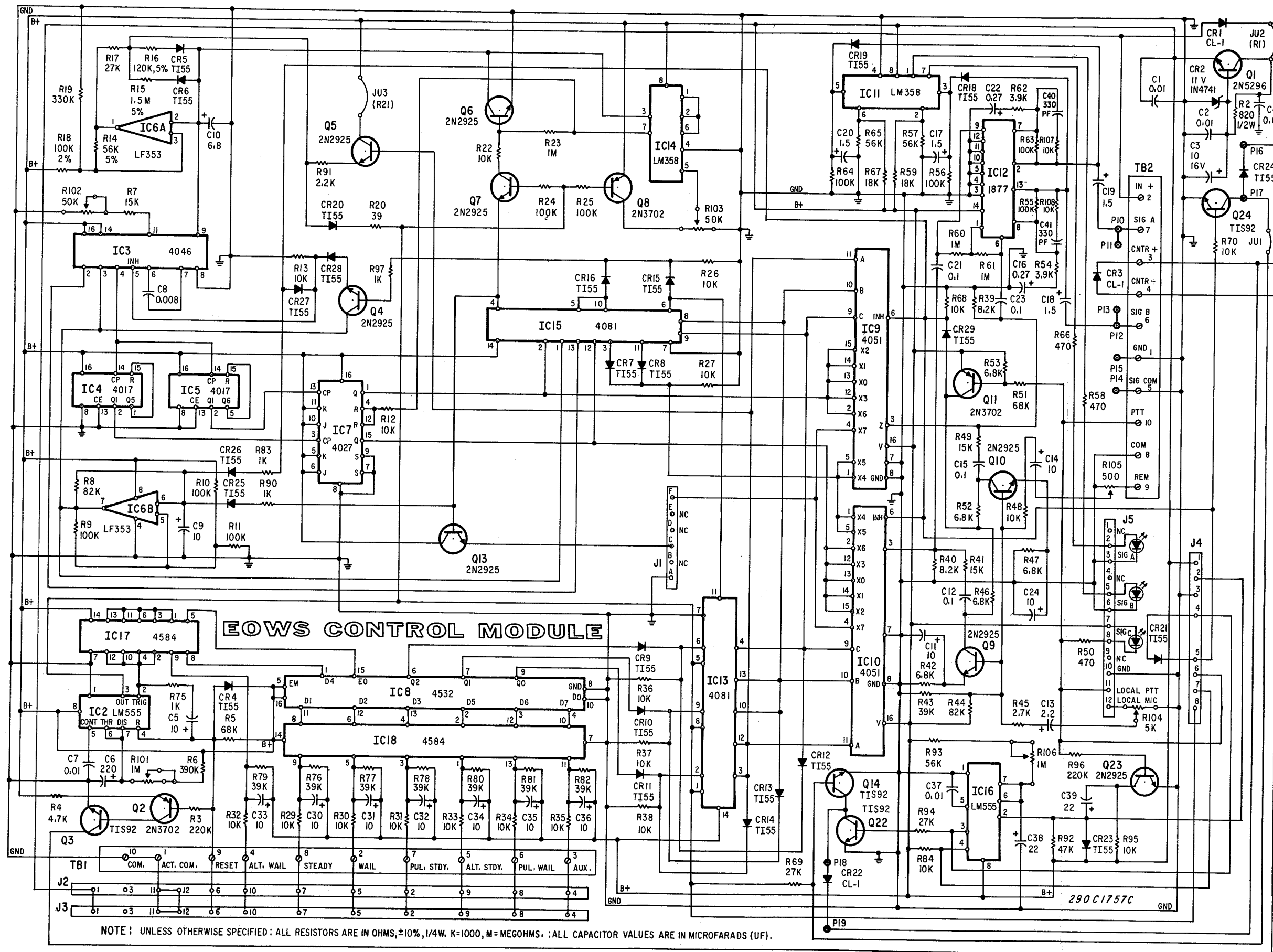


Figure 7-4. Control Module Schematic Diagram.

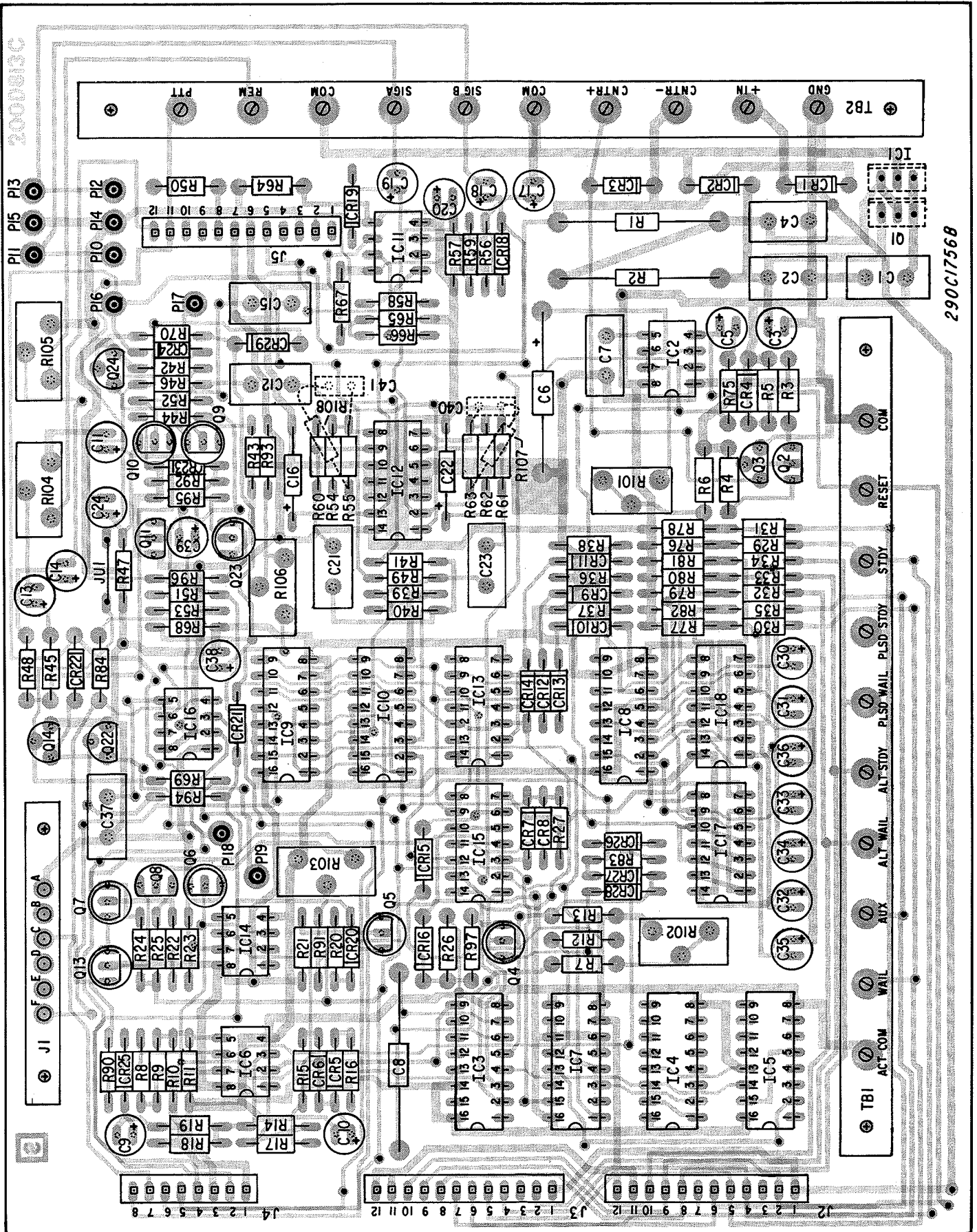


Figure 7-5. Control Module Component Location Diagram.

PARTS LIST
EOWS CONTROL MODULE ASSEMBLY

<u>Schematic Symbol</u>	<u>Description</u>	<u>Part No.</u>
R2	820 Ohm	100A403
R3,96	220K Ohm	100A213
R4	4.7K Ohm	100A224
R5,51	68K Ohm	100A235
R6	390K Ohm	100A218
R7,41,49	15K Ohm	100A203
R8,44	82K Ohm	100A230
R9,10,11, 24,25, 55,56,63, 64	100K Ohm	100A222
R12,13,22, 26,27,29 thru 38,48,68,70, 84,95,107,108	10K Ohm	100A207
R14	56K Ohm, 5%	100A704
R15	1.5 Megohm, 5%	100A726A
R17,69,94	27K Ohm	100A254
R18	100K Ohm, 2%	100A780A
R19	330K Ohm	100A212
R20	39 Ohm	100A286
R23,60,61	1 Megohm	100A215
R39,40	8.2K Ohm	100A268
R42,46,47, 52,53	6.8K Ohm	100A210
R43,76 thru 82	39K Ohm	100A214
R45	2.7K Ohm	100A206
R50,58,66	470 Ohm	100A255
R54,62	3.9K Ohm	100A273
R57,65,93	56K Ohm	100A229
R59,67	18K Ohm	100A204
R75,83,90, 97	1K Ohm	100A233
R91	2.2K Ohm	100A221
R92	47K Ohm	100A228
R16	120K, 5%	100A767A
R101,106	1 Megohm, Potentiometer	105A254
R102,103	50K Ohm, Potentiometer	105A242
R104	5K Ohm, Potentiometer	105A233
R105	500 Ohm, Potentiometer	105A241

*Unless otherwise specified,
all resistors are fixed com-
position, 10%, 1/4 watt.

CAPACITORS

C1,2,7,37	0.01UF, 50V, Mylar	107A404
C3,5,9, 11,14,24, 30 thru 36	10UF, 16V, Electrolytic	108A143
C6	220UF, 15V, Tantalum	107A633
C8	0.008UF, 33V, Film	107A728
C10	6.8UF, 15V, Tantalum	107A604

<u>Schematic Symbol</u>	<u>Description</u>	<u>Part No.</u>
CAPACITORS (cont'd.)		
C4,12,15,21, 23	0.1UF, 100V, Mylar	107A406
C13	2.2UF, 20V, Electrolytic	108A142
C16,22	0.27UF, 35V, Tantalum	107A608
C17,18,19, 20	1.5UF, 35V, Tantalum	107A641
C38,39	22UF, 16V, Electrolytic	108A144
C40,41	330PF, 50V Mylar	107A304

SEMICONDUCTORS

Q5	Transistor, NPN	125A118
Q1	Transistor, NPN, 2N5296	125B415
Q2,8,11	Transistor, PNP, 2N3702	125B113
Q3,14,22,24	Transistor, NPN, TIS92	125B132
Q4,6,7,9, 10,13,23	Transistor, NPN, 2N2925	125A119
CR1,3,22,24	Diode, CL-1 (ED3002S)	115B301
CR2	Diode, Zener, 11V, 1N4741	115A245
CR4 thru 16, 18 thru 21, 23 thru 29	Diode, TI55	115B101
IC2,16	Integrated Circuit, LM555	128A043-02
IC3	Integrated Circuit, 4046	128A079
IC4,5	Integrated Circuit, 4017	128B072
IC11,14	Integrated Circuit, LM358	128A045
IC7	Integrated Circuit, 4027	128A044
IC8	Integrated Circuit, 4532	128A060
IC9,10	Integrated Circuit, 4051	128A062
IC12	Integrated Circuit, LM1877N-9	128A073
IC13,15	Integrated Circuit, 4081	128A077
IC17,18	Integrated Circuit, 4584	128A059
IC6	Integrated Circuit, LF353N	128B210A

MISCELLANEOUS

P10 thru 19	Terminal, Male	233A106
J1	Connector, 6-pin	139A151
J2,3,5	Connector, 12-pin	140A195
J4	Connector, 8-pin	140A170
TB1,2	Terminal Block, 10-pin	229A136
	Circuit Board	130D276C
	(without parts)	
	Circuit Board (with parts)	200D813C
	Jack, Phone, (w/mtnd. hardware)	142A115
	Fuseholder	143A106
LED A,B,C	Pilot Light, Red (3)	147A112-01
	Fuse, 1/4-ampere	148A121
	Switch, Pushbutton, Red (1)	8469A067
	Switch, Pushbutton, Black (7)	8469A067-01
	Housing, Control and Clip Assembly	8549C049
	Panel, Front Control	8549C052
	Control Housing and P.C. Board Assembly	8549D051

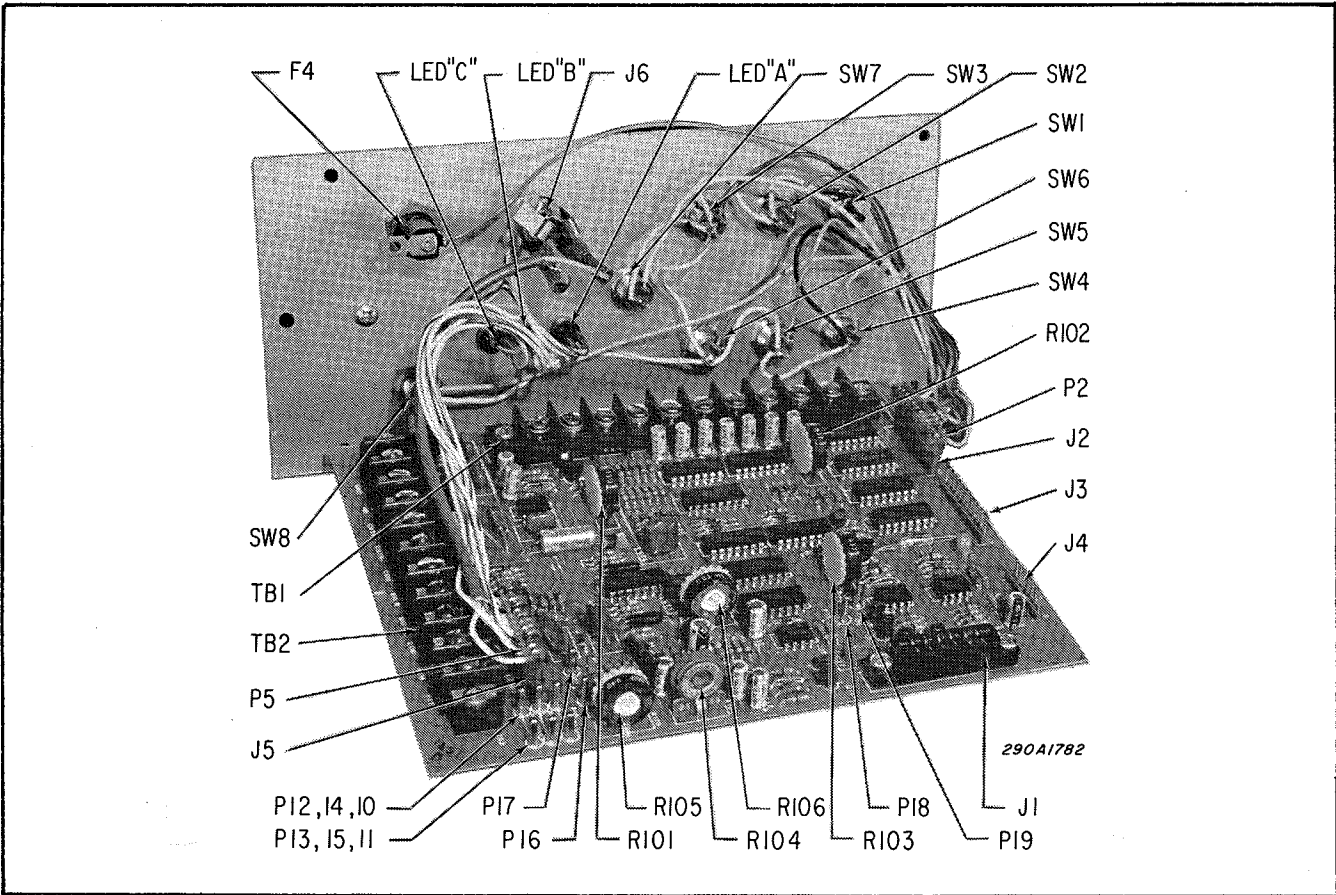


Figure 7-6. Control Module Internal View.

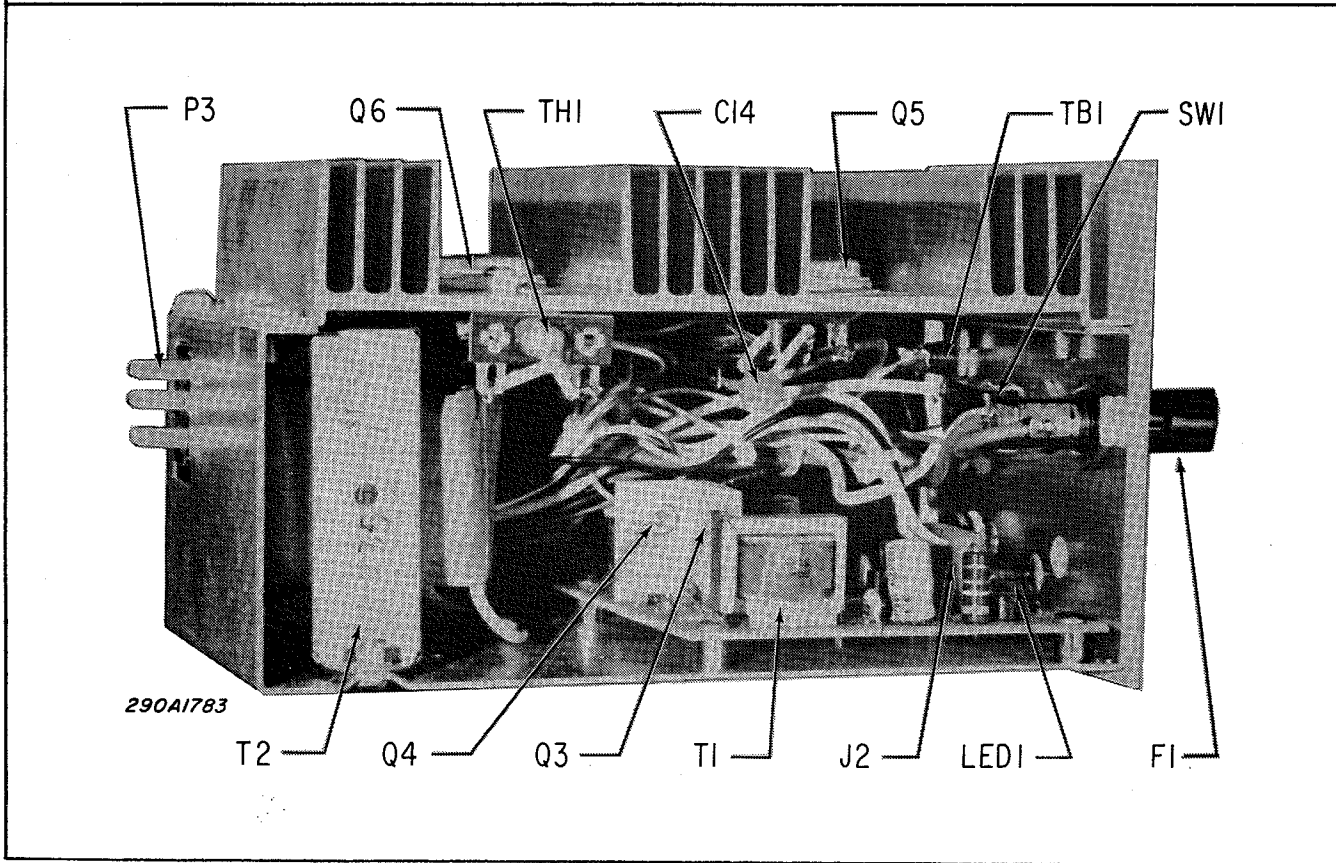


Figure 7-7. Amplifier Module Internal View.

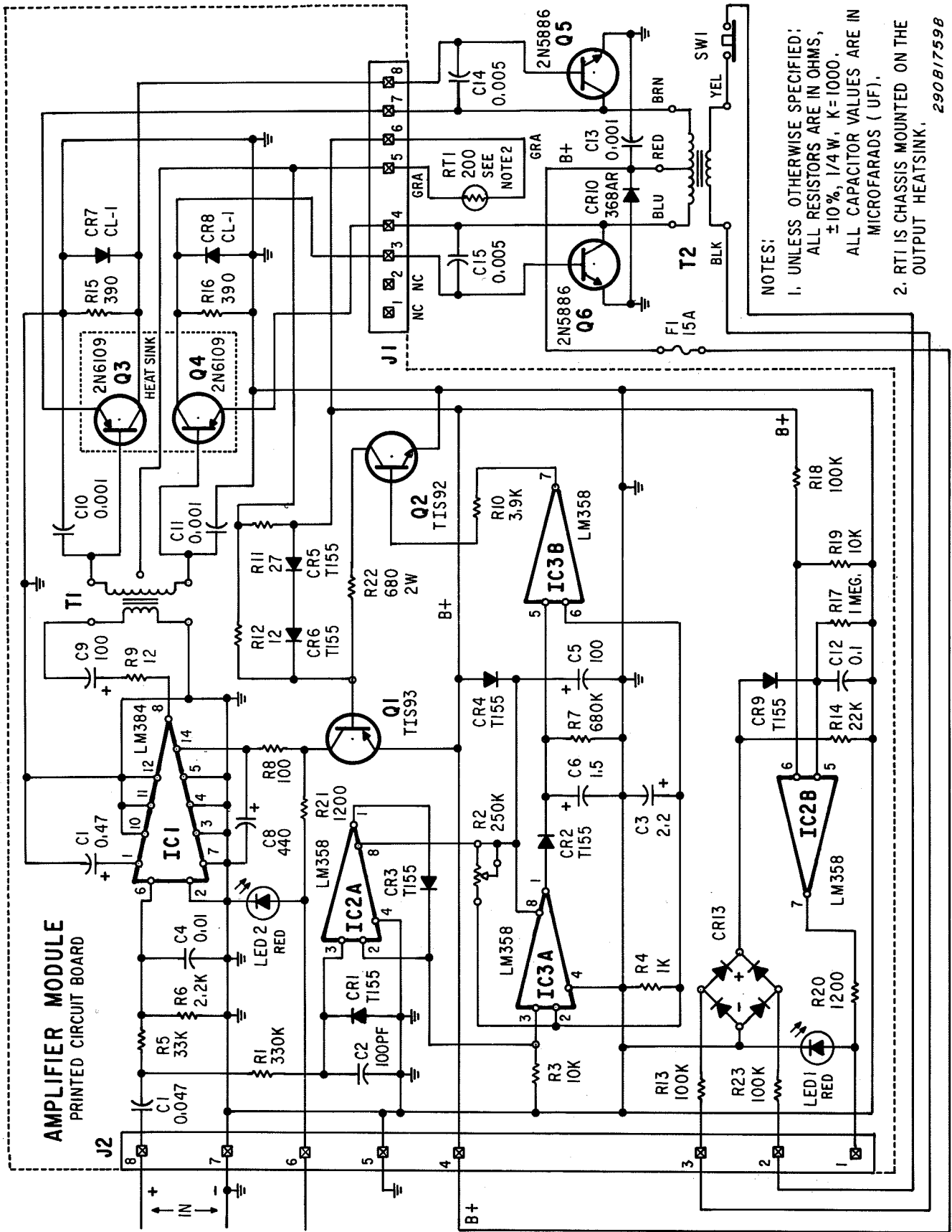


Figure 7-8. Amplifier Module Schematic Diagram.

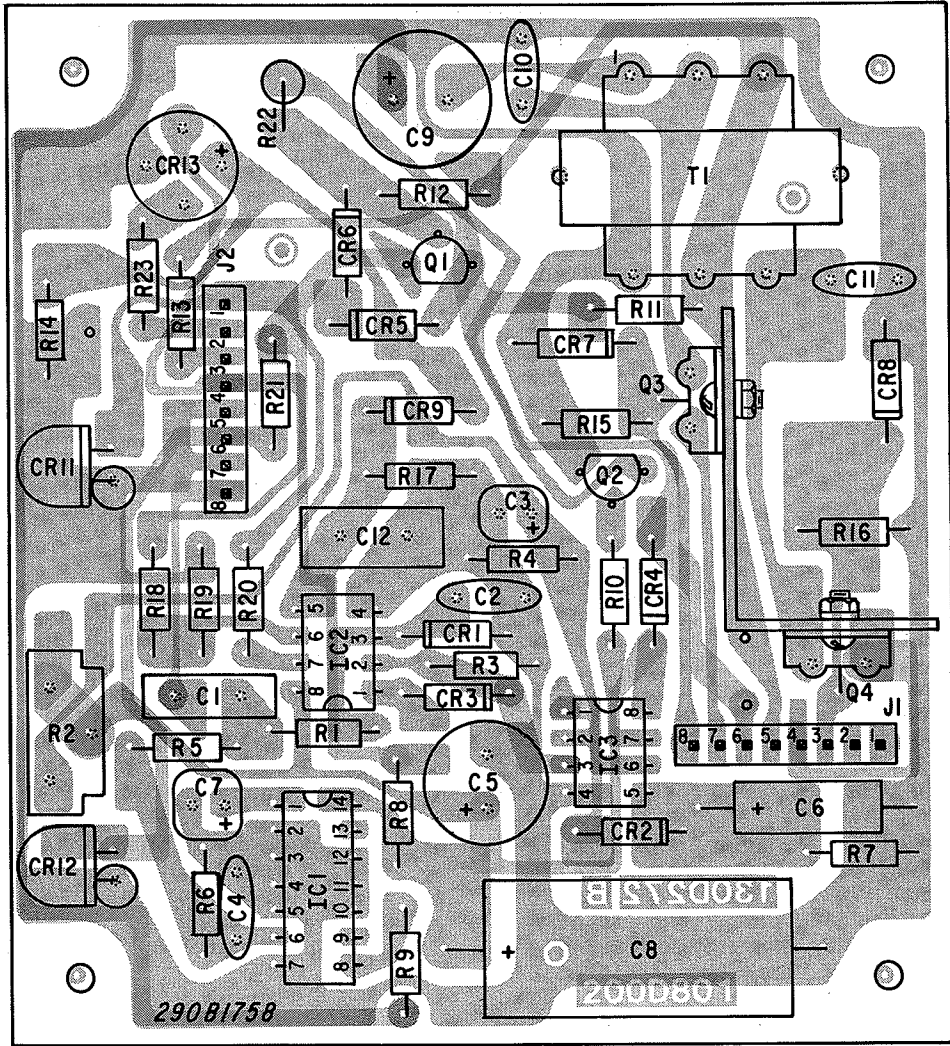


Figure 7-9. Amplifier Module Component Location Diagram.

PARTS LIST
EOWS AMPLIFIER MODULE ASSEMBLY

<u>Schematic Symbol</u>	<u>Description</u>	<u>Part No.</u>	<u>Schematic Symbol</u>	<u>Description</u>	<u>Part No.</u>
*RESISTORS			SEMICONDUCTORS		
R1	330K Ohm	100A212	Q1	Transistor, PNP, TIS93	125B133
R2	250K Ohm, Potentiometer	105A253	Q2	Transistor, NPN, TIS92	125B132
R3,19	10K Ohm	100A207	Q3,4	Transistor, PNP, 2N6109	125B431
R4	1K Ohm	100A233	Q5,6	Transistor, NPN, 2N5886	125A433
R5	33K Ohm	100A211	CR1,2,3	Diode, TI55	115B101
R6	2.2K Ohm	100A221	4,5,6,9		
R7	680K Ohm, 20%	100A252	CR7,8	Diode, CL1 (ED3002S)	115B301
R8	100 Ohm	100A236	CR10	Diode, Rectifier, 368AR	115A311
R9,12	12 Ohm, 5%	100A782	LED 1,2	Pilot Light, LED, Red	147A112-01
R10	3.9K Ohm	100A273	CR13	Rectifier, Bridge	115A602
R11	27 Ohm, 5%	100A290	IC1	Integrated Circuit, LM384	128A046A-01
R13,18,23	100K Ohm	100A222	IC2,3	Integrated Circuit, LM358	128A045
R14	22K Ohm	100A208			
R15,16	390 Ohm	100A283			
R17	1 Megohm	100A215			
R20,21	1.2K Ohm	100A295			
R22	680 Ohm, 2 watt, WW	103A117			
*Unless otherwise specified, all resistors are fixed composition, 10%, 1/4 watt.					
CAPACITORS					
C1	0.47UF, 50 V, Mylar	107A418	T1	Transformer, Driver	120B145
C2	100PF, 100V, Disc	107A235	T2	Transformer, Output	120B159
C3	2.2UF, 20V, Tantalum	107A636	J1,2	Connector, Wafer	140A170
C4	0.01UF, 50V, Disc	107A213	F1	Fuse, 15-ampere, 3AG	148A107
C5	100UF, 50V, Electrolytic	108A214	S1	Switch, Pushbutton	122A201
C6	1.5UF, 35V, Tantalum	107A616	RT1	Thermistor, 200 Ohm	104A111
C7	0.47UF, 35V, Tantalum	107A645		Heat Sink (Q3,Q4)	236A110
C8	440UF, 50V, Electrolytic	108A204		Insulator (Q5,Q6)	235A124
C9	100UF, 25V, Electrolytic	108A133		Spacer, Plastic (Q5,Q6)	230A151
C10,11,13	0.001UF, 500V, Disc	107A263		Socket, Transistor(Q5,Q6)	138A125
C12	0.1UF, 200V, Mylar	107A406		Jack, Banana, Red	142A116A-01
C14,15	0.005UF, 100V, Disc	107A211		Jack, Banana, Black	142A116A-02
				Fuseholder	143A106
				Circuit Board (without parts)	130A272B
				Circuit Board (with parts)	200D801
				Front Panel	8549C041
				Amplifier Assembly	200D816

PARTS LIST
EOWS POWER AMPLIFIER ASSEMBLY

<u>Schematic Symbol</u>	<u>Description</u>	<u>Part No.</u>
P1,2	Connector, 6-contact	139A180
TS1	Terminal strip (plug end)	229A182
	Circuit Board (with parts)	200C989

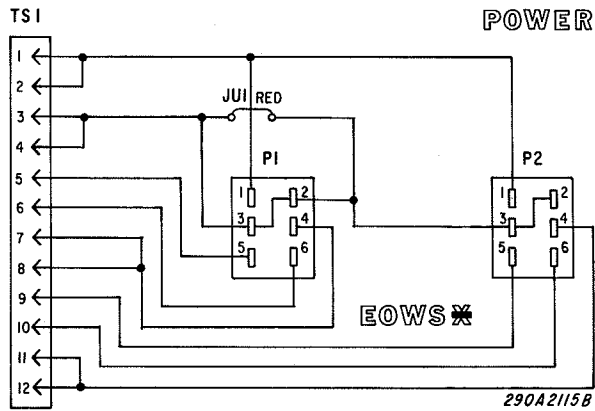


Figure 7-10A. Power Amplifier Assy. Schematic Diagram.

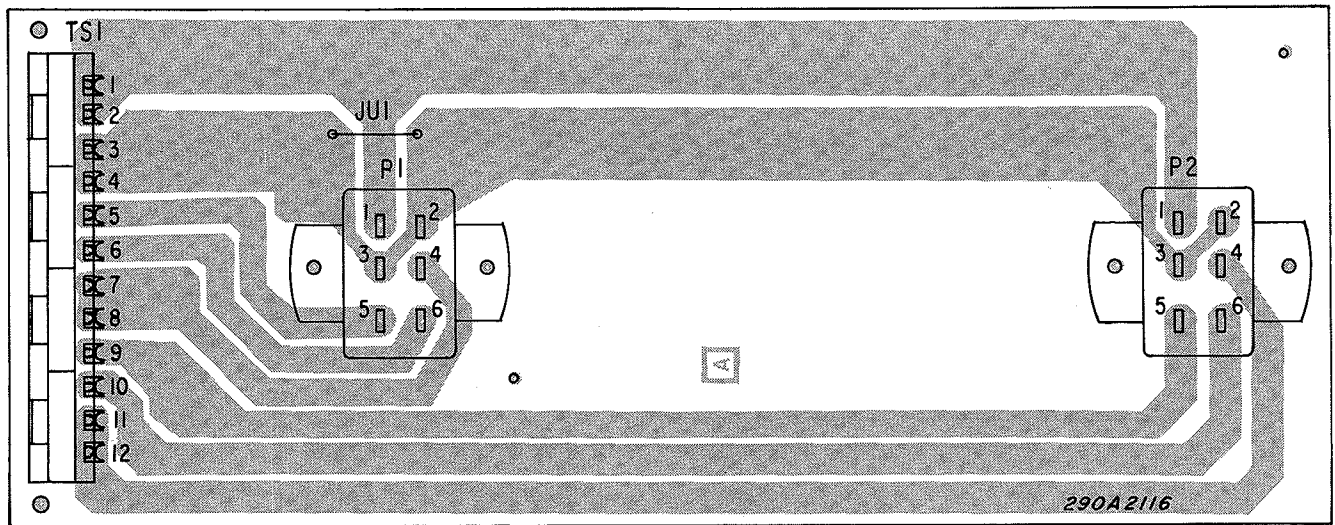
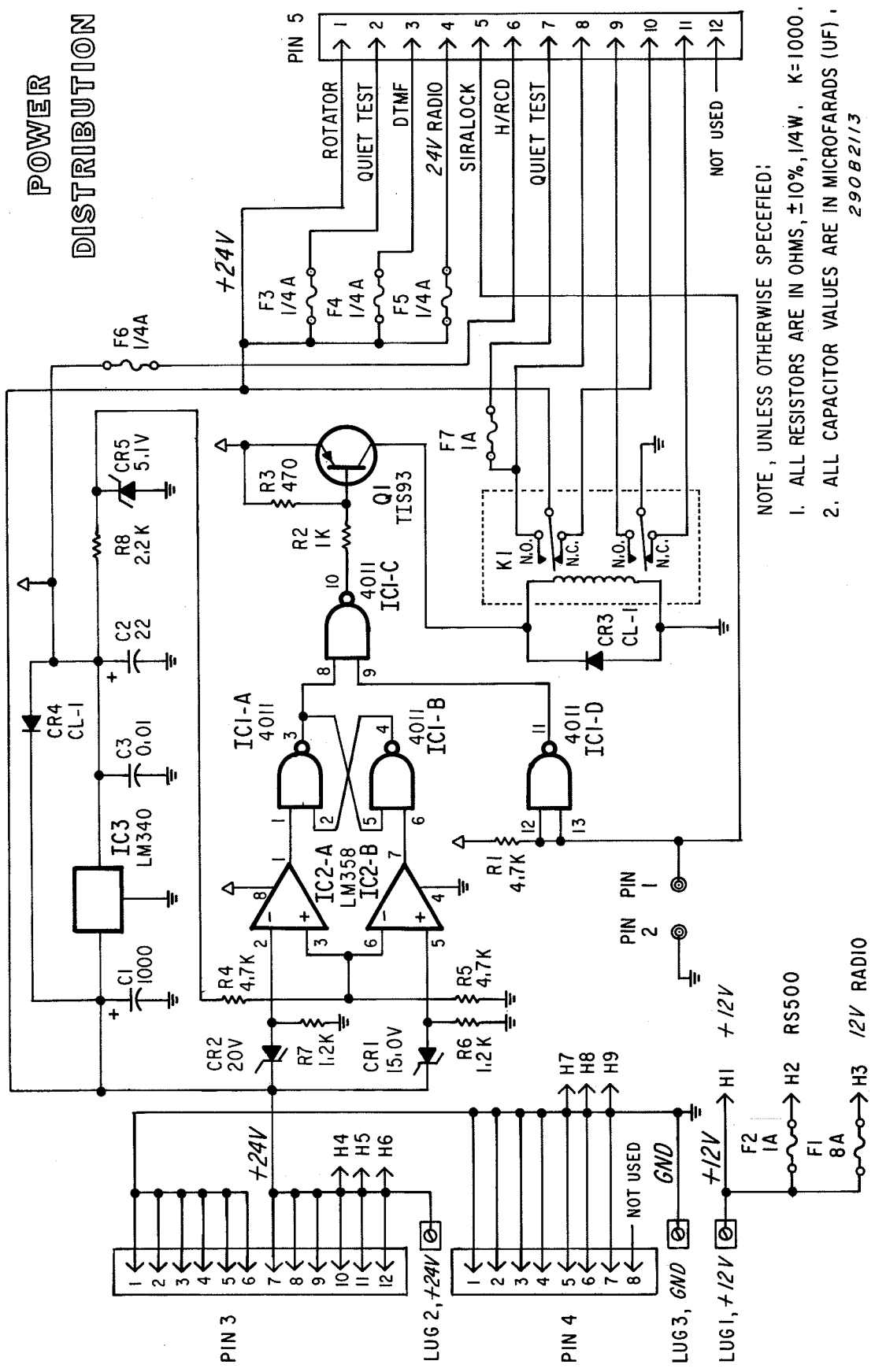


Figure 7-10B. Power Amplifier Assy. Component Location Diagram.



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

290821/3

Figure 7-11A. Power Distribution Assy. Schematic Diagram.

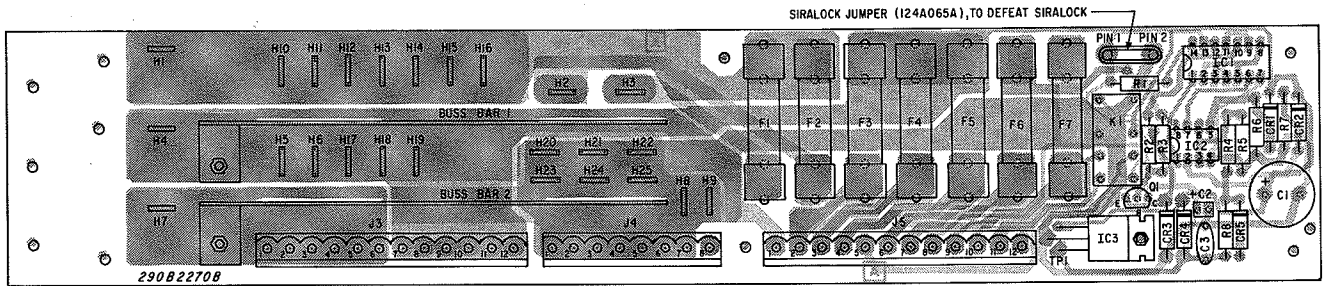


Figure 7-11B. Power Distribution Assy. Component Location Diagram.

PARTS LIST
POWER DISTRIBUTION ASSEMBLY

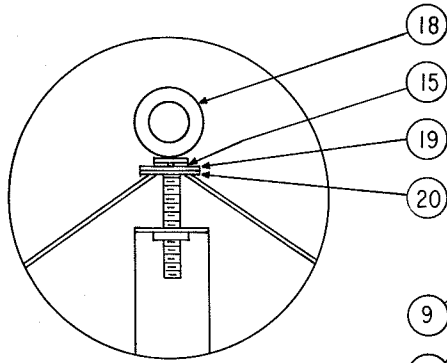
<u>Schematic Symbol</u>	<u>Description</u>	<u>Part No.</u>	<u>SEMICONDUCTORS (cont'd)</u>		
RESISTORS			<u>Schematic Symbol</u>	<u>Description</u>	<u>Part No.</u>
R1,4,5	4700 Ohm,10%, $\frac{1}{4}$ Watt	100A298	IC1	IC,4011BE	128A065
R2	1000 Ohm,10%, $\frac{1}{4}$ Watt	100A233	IC2	IC,LM358	128A045
R3	470 Ohm,10%, $\frac{1}{4}$ Watt	100A248	IC3	IC,LM340	128A066
R6,7	1200 Ohm,10%, $\frac{1}{4}$ Watt	100A770	MISCELLANEOUS		
R8	2200 Ohm,10%, $\frac{1}{4}$ Watt	100A225	K1	Relay,12V,DPDT	131A130A-01
CAPACITORS			F1	Fuse,8-amp.,3AG,Slo-Blo	148A143
C1	1000UF,35V,Electrolytic	108A149	F2,7	Fuse,1-amp.,3AG	148A106
C2	22UF,15V,Tantalum	107A677A-02	F3,4,5,6	Fuse, $\frac{1}{4}$ -amp.,3AG	148A121
C3	0.01UF,50V,Disc	107A213	LUG 1,2,3	Connector	8474A120
SEMICONDUCTORS			H1 thru 9	Terminal, Male	233A157A-01
Q1	Transistor, PNP,TIS93	125B133	PIN 1,2	Terminal, Male Bead	233A120A
CR1	Diode, Zener, 15V,1N965B	115A250	PIN 3,5	Terminal, 12-pin	229A180
CR2	Diode, Zener, 20V, 1N5250B	115A247	PIN 4	Terminal, 8-pin	229A172
CR3,4	Diode,CL-1	115B301		Buss Bar, (2)	8459A223
CR5	Diode, Zener, 5.1V,1N751A	115A249		Circuit Board (with parts)	200D985
				Clip,Fuse (14)	144A114



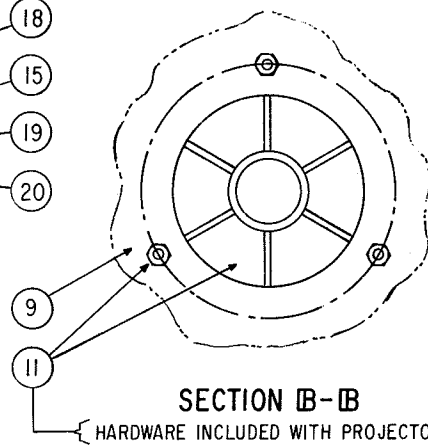
SIGNAL DIVISION
Federal Signal Corporation

PARTS INDEX
MODEL

EOWS*1212

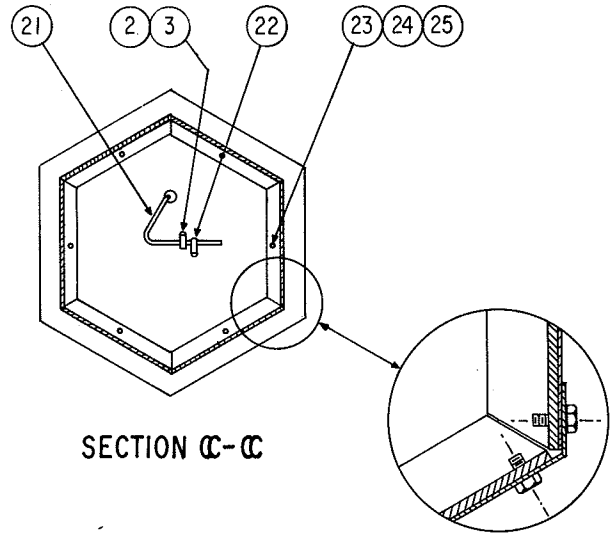
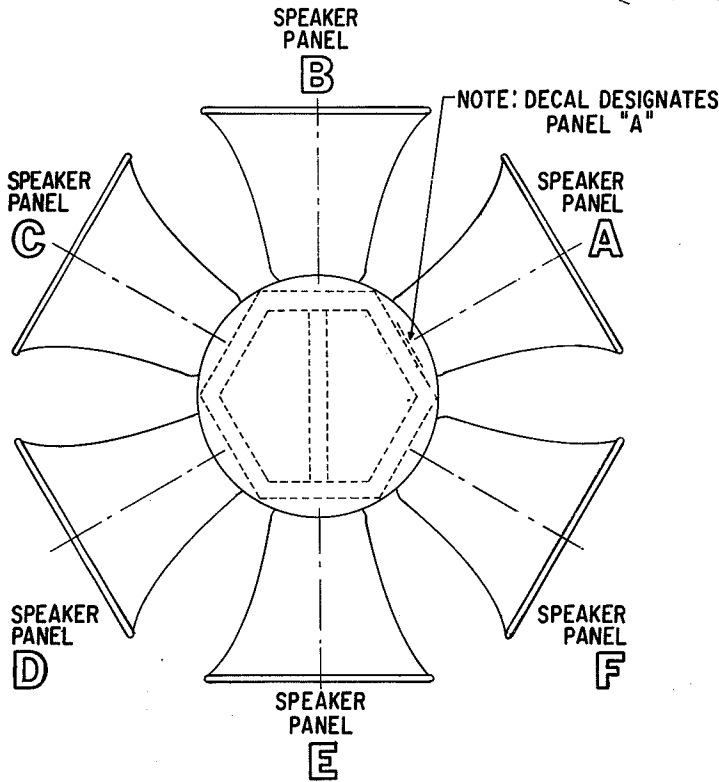


DETAIL A

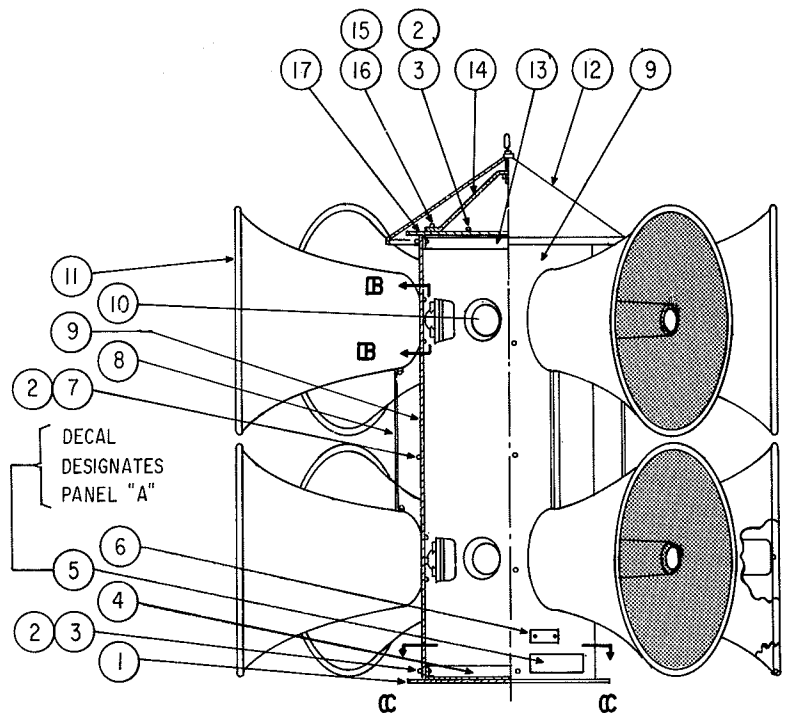
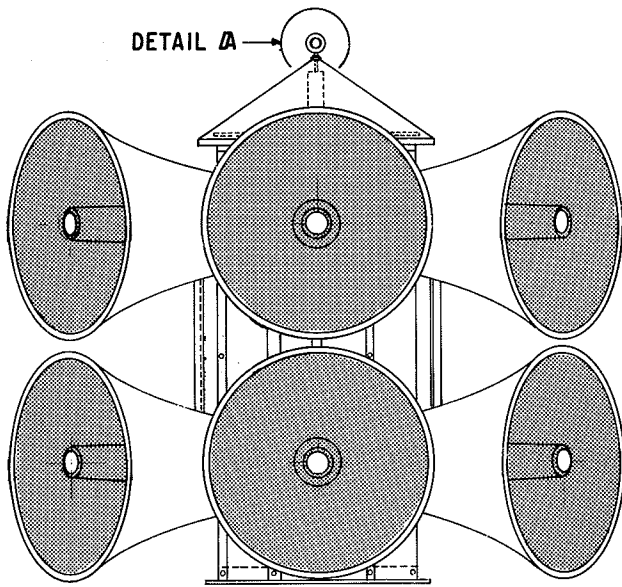


SECTION B-B

HARDWARE INCLUDED WITH PROJECTOR



SECTION C-C



290C1950

Figure 7-12. Model EOWS*1212 Component Location Diagram.

ELECTRONIC OUTDOOR WARNING SIREN

PPL 0199 PARTS LIST

Model EOWS*1212

OCTOBER 1985

Item No.	Description	Part No.	Qty.
1	Plate , Base Assembly	8549B012	1
2	Lockwasher , Split , 1/4" Scr. , S.S.	7074A016	46
3	1/4-20 x 7/8" Scr. , Hex Hd. , S.S.	7000A311-14	28
4	Frame , Support , Welded Assembly (base)	8549B010	1
5	Decal (indicates panel "A")	8146B062	1
6	Nameplate , EOWS*1212	8146A829-08	1
7	1/4-20 x 7/16." Scr. , Hex Hd. , S.S.	7000A311-07	18
8	Brace , Speaker , Middle	8549A116	6
9	Panel Assembly , EOWS*1212	8549B174	6
10	Driver , 100 Watt , Gray	8287B321	12
11	Projector & Cone , Machined Assembly (complete with screen , label , and hardware)	8549C081	12
	Screen (for replacement only)	8549C060	AR
12	Cover , Top Assembly	8549B005	1
13	Frame , Support , Welded Assembly (top)	8549B010-01	1
14	Bracket , Hoisting , Welding Assembly	8549A008	1
15	Lockwasher , Split , 1/2" Scr.	7074A025	2
16	1/2-13 x 1-1/4" Scr. , Hex Hd. , Unslot Indt.	7000A320-20	2
17	Plate , Cover	8549B007	1
18	1/2-13 x 3-1/4" Bolt , Eye , Pltd.	7003A003	1
19	Washer Flat , 1/2 I.D. x 1-3/4 O.D. x 1/16 Thk.	7072A095	1
20	Washer , Flat , Rubber 9/16 I.D. x 1-3/4 O.D. x 1/8 Thk.	7072A038	1
21	Wireset , Speaker Array , EOWS*1212	310A816	1
22	Clamp , Thinwall , 1/2" Conduit	150A129	2
23	Nut , Hex 8-18 , S'S.	7059A063	6
24	Lockwasher , Split , 3/8" Scr. , S.S.	7074A046	6
25	3/8-16 x 1-1/4" Bolt , Hex , S.S.	7002A009-20	6
NOT SHOWN			
	Angle Assembly , Roof , Egyptian Gray	8540C017-03	1
	Plate , Brace , Egyptian Gray	8541C037-02	1
	Bracket , Pole Mtg. , Welding Assembly	8549A170	3
	Accessory Kit , Mtg. Hardware	8549A055	1

DO NOT ORDER PARTS BY ITEM NUMBER . Give model , voltage , description ,and part number. Refer to PARTS PRICE LIST (Part No. 1001) for prices of parts.

Federal Signal Corporation , Signal Division , 2645 Federal Signal Drive , University Park , Illinois 60466

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CAUTION TO REDUCE THE POSSIBILITY OF LIGHTNING DAMAGE, REMOVE EXCESS CABLE BEFORE CONNECTING TO TERMINAL BOX.

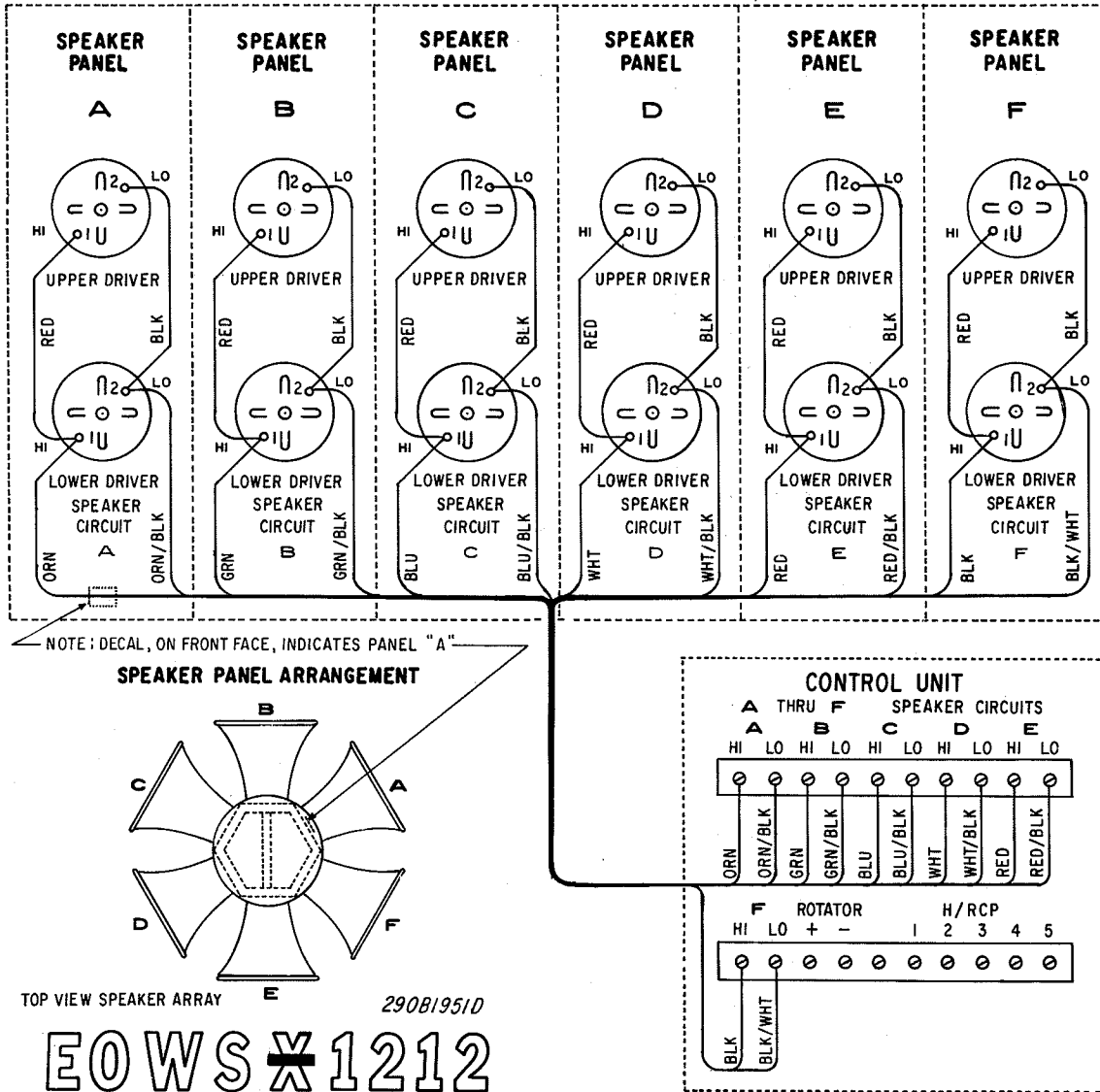


Figure 7-13. Model EOWS*1212 Wiring Diagram.

CAUTION: TO REDUCE THE POSSIBILITY OF LIGHTNING DAMAGE, REMOVE EXCESS CABLE BEFORE CONNECTING TO TERMINAL BOX.

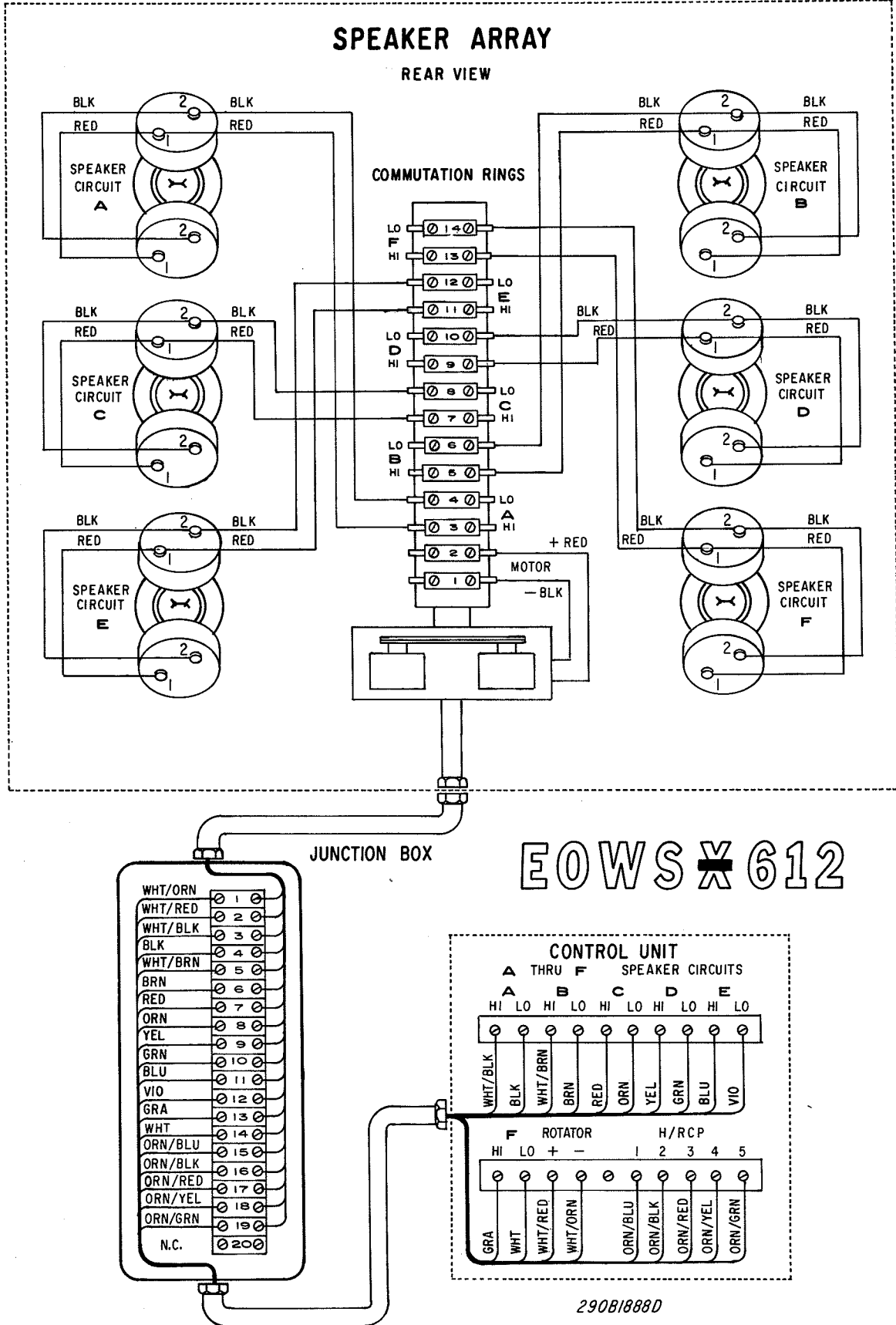


Figure 7-14. Model EOWS*612 Wiring Diagram.

PARTS INDEX
MODEL

EOWS*612

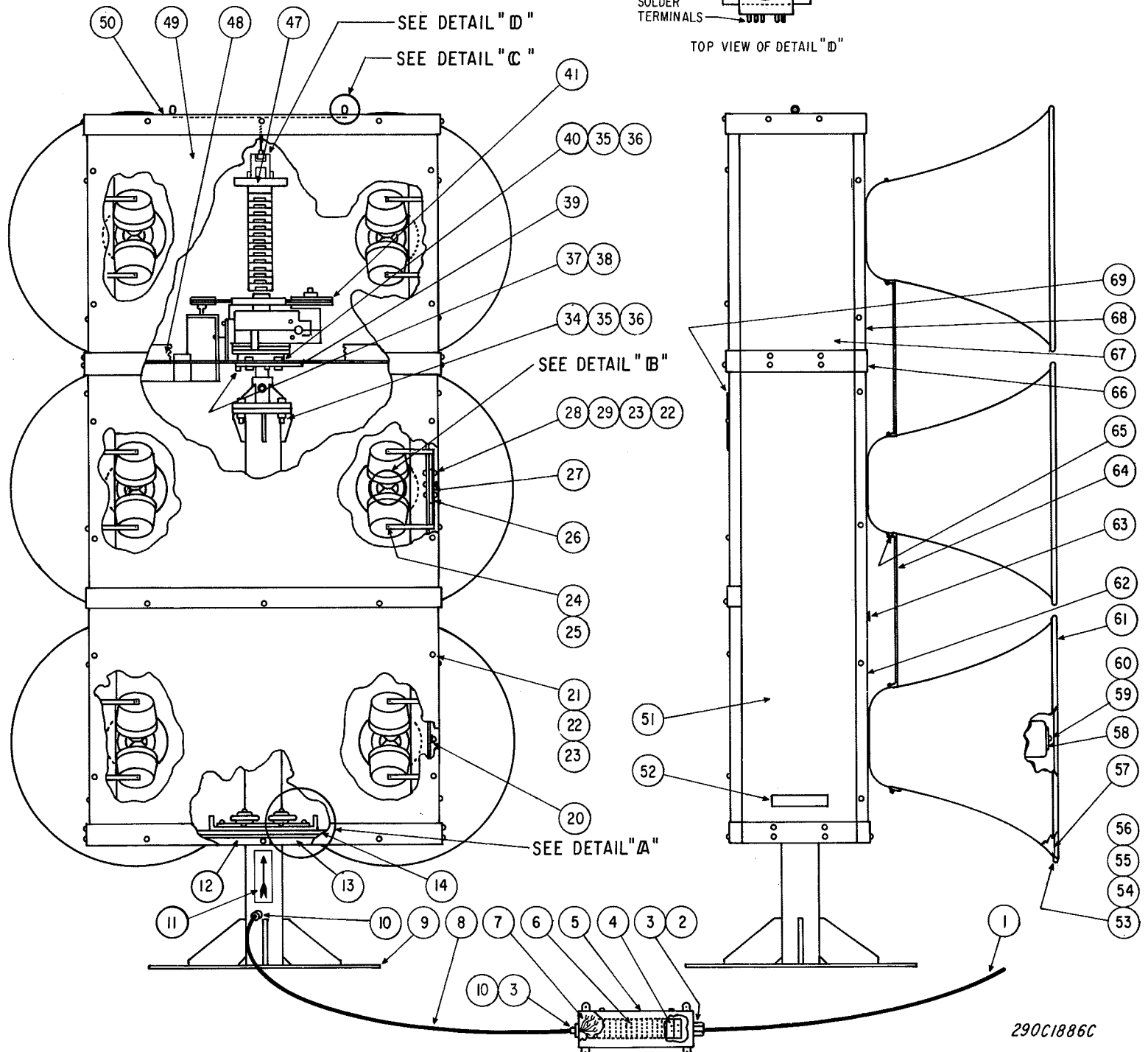
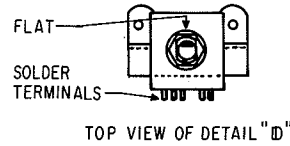
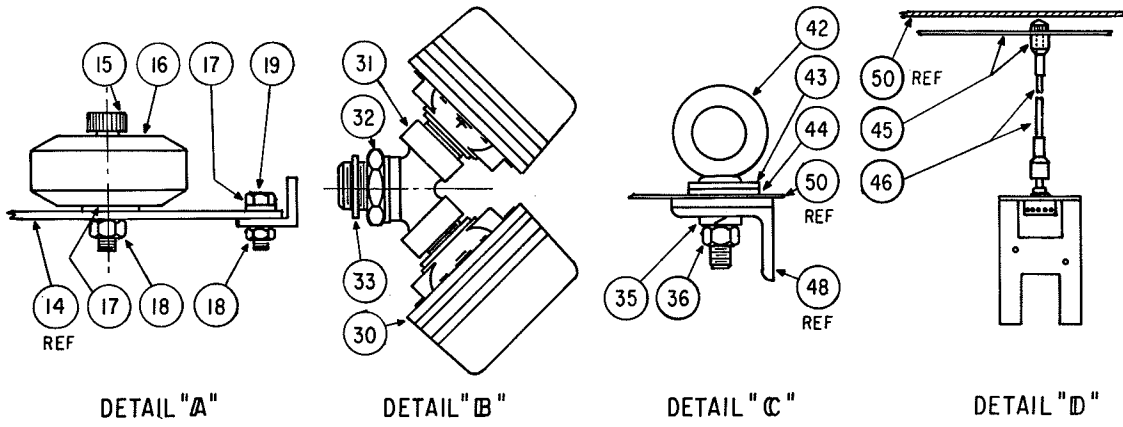


Figure 7-15. Model EOWS*612 Component Location Diagram.
7-20

ELECTRONIC OUTDOOR WARNING SIREN

PPL 0191

Model EOWS*612

JUNE 1989

Item No.	Description	Part No.	Qty.
1	Wire Set, Spkr. Cable, EOWS*812	175C426	1
2	Connector, Cord Grip 1"	140A198	1
3	Locknut, Sealing, 1"	7065A033	2
4	Screw, 10-32, Rd. Hd. Slit.	7000A068-08	4
5	Junction Box Assy., EOWS*	170B239	1
6	Terminal, 20-position	229A192	1
7	Lug, 6-spade, Crimp Terminal	224A117	14
8	Conduit, Flexible, 3" Lg.	R92-10-04	1
9	Pipe Base, EOWS*612	8549C167	1
10	Connector, 1", Liquid-Tight	8549A108	2
11	Label, Motor Arrow	161A321	1
12	Panel, Bottom Left Assy. EOWS*	8549C163	1
13	Panel, Bottom Right Assy. EOWS*	8549C163-01	1
14	Plate, Roller Adjust	8549B074	2
15	Screw, Shld., 3/8-16, Allen Hd.	7017A028-28	4
16	Roller	8549A076	4
17	Washer, Flat SS, .406ID x 1.0OD	7072A035	12
18	Nut, Esna, Hex, 3/8-16	7058A012	12
19	Bolt, Hex Hd, 3/8-16 x 1-1/4	7002A009-20	8
20	Washer, Flat, Stl., .344ID x 7/8OD	7072A032	6
21	Screw, Hex Hd. SS, 1/4-20	7000A311-07	75
22	Washer, Flat SS, .266ID x 11/16OD	7072A024	93
23	Lockwasher, Split, SS, 1/4 Screw	7074A016	93
24	Screw, Hex Hd., Slit., 5/16-18	7000A319-12	12
25	Nut, Hex, 5/16-18	7057A027	12
26	Bracket Driver	8549A148	12
27	Bracket, Dual Driver	8549A149	6
28	Screw, Hex Hd., SS 1/4-20	7000A311-16	18
29	Nut, Hex, 10-32	7059A020	18
30	Driver, 100 Watt, Gray	8287B321	12
31	Coupler, Driver	8549A108	6
32	Nut, Jam, Hex, 1-3/8-18	8542A167	6
33	Washer, Fiber	8283A451	36
34	Screw, Cap, Hex Hd., 1/2-13	7002A016-28	4
35	Lockwasher, Split, 1/2	7074A025	10
36	Nut, Hex, 1/2-13	7059A077	10
37	Screw, Cap, Hex Hd., 3/8-16	7002A007-16	3
38	Lockwasher, Split, 3/8	7074A023	3
39	Plate, Mounting, Rotator	8549B153	1
40	Screw, Cap, Hex, 1/2-13	7002A016-24	4
41	Rotator Mechanism Assy.	8549C147	1
	Motor, Rotator (repl.) (P/O item 41)	*	AR
	Fan Belt, Rotator (repl.) (P/O item 41)	*	AR
42	Bolt, Eye, 1/2-13	7003A007	2

Item No.	Description	Part No.	Qty.
43	Washer, Flat, 1-3/8OD x .562ID	7072A115	4
44	Washer, Flat, 9/16 x 1-3/4 x 1/8	7072A038	2
45	Upper Pot Bracket Assy.	8549A264	1
46	Shaft Assy., Flexible	288A423	1
47	Brushes, Rotator (repl.) (P/O item 41)	*	AR
48	Frame, Angle, EOWS*612	8549D164	1
49	Panel, Back, Assy.	8549B161	3
50	Panel, Top	8549C155	1
51	Panel, Side, Assy.	8549B162	2
52	Decal, Siren 2	8146B062	2
53	Washer, Flat .203 x 7/16 x .032	7072A015	24
54	Screw, Rd. Hd. Slit, 10-32	7000A070-08	24
55	Lockwasher, Split SS, No. 10 Screw	7074A010	24
56	Nut, Hex, 10-32	7059A016	24
57	Screen, Projector	8549C060	6
58	Nameplate, FS, Flat	8146A767	6
59	Rivet Nut, 10-32 x 1/2	7065A000	6
60	Screw, Rd. Hd., Slit., 10-32	7000A070-16	6
61	Projector and Cone	8549B176	6
62	Panel, Front, Lower Assy.	8549C165	1
63	Nameplate, EOWS*612	8146A829-07	1
64	Brace, Speaker	8549A151	4
65	Brace, Speaker, Horiz.	8549A150	4
66	Flange, Side Panel	8549B143	4
67	Panel, Side, Top Assy.	8549B162-01	2
68	Panel, Front, Upper Assy.	8549C160-01	1
69	Sign. Danger Equip. Starts Auto.	8287A398	1
Not Shown	Bracket, Pole Mtg. Weld. Assy.	8549A170	4
	Accessory Kit Mtg. Hardware	8549A083	1
	Accessory Kit, EOWS*612	8549A122	1
	Wire Set, Drivers EOWS*612	310A905	1

Special Order. Contact Service Dept. *

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