



FEDERAL SIGNAL CORPORATION

**MODEL 300VSC-1,
MODEL 300VSC-1044SB,
and
Model 300VSC-1044-1
SelecTone® Command**



INSTALLATION AND SERVICE INSTRUCTIONS

2561044E
Rev. E 12/98
Printed in U.S.A.

LIMITED WARRANTY

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

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

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

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

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

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



FEDERAL SIGNAL CORPORATION
Electrical Products Division

TABLE OF CONTENTS

<u>Paragraph</u>		<u>Page</u>
SECTION I - GENERAL DESCRIPTION		
1-1	General	1-1
1-2	Chassis Description	1-1
1-3	Control Circuitry	1-2
1-4	Power	1-2
1-5	Audio Inputs	1-2
SECTION II - SPECIFICATIONS		
2-1	Power Input	2-1
2-2	Emergency Power Source Input	2-1
2-3	Audio Input	2-1
2-4	Audio Outputs	2-1
2-5	Internal Speaker	2-2
2-6	Remote Tone Activation Circuit	2-2
2-7	Remote Mic. Activation Circuit (PTT)	2-2
2-8	Relay Contact Closure Outputs	2-2
2-9	Fuse	2-2
2-10	UL Listed	2-2
2-11	CSA Certified	2-2
2-12	Physical	2-2
SECTION III - INSTALLATION		
3-1	Signal Lines	3-1
3-2	Model 300VSC Signal Connections	3-1
3-3	Connection to Remote Devices	3-2
3-4	Power Connections	3-2
3-5	Connections to Remote Switches	3-4
3-6	Tone Module Installation	3-4
SECTION IV - CIRCUIT DESCRIPTION		
4-1	General	4-1
4-2	Tone Control Circuits	4-1
SECTION V - SERVICE		
5-1	General	5-1
5-2	Replacement Parts	5-1

SECTION I

GENERAL DESCRIPTION



Figure 1-1. Model 300VSC-1 SelecTone® Command

1-1. GENERAL.

The Model 300VSC SelecTone® Command (figure 1-1) is a UL listed and CSA certified central control device that is capable of generating up to four different tone signals on a line that is connected to remote speaker/amplifiers in a SelecTone System. The 300VSC can control signal lines to Federal Signal Models 300GC, 300GCX, 300X, 302GC, 302GCX, 302X, and 50GC speaker/amplifiers and to other devices designed to operate with a SelecTone system. It can also control signals to speakers designed for 25Vrms line operation. The 300VSC has a public address (PA) function so voice messages or instructions can be announced over the SelecTone system through an optional Model MSB-1 or MNC-1 Microphone. The unit can also be used to play background music generated from an external source over the SelecTone system.

The Model MNC-1 microphone is a hand held, noise canceling microphone that is ideal for use as a local microphone. The Model MSB-1 microphone (figure 1-2) is a base station type microphone designed for desk-top operation.

The Model 300VSC-1 may be installed, in indoor installations only, on a desk-top.

- A. The Model 300VSC-1044SB and 300VSC-1044-1 are a rack mountable unit complete with mounting hardware. The 300VSC-1044 will fit any standard 19" rack mount cabinet.

The Model 300VSC can be used for a variety of prioritized signaling purposes, such as playing background music, auxiliary fire alarm, evacuation alarm, start and dismissal, paging, and other emergency warning applications. The system can be automated if external devices such as heat detectors, switches or program clocks are connected to the remote control inputs. Additional advantages of the Model 300VSC include economical system expansion along with long term system flexibility.

The Model 300VSC generates and amplifies tone and audio signals and applies them through signal lines to the remote SelecTone devices in the system. A Model 300CK Connector Kit is required in each Selectone device to connect the Selectone devices to the signal line. Speakers designed for 25 volt operation can connect directly to the 25 volt output. The 300VSC has provisions for up to four SelecTone tone modules of the user's choice. The tones are designated as



Figure 1-2. Model MSB-1 Microphone.



Figure 1-3. Model 300VSC-1044SB and 300VSC-1044-1 SelecTone® Command.

Tone #1, Tone #2, Tone #3, and Tone #4. Each tone can be manually activated locally by its associated push button switch on the front panel or by a contact closure at the associated remote control input. Whenever a tone is activated, either locally or remotely, its associated front panel push button LED illuminates to indicate that the tone has been activated. The LED remains lit until the tone is deactivated and the contact closure is removed. All 300VSC controls are located on the front panel.

1-2. CHASSIS DESCRIPTION.

The Model 300VSC-1 is assembled in a black brushed aluminum 2- piece housing approximately 10.5" wide by 9.5" deep by 2.44" high. It is intended to be placed on any flat horizontal surface, or it can be wall mounted using the wall mounting brackets supplied in the accessory kit. The housing is held together with four screws, two on the bottom near the front and two at the back near the terminal blocks.

- B. The Model 300VSC-1044SB and 300VSC-1044-1 are assembled in a 3 piece aluminum housing. The housing is 3.5"H x 17.5"W x 10.5"D. The 300VSC-1044 is painted black. This unit is intended to be mounted in a standard 19" rack mount cabinet.

The switch printed circuit board is attached to the upper housing with four screws. A wiring assembly connects the

switch board to the main printed circuit board. The main printed circuit board is attached to the lower housing with eight screws. The front panel switches are designated as TONE 1 through TONE 4, AUX, TEST and CANCEL. The tone corresponding to each switch can be labeled in the white area next to the switch with a permanent felt-tip marker. In the event a tone or message changes, the marking can be removed by lightly rubbing with a rag dampened with denatured alcohol. Ensure the denatured alcohol does not come in contact with the switches as this could result in their being damaged.

1-3. CONTROL CIRCUITRY.

A. Control Circuitry.

The control circuitry in the 300VSC has a built-in priority level feature. If a given tone is already sounding when higher priority tone is locally or remotely activated, the higher priority tone automatically overrides the lower priority tone. However, the push button LED for the lower priority tone remains lit to indicate that the lower priority tone remains activated. When the higher priority tone is deactivated, the LED in its push button goes out and the lower priority tone resumes sounding. Pressing cancel will deactivate any currently active tones. The local microphone has the highest priority. All of the tones have priority by number sequence and all have priority over remote PA and background music.

Since Tone #1 has priority over all other tones, the "Slow Whoop" (TM9) tone module is frequently installed in the Tone #1 position as a "Fire" signal. Whenever the 300VSC is activated, and is not in the test mode, a built-in relay causes a set of normally closed contacts to open and normally open contacts to close, which makes it possible to send an alarm signal to other emergency services or circuits. Check with local codes for specific requirements regarding types tones to use.

B. "TEST" Pushbutton.

The "TEST" pushbutton switch permits the testing of tones without activating the remote SelecTone devices. While a test is being conducted, the tone under test is heard from the monitor speaker inside the enclosure only. The "TEST" switch also cancels false alarms. Whenever this pushbutton is pressed, the LED remains illuminated to remind the operator to press the reset button after the test is complete or the false alarm is corrected.

C. "CANCEL" Pushbutton.

The "CANCEL" pushbutton when pressed will reset all the manually activated signaling functions of the 300VSC. It also provides a momentary dry contact closure to facilitate remote resetting of any other alarm circuit. The contact stays closed as long as the "CANCEL" pushbutton is depressed. Resetting of remote activation will not occur if the closure occurring at the remote input has not been removed.

1-4. POWER.

WARNING

In order to prevent power to the 300VSC from being turned off accidentally, the unit does not have a power switch.

Before performing any installation or maintenance, ensure that power is disconnected.

The front panel has a green LED to indicate the presence of primary power. The 300VSC can be operated from either a 120VAC or a 24VDC power source. The AC power is connected via the power cord, and the 120 volt operation must be manually switched internally while 24VDC connects via the rear terminals.

1-5. AUDIO INPUTS.

A microphone can be connected directly to the 300VSC via modular jacks provided in front of the unit (highest priority). However, there are screw terminal provisions for a low level, low impedance audio signal to be input in the back of the unit, which allows audio to be coupled from a telephone system (PBX) with the proper interface equipment supplied by the phone company. This input is designed to also allow the direct connection of a low impedance remote microphone with separate PTT (priority below the tones). An RCA jack is provided in the back of the unit to couple standard 1 volt audio signal from a background music source such as a radio receiver, CD player or a tape player.

SECTION II SPECIFICATIONS

2-1. POWER INPUT.

A.	Input Voltage	120V,50-60HZ
B.	Standby Current	50MA 120VAC
C.	Operating Current	210MA(MAX)
D.	Power Consumption	26 Watts(MAX)

2-2. EMERGENCY POWER SOURCE INPUT.

A.	Input Voltage	22-32 VDC
B.	Standby Current	90MA
C.	Operating Current	760MA

2-3. AUDIO INPUT.

A.	Local PA (Use optional Model MSB-1 microphone)	
	Input Impedance	5k Ohms
	Input Voltage	16MVrms (MAX)
B.	Remote Mic.	
	Input Impedance	5k Ohms
	Input Voltage	16MVrms (MAX)
C.	Aux. Input	
	Input Impedance	5k Ohms
	Input Voltage	500MVrms (MAX)

2-4. AUDIO OUTPUTS.

A.	Output Impedance	
	Unbalanced Sig. line	25 Ohms (MAX)
	Unbalanced Sig. Line Standby	120 Ohms
	Balanced Sig Line	40 Ohms (MAX)
	Low Level Sig. Out	600 ohms
B.	Output Voltage Levels No Load (<3% THD)	
	Unbalanced Sig. Line	9Vrms
	Balanced Sig. Line	17Vrms
	Low Level Sig. Out	1Vp-p
C.	Output Voltage Levels Max Load (<3% THD)	
	Unbalanced Sig. Line	8Vrms(25 Ohm load)
	Balanced Sig. Line	15Vrms(40 Ohm load)
	Low Level Sig. Line	1Vp-p (600 Ohm load)
D.	Tone Output Levels No Load (sq. wave)	
	Unbalanced Sig. Line	12Vrms
	Balanced Sig. Line	25Vrms
	Low Level Sig. Line	1Vp-p
E.	Tone Output Levels Max Load (sq. wave)	
	Unbalanced Sig. Line	12Vrms (25 Ohm load)
	Balanced Sig. Line	20Vrms (40 Ohm load)
	Low Level Sig. Line	0.56Vrms (600 Ohm load)
F.	Audio Frequency Response Balanced Sig. Line	
	40 Ohms max load, From 250Hz to 80KHz	
	(Reference 1KHz)	-3db
	40 Ohm max load, From 450Hz to 60KHz	
	(Reference 1KHz)	-1db
	No load, From 100Hz to 90KHz	
	(Reference 1KHz)	-3db
	No load, From 200Hz to 60KHz	
	(Reference 1KHz)	-1db

G.	Signal To Noise Ratio (<3% THD)	
	Local PA	60db
	Remote Mic	40db
	Aux Input	80db
H.	Audio Distortion From Aux Input to Balanced Sig. Line Output (40 Ohm load)	2%

2-5. INTERNAL SPEAKER.

Sound Level At 1 Meter	65db
------------------------	------

2-6. REMOTE TONE ACTIVATION CIRCUIT.

Type	Dry Contact Closure
Line Impedance	100 Ohms (MAX)
Circuit Current	50MA Max (12VDC)

2-7. REMOTE MIC. ACTIVATION CIRCUIT (PTT).

Type	Dry Contact Closure
Line Impedance	100 Ohm (MAX)
Circuit Current	10MA Max (12VDC)

2-8. RELAY CONTACT CLOSURE OUTPUTS.

Tone 1, Tone 2, Tone 3, Tone 4, Sig. Out, Aux., Test and Cancel Relays	
Type	Dry Contact Closure
Rating	24VDC, 1A, Resistive

2-9. FUSE.

F1	Type GMC-1 1A, 250V
F2	Type GMC-1/2 1/2A, 250V

2-10. UL LISTED.

File	E61713
Standard	UL 813 Commercial Audio Equipment

2-11. CSA CERTIFIED.

2-12. PHYSICAL.

A.	300VSC-1	
	Weight	4 1/8 lb. (1.88 kg.)
	Dimensions (HWD)	2.44" x 10.5" x 9.25"
B.	300VSC-1044	
	Weight	6 lb, 5.8 oz. (3.08 kg)
	Dimensions (HWD)	3.5" x 17.5" x 10.5"

SECTION III INSTALLATION

WARNING

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death to you or others.

SAFETY MESSAGE TO INSTALLERS

Peoples lives depend on your safe installation of our products. It is important to follow all instructions shipped with the products. This device is to be installed by a trained electrician who is thoroughly familiar with the National Electric Code and will follow the NEC guidelines as well as local codes.

The selection of the mounting location for the device, its controls and routing of the wiring is to be accomplished under the direction of the Facilities Engineer and the Safety Engineer. In addition, listed below are some other important safety instructions and precautions you should follow:

- Read and understand all instructions before installing or operating this equipment.
- Do not connect this unit to the system when power is on.
- All effective warning speakers produce loud sounds which may cause , in certain situations, permanent hearing loss. You should take appropriate precautions such as wearing hearing protection.
- After installation, test the sound system to ensure proper operation.
- Show these instructions to your Safety Engineer and then file them in a safe place and refer to them when maintaining and/or reinstalling the unit.
- Establish a procedure to routinely check the sound system for proper activation and operation.
- Consult the authority having jurisdiction in your area regarding the proper use and installation of this product.

3-1. SIGNAL LINES.

- A. The signal lines transfer the tone signals and verbal messages from the 300VSC to the remote SelecTone devices. In order to reduce the possibility of cross talk, hum and static noise pick up, the signal lines must be twisted pair, shielded audio cable. In the majority of systems use AWG 18 shielded twisted pair audio cables.

CAUTION

If too small a diameter cable is used, unacceptable signal voltage drop in the signal line will cause reduced sound output from the remote signal device. Only use a cable having wire diameter greater than 22AWG.

- B. Federal does not recommend that new or existing telephone lines be used as signal lines in a SelecTone system for the following reasons:
1. Interference from other services or systems, or interference from the system to other services.

2. Cross talk, interference or hum induced by other telephone lines.
3. Extended downtime because of the second party involvement required to service the lines.
4. The additional cost of installation, interfacing devices and monthly charges as opposed to a one-time cost of performing the installation.

3-2. MODEL 300VSC SIGNAL CONNECTIONS.

CAUTION

Crosstalk can occur between signal lines and power lines, causing confusing messages, which interfere with the emergency warning capability of this equipment.

Do not install signal lines in the same conduit with power lines. Avoid routing signal lines on cable trays with high voltage power lines.

To connect the signal lines of the SelecTone system to the 300VSC, connect a color coded shielded twisted pair of audio cables having conductors no smaller than 18 AWG to SIG. HI (TB1-2) and COM (TB1-1) terminals on TB1 (see figure 3-1). Every remote SelecTone signaling device in the system will be connected in parallel to these lines. When connecting the remote devices in parallel to the signal lines, observe the correct polarity and install wire nuts over the connections.

3-3. CONNECTION TO REMOTE DEVICES.

Physically install the remote SelecTone device(s); follow the installation instructions packed with the device.

A. 300GC, 300GCX, 300X, 302GC, 302GCX, 302X and 50GC.

A 300CK Printed Circuit Connector Board is required to connect a 300GC, 300GCX, 300X, 302GC, 302GCX, 302X or 50GC to the signal lines. The 300CK properly terminates the signal lines to the amplifier in the 300GC, 300GCX, 300X, 302GC, 302GCX, 302X and 50GC. As shown in the figure 3-2, connect the blue wire on the 300CK to the COM. wire from the 300VSC. Connect the yellow wire on the 300CK to the SIG. HI wire from the 300VSC.

B. 25 Vrms Signal Line Application.

The 300VSC has provision for connecting 25 Vrms line operated speakers to its output. Connect the 25 Vrms line at terminals TB1-4 and TB1-5 of terminal block TB1. Connect the speakers in parallel to this line using 25 Vrms line tap. This output is to be used only if there is no SelecTone system devices connected across TB1-1 and TB1-2. This output is not switched like SelecTone system output across terminal TB1-1 and TB1-2.

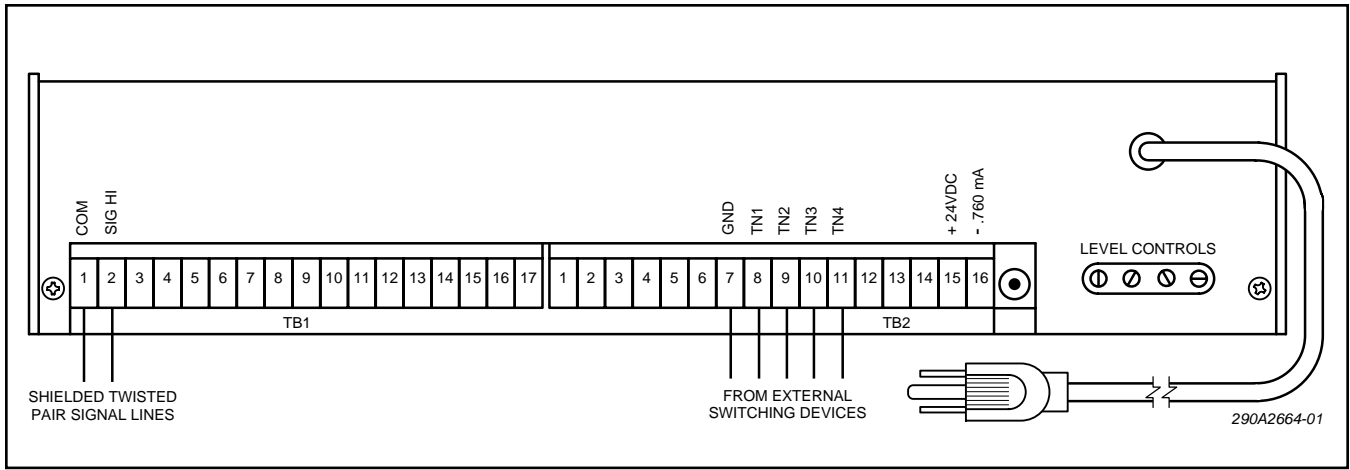


Figure 3-1. Model 300VSC Rear View

C. Low Level Audio Output.

The 300VSC also has provision for 1 volt peak to peak audio output that can be coupled to the audio input of another amplifier. This low level output is available across terminals TB1-1 and TB1-2. It can also be connected to an analog fiber optic transmitter so that audio can be transmitted over a fiber optic link in an electrically noisy environment.

CAUTION

Improper installation could render this system inoperable, interfering with the warning nature of this product. The installation must conform to applicable local and/or National Electrical codes.

If an emergency power source is required, central power system as described below should be employed.

3-4. POWER CONNECTIONS.

The two basic methods of supplying power to a SelecTone system are 120VAC 50/60HZ Local Power and 24VDC Central Power. The following paragraphs describe each method along with the advantages and disadvantages of each.

A. Local Power (see figure 3-3).

In this system, power is supplied to each remote SelecTone device by connecting it to 120VAC supply in the immediate vicinity of the device.

B. Central Power (See figure 3-4).

1. General.

In the central power system all of the remote amplifier power lines are connected in parallel to one or more centrally located power sources of either 24VAC or 24VDC.

2. Advantages of the Central Power System.

- a. The entire system may be independent of local line voltage.
- b. The entire system can be switched to an emergency standby power source in the event of a power failure.
- c. The central power system has the added advantage that an auxiliary power supply, such as the Federal Model PS300 can be used to power the remote devices in the SelecTone system. If the PS300 is used, it is not necessary to switch the power source if a power failure occurs.

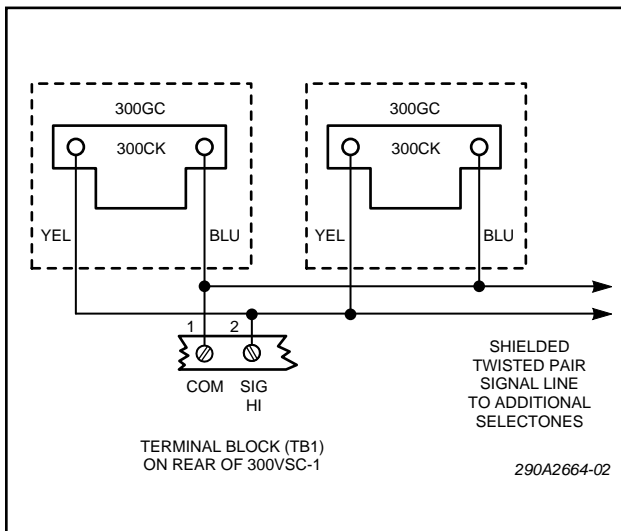


Figure 3-2. 300CK Connections.

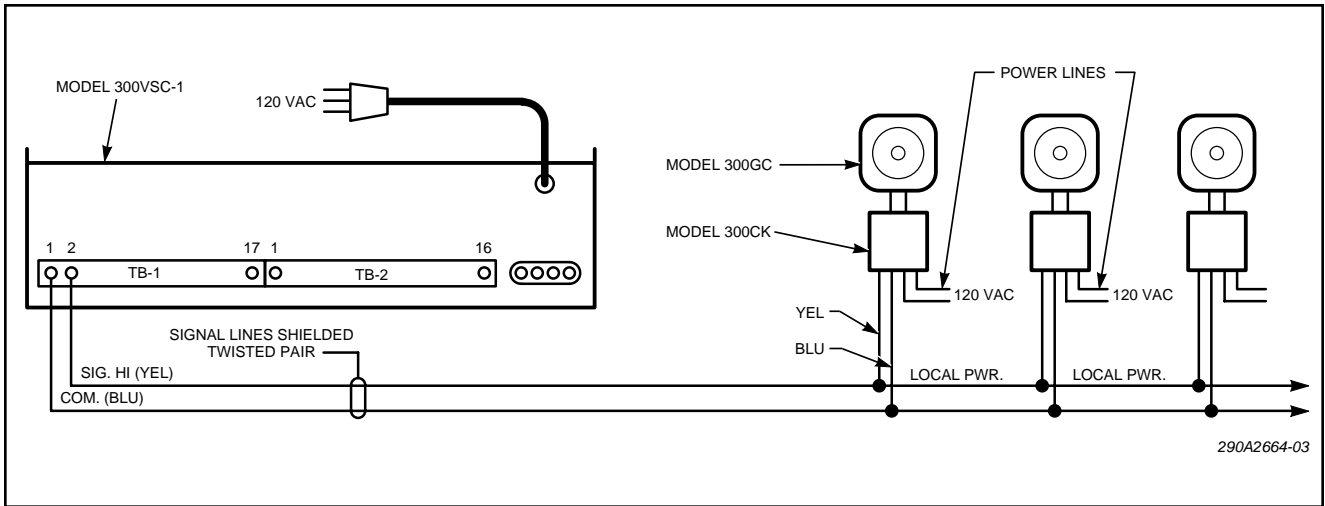


Figure 3-3. Typical Local Power System.

3. Disadvantages of Central Power System.

- Heavy power lines are required from the power source to the remote devices in the system. The size of the power lines is dependent upon the number of amplifiers and the total distance of the power loop in order to minimize the voltage drop while a tone signal is being generated.
- Future expansion is limited by the current capacity of the power source and the power lines that were initially installed.
- Central power installations must comply with local electrical codes. Most power circuits are Class I circuits. Therefore, conduit will probably be required. Installation costs are higher than a local power system.

C. 300VSC Power Connections.

DANGER

Installation with the system power on could cause serious injury or death. Do not perform any installation or maintenance on this system when power is on. Since the 300VSC does not have a power switch, ensure that the power is disconnected before proceeding.

WARNING

This device is to be installed by a trained electrician who is thoroughly familiar with the national electrical code and local codes and will follow the guidelines.

CAUTION

Cross talk, interference, or hum can be induced in signal lines, causing poor audio output or confusing messages, which interferes with the emergency warning capability of this equipment. Do not install power lines in the same conduit as signal lines.

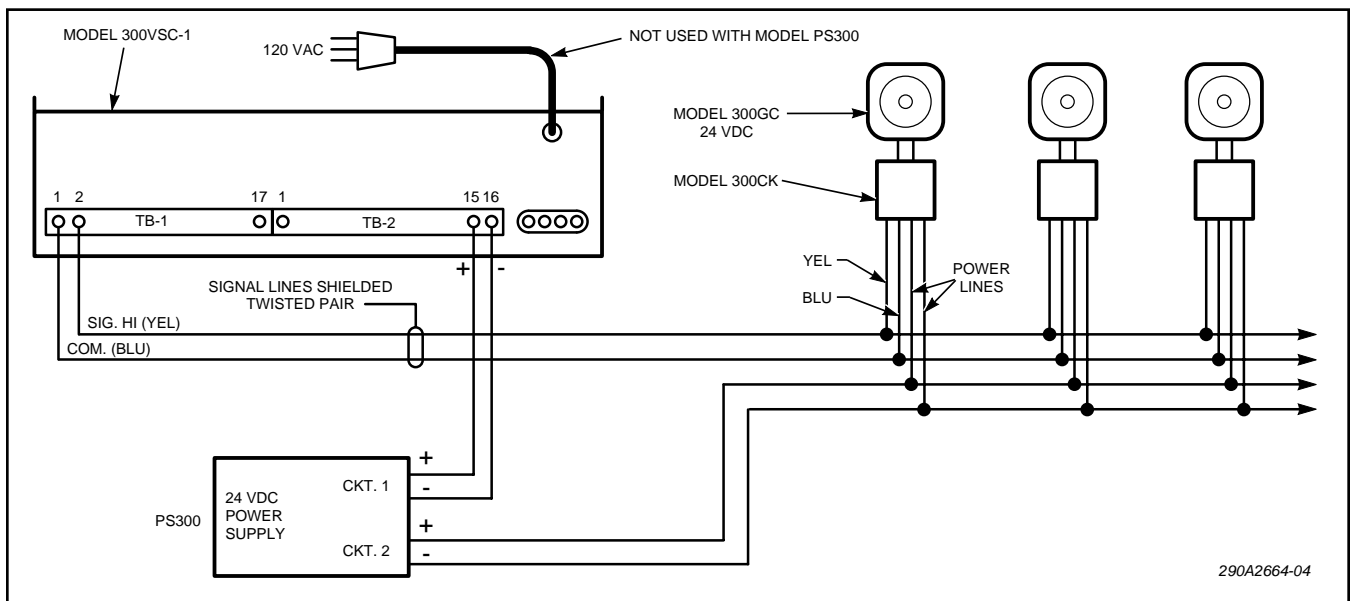


Figure 3-4. Typical Central Power System.

Operating power is connected to 300VSC by merely inserting the plug end of the line cord into any standard 120 volt, 60 Hz outlet. The 300VSC is factory set for 120VAC 50/60Hz operation.

If it is desired to use 24 VDC either as a primary or auxiliary source of power, connect the “+” terminal of 24 volt DC power supply to the terminal TB2-15 (+24 VDC) and “-” terminal of the 24 VDC power supply to the terminal TB2-16 of the TB2 terminal block located in the back of 300VSC.

3-5. CONNECTIONS TO REMOTE SWITCHES.

The 300VSC tones can be activated remotely by any normally open low current switch contacts having a current capacity of at least 50 ma inductive. Figure 3-5 illustrates the connection of switch contacts to the 300VSC. S1, S2, S3 and S4 represents remote switch contacts such as those found in flow switches, program clocks, heat detectors, and smoke detectors. The remotely activated tone sounds as long as the activating contacts remain closed.

3-6. TONE MODULE INSTALLATION.

WARNING

Installation or maintenance on 300VSC when power is on can result in serious injury or death. Do not perform any installation or maintenance to the system when power is on.

The 300VSC can accommodate up to four SelecTone modules of the user’s choice. To install the tone modules insert them into the desired receptacles on the printed circuit board as shown in figure 3-5. The receptacles for TONE #1 module and TONE #2 module are located on the mother board. Receptacles for TONE #3 module and TONE #4 modules are located on the card that plugs into the mother board.

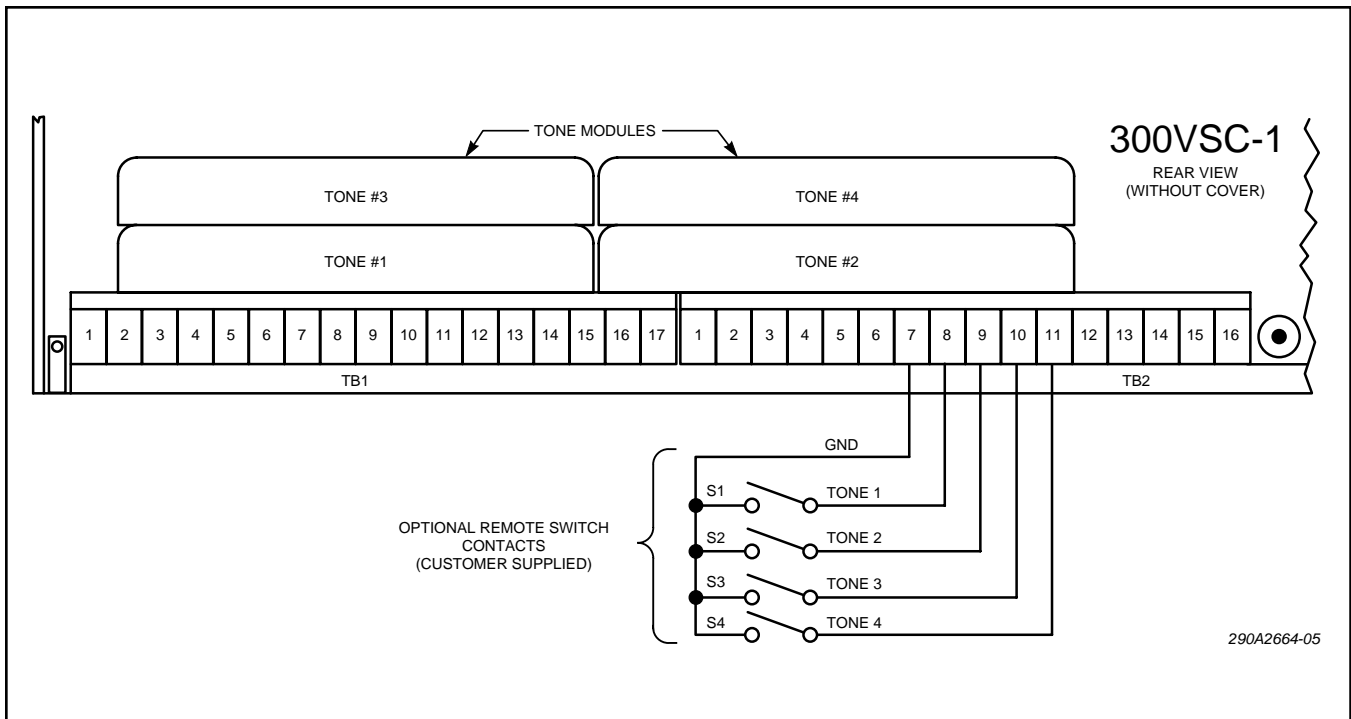


Figure 3-5. Model 300VSC Rear View (Cover Removed).

SECTION IV

CIRCUIT DESCRIPTION

4-1. GENERAL.

The electronic circuitry in the 300VSC consists primarily of priority control circuits, tone control circuits, audio preamplifiers and a power amplifier. The unit also contains all of the necessary switching circuitry for the control of PA, remote PA and background music. All of the electronic circuitry is mounted on two printed circuit boards. The operation of the tone modules will not be described because they are not an integral part of the 300VSC. However, the effect of the signal(s) from the tone module(s) will be discussed. When reading the following paragraphs, refer to the 300VSC schematic diagram (figure 4-1) and the Switch Board Schematic diagram (figure 4-2).

4-2. TONE CONTROL CIRCUITS.

A. Tone Activation Circuits.

The operation of the activation circuitry of all four tones is identical. Therefore, only the operation of the TONE #1 activation circuit will be discussed.

TONE #1 is activated by pressing local, TONE 1 push button located on front panel or when remote switch contacts, connected to TB2-7 and TB2-8, are closed, energizing K5 and the output relay K2. Simultaneously, the switch contacts close the TONE 1 red LED circuit and the LED illuminates. When K5 energizes, the "A" contacts apply +12 VDC to the TONE #1 module installed in lower left tone receptacle. The tone module then generates TONE #1 and applies it through CR16, C35, R43, pre amp IC11A, C44, level control R51, C48, analog multiplexer IC6 pin 2, 3 and C10 to the input pin 9 of the power audio amplifier IC3. After the tone is amplified, it is applied through C31 to the Monitor Speaker and via C32 through the closed K2A contacts of relay K2 to the SIG. HI terminal TB1-2 of terminal block TB1.

B. Priority Level Control.

The contacts of the Tone Control Relays are connected so that TONE #1 has priority over all other tones; TONE #2 has priority over TONE #3 and TONE #4, etc.

Figure 4-3 is a simplified schematic diagram of the relay tone control contact circuit. When all tone control relays are de-energized, as shown in figure 4-3, the tone control contacts K5A, K3A, K7A, and K8A are connected in series to the +12 volt source. Therefore, any one of the four tones can be activated. However, after a given tone has been activated, no lower priority tone can be initiated. For example, TONE #2 is activated when K3 is energized causing K3A to apply +12 VDC to the TONE #2 tone module via J7-3. As shown in figure 4-4, when K3 applies +12 VDC to TONE #2 tone module, the circuit to K7A and K8A is open. As a result, if either K7 or K8 is energized, TONE #2 continues to sound. However, if TONE #1 is activated, K5 energizes and

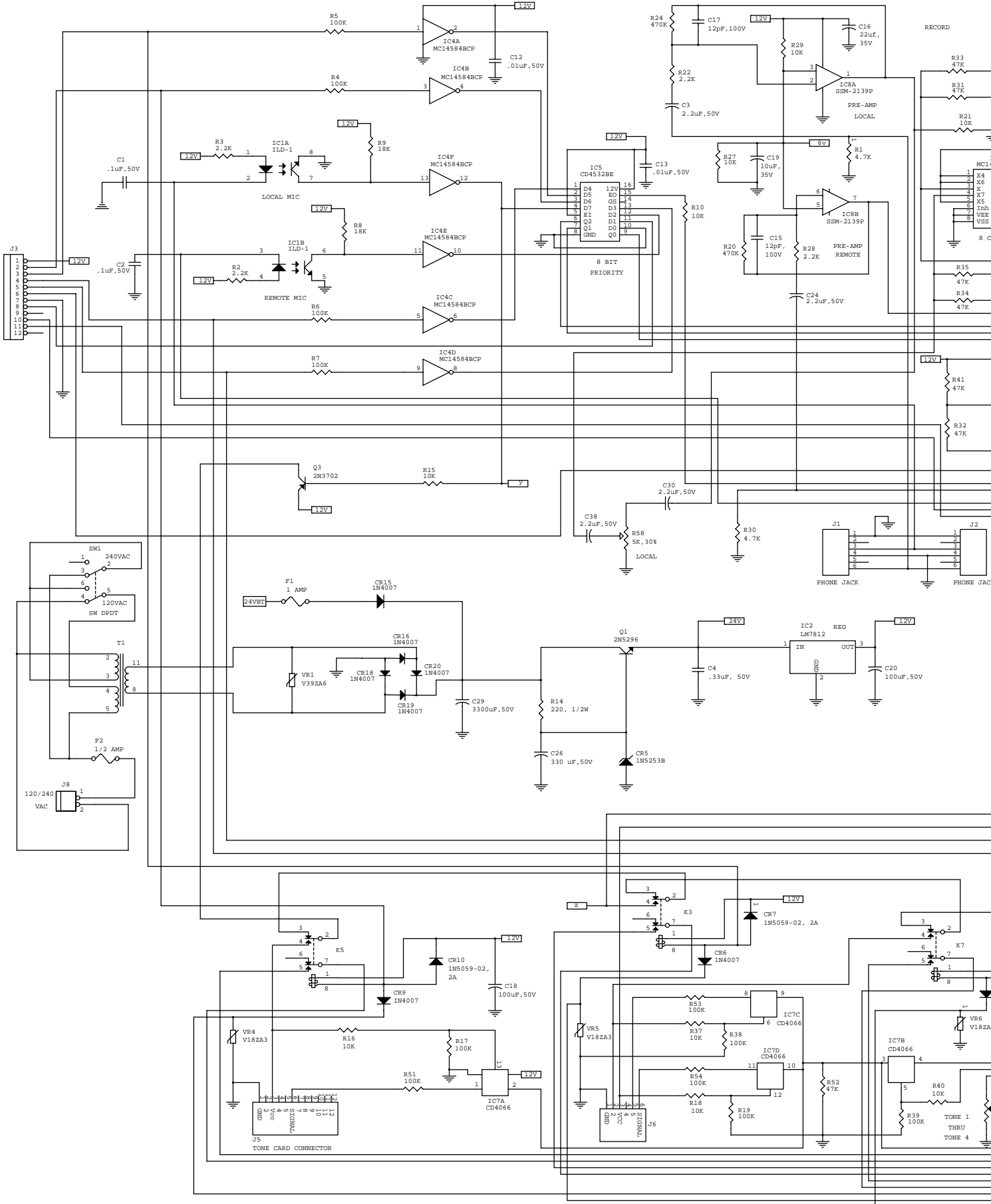
K5A applies +12 VDC to TONE #1 tone module via J5-3, while opening the circuit to TONE #2 and all other tones. Consequently, TONE #1 overrides TONE #2 even though TONE #2 relay K3 is energized.

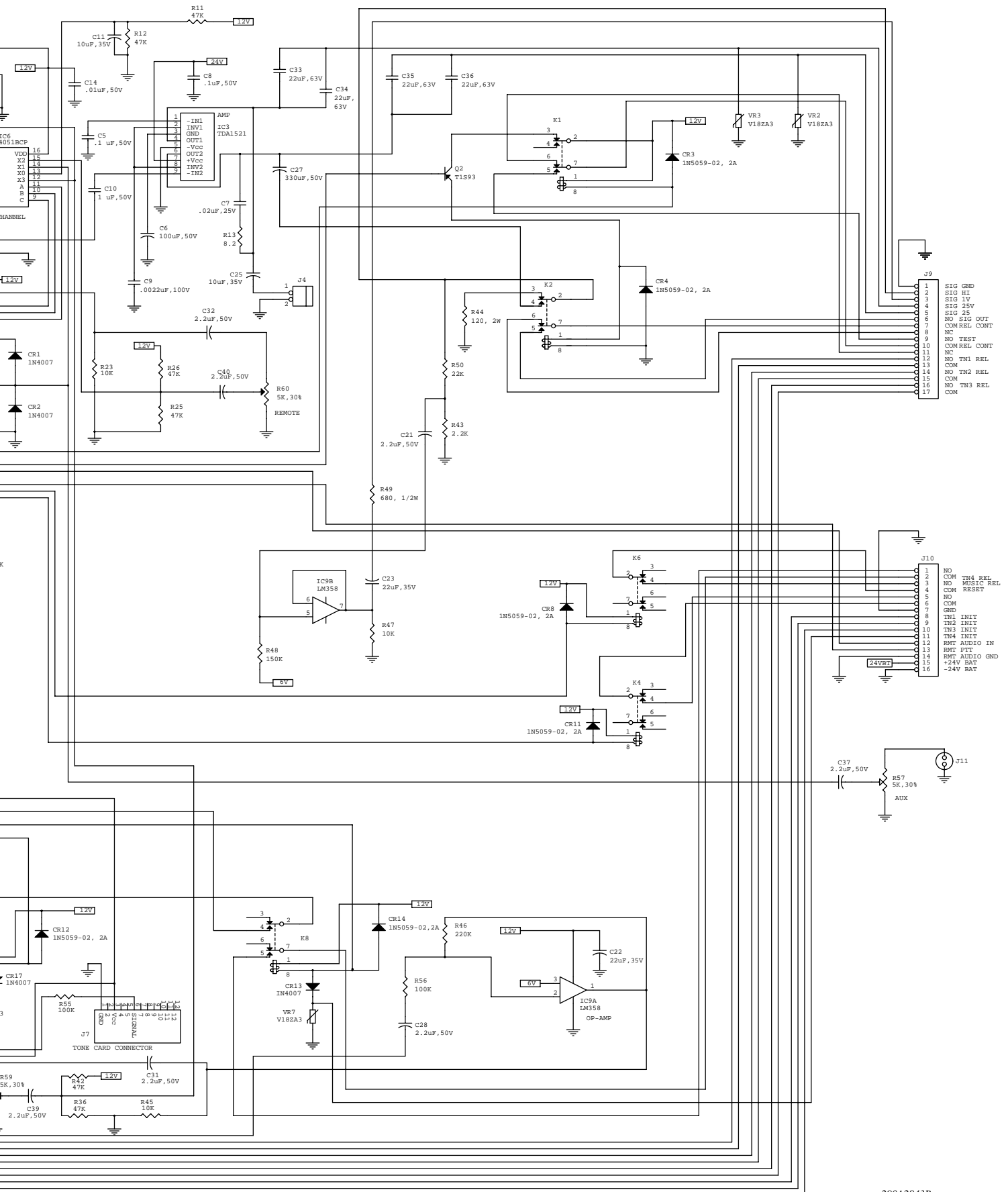
C. Public Address (PA) Switching.

1. Local PA.

As shown in schematic diagram figure 4-1, whenever local microphone, push-to-talk (PTT) switch is pressed, pin 2 of opto-isolator IC1A is grounded which in turn applies a low at pin 13 of IC4 inverter 'F'. This causes IC4-12 to go high. The IC4-12 pin is connected to Priority Encoder IC5 pin 4. The Priority Encoder, IC5 accepts highs at seven of the eight available inputs and produces a three-bit parallel binary coded output at IC5-6 (most significant bit-msb), IC5-7, and IC5-9 (Least significant bit-Lsb). The value of binary coded output is between 0 and 7 (000 and 111 binary). The higher the priority, the higher the value. When more than one input to IC5 is present, the output assumes the binary code of the highest priority input. IC5-4 is highest priority input, so when this pin goes high, the highest priority value 7 (binary 111) produced by IC5 at pins 6, 7 and 9 is applied to pins 9, 10 and 11 of Analog Multiplexer IC6. When the local microphone push-to-talk button is pressed, the audio signal from the microphone is coupled to the input of the pre-amplifier IC9-A pin 2 via C3 and R26. The output of the pre-amplifier IC9A is connected to the Analog Multiplexer pin 4 via C43, level control R50 and C47. When a binary code 111 is applied to the multiplexer pins 9, 10 and 11, the analog switch between pins IC6-4 and IC6-3 closes and applies higher level local microphone audio from the IC9A pre-amplifier to the audio input of the power amplifier IC3. The Priority Encoder IC5-15 normally stays high. However, when any one of its seven inputs goes high, IC5-15 goes low. This low is applied to the base of Q3. This causes Q3 to turn on and energize the Signal Output relay K2, to apply amplified local microphone audio signal to the signal line connected at TB1-2.

When the local microphone push-to-talk switch is pressed, the high generated by inverter IC4F is also applied to the base of transistor Q5 through resistor R10. This causes Q5 to turn off, thus removing the +12 VDC source to the tone circuits and giving priority to local PA over all tones.





290A2843B

Figure 4-1. Model 300VSC Mother Board Schematic Diagram.

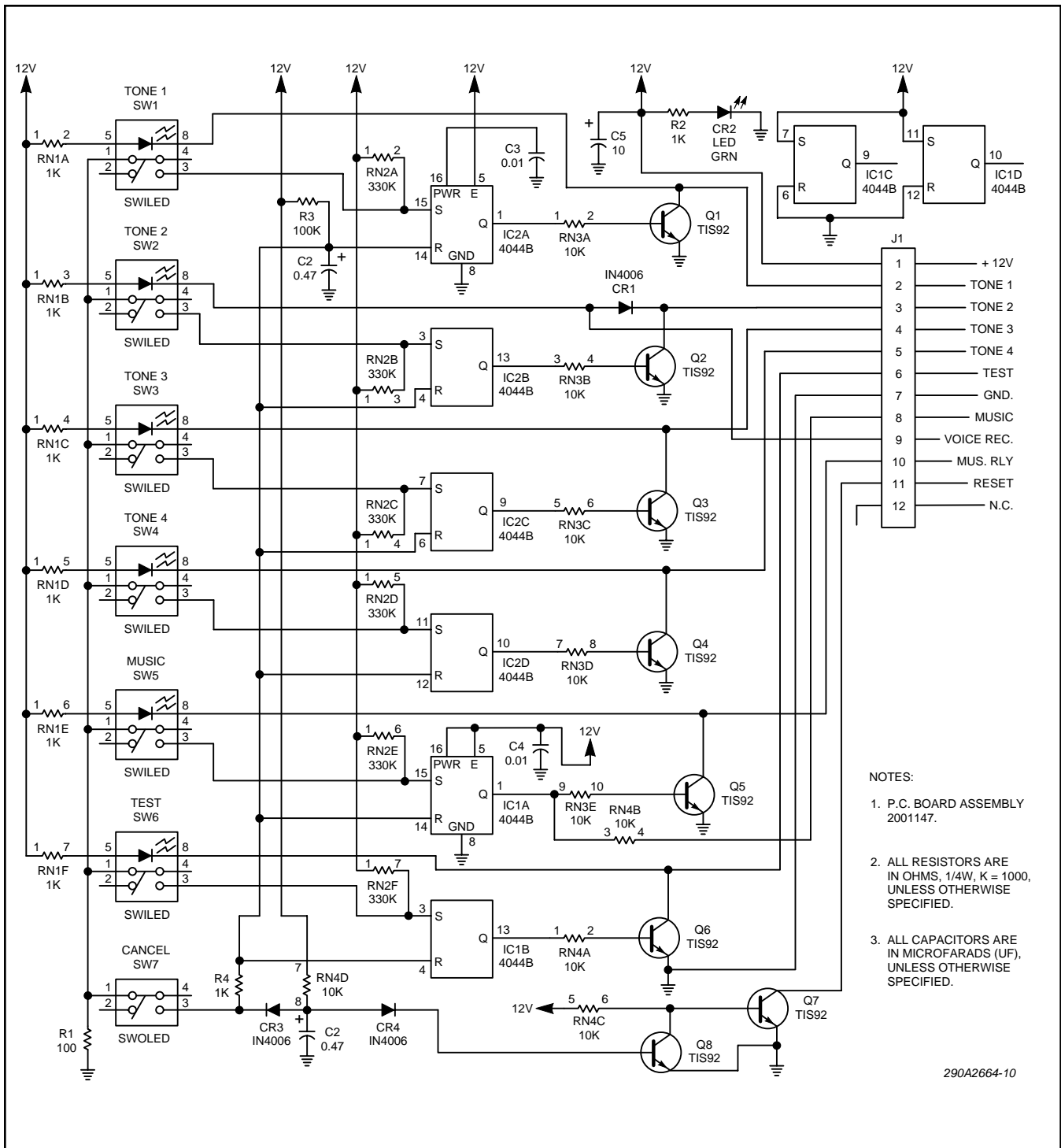


Figure 4-2. Switch Board Schematic.

2. Remote PA.

Remote PA operation is similar to that of local PA, except that the priority code produced by IC5 is 010 (value 2). Depressing the remote PTT switch applies a low to opto isolator IC1B pin 3. This causes a low to be applied to the input of the inverter IC4E at pin 11. As a result, a high is applied to the input pin 12 of the Priority Encoder IC5. The Priority Encoder IC5 produces an output binary code 010 (of value 2) and applies it to the Analog Multiplexer IC6. The analog switch in IC6 between input pin IC6-15 and

IC6-3 closes. The remote PA audio input signal coupled to TB2-12 is applied to the remote PA pre amplifier IC9B pin 6 through C30 and R29. The pre-amplified remote PA audio signal is coupled to the input of the power amplifier IC3-9 through C45, level control R52, C49, the analog switch between pins IC6-15 and IC6-3 and capacitor C10. This signal is then amplified and applied to the signal lines at TB1-2 as described earlier. The remote PA has priority only over the background music. Activation of any one of the tones or local PA will override remote PA.

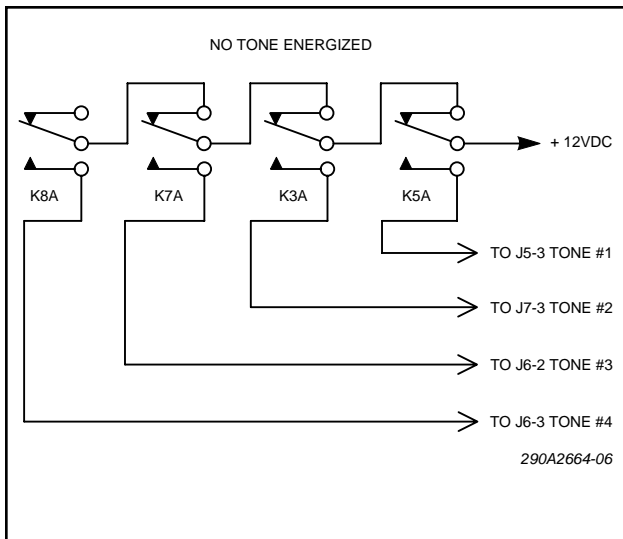


Figure 4-3. Tone Control Relays (No Tone Activated).

D. Background Music (AUX - IN).

The 300VSC also has provision for playing background music over SelecTone speaker/amplifiers, if desired. This is the lowest priority feature. Local PA, all four tones and remote PA will override background music. When the AUX push button is depressed, the associated red LED illuminates and a high is applied to pin 11 of the Priority Encoder IC5. As a result, a binary code 001 (value 1) is applied to Analog Multiplexer IC6 control inputs. This causes a music source input, connected at RCA jack J10 at the rear of the 300VSC, to be connected to the input pin of power amplifier IC3 through level control R49, C46, analog switch between IC6-14 and IC6-3 and C10. This music audio signal is then amplified and applied to the remote SelecTone speaker/amplifiers via signal lines as described earlier.

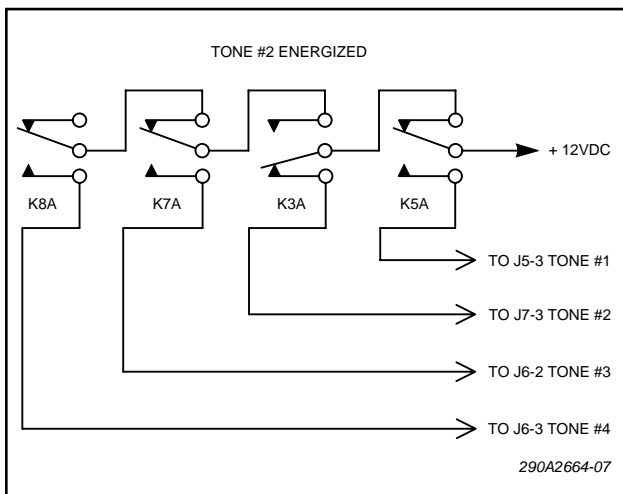


Figure 4-4. Tone Control Relays (Tone 2 Activated).

E. Test Circuit.

The TEST circuit allows the testing of the 300VSC functions such as local PA, all the tones, remote PA, and background music, without activating the remote SelecTone devices. This circuitry also cancels false alarms.

A tone is tested by first pressing the TEST push button switch at front panel of the 300VSC and then pressing the appropriate tone push button. When the tone push button is pressed, the tone module for the selected tone operates as described previously in this section. As shown in the schematic diagram 4-2, pressing of TEST push button sets the associated flip-flop IC1B and turns Q6 on by providing base drive through resistor RN4A. Transistor Q6 simultaneously energizes the red LED associated with TEST push button and relay K1 as shown on schematic diagram 4-1. When K1 is energized, the normally closed contact K1A opens and disables the audio output relay K2 by removing +12 VDC source from its relay coil. Consequently, the Audio Amplifier output is not connected to the SIG. HI terminal TB1-2. Therefore, the tone signal is not applied to remote SelecTone devices. However, the circuitry between the Audio Amplifier and Monitor Speaker is not disconnected, so the tone is still being sounded from the Monitor Speaker.

F. Cancel Circuit.

The CANCEL circuit allows the operator to reset any of the locally (manually) activated functions, such as TEST, tones or background music. As shown in the schematic diagram 4-2, when a function button is pressed at front control panel, a low is applied to the 'S' pin of the associated flip-flop. This sets the flip-flop. The output of that flip-flop goes high and provides base drive to the output transistor, which turns on the red LED and the relay associated with that function. When signaling or testing is completed, pushing the CANCEL button momentarily resets all functions to their stand-by condition. When the CANCEL push button is pressed momentarily a low is applied simultaneously to the reset pins of all of the flip-flops through resistor R1 and R4. This causes all the set flip-flops to reset and remove the base drive signals from the associated output transistors. Consequently, all of the energized relays will de-energize and all the illuminated red LEDs will extinguish.

G. Power Supply.

The power supply is the source of regulated +24 VDC necessary for the operation of audio power amplifier of 300VSC. The power supply also provides +12 VDC necessary for the operation of all the electronics circuitry in the 300VSC. This +12 VDC source supplies DC operating voltage to all the tone modules. The power supply is capable of operating from either 120 VAC or 24 VDC.

The power supply uses a step down transformer, T1, with a full wave bridge rectifier, CR25. The rectified output from the CR25 is filtered by C38, R21 and C33. Zener diode CR12 develops a stable reference voltage for the base of the regulator Q2. The regulated +24 VDC is present on the emitter of Q1. This regulator supplies 24 VDC to the input pin of 12 VDC regulator IC2. The +12 VDC output from the IC2 regulator is further filtered by C23 and distributed to all of the electronics circuitry operating at 12 VDC. MOV, VR7 is connected in parallel with the secondary of T1 to reduce transients and noise that could cause damage to the electronic circuitry.

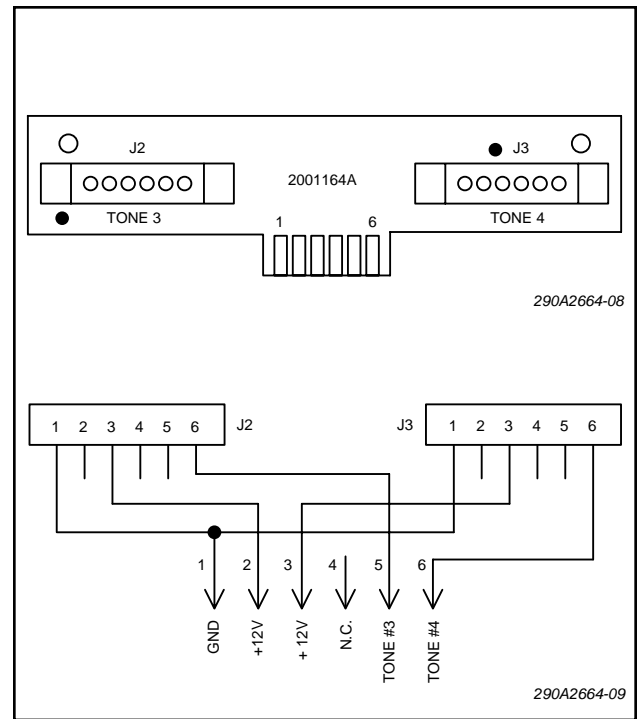


Figure 4-5. Tone Connector and Schematic.

SECTION V

SERVICE

WARNING

Always insure that the power to the 300VSC is turned off before removing the metal cover.

CAUTION

This service information is for qualified personnel only. To avoid electric shock, do not perform any servicing other than changing fuses, unless qualified to do so. Refer all servicing to qualified service personnel.

5-1. GENERAL.

WARNING

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death to you or others.

SAFETY MESSAGE TO MAINTENANCE PERSONNEL

Listed below are some important safety instructions and precautions you should follow:

- Read and understand all instructions before operating this system.
- Any maintenance to the sound system must be performed by a trained electrician in accordance with NEC guidelines and local codes.
- Any maintenance to the sound system must be done with power turned off.

Most of the components used in the Model 300VSC are standard electronic parts. Consequently, they can be obtained from almost any radio or electronic outlet.

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

Any units returned to Federal Signal for service, inspection, or repair, must be accompanied by a Return Material Authorization. The R.M.A. can be obtained from the local Distributor or Manufacturer's Representative.

At this time a brief explanation of the service requested or the nature of the malfunction should be provided.

Address all communications and shipments to:

FEDERAL SIGNAL CORPORATION

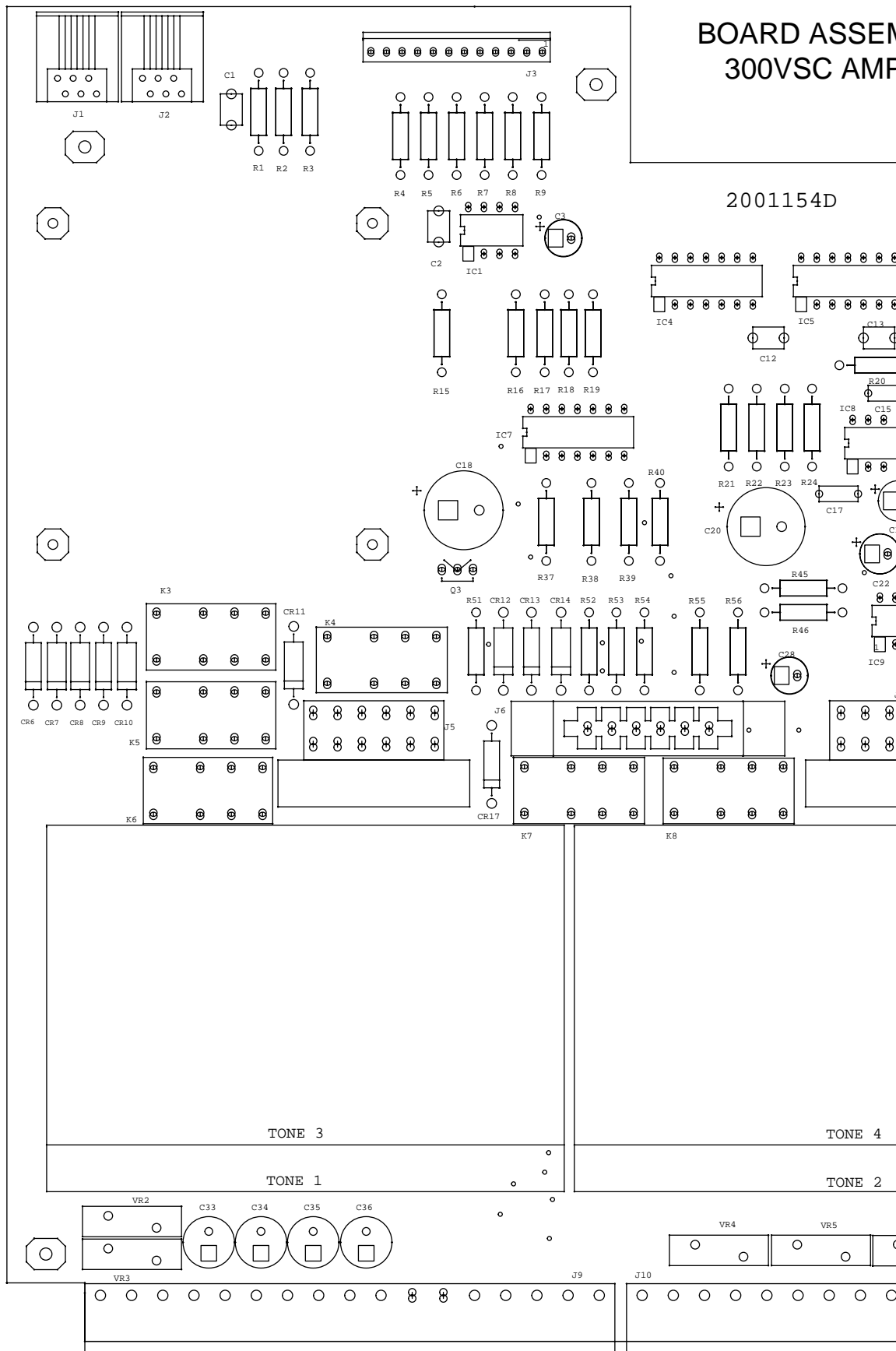
Electrical Products Division
Service Department
2645 Federal Signal Drive
University Park, IL 60466-3195

5-2. REPLACEMENT PARTS.

<u>Description</u>	<u>Part Number</u>
Mother board	K2001154C
Switch board (300VSC-1)	K2001147A
Switch board (300VSC-1044)	K2001318
Tone card con. board	K2001164A
Fuse F1 250V, 1 amp, GMC-1A	K148A155A-01
Fuse F2 250v, 1/2 amp, GMC-1/2A	K148A155A
Connector Plug, TB-1 17 position	K140A332A-17
Connector Plug, TB-2 16 position	K140A332A-16
Rack mount accesory kit	K8500

BOARD ASSEMBLY 300VSC AMP

2001154D



MBLY, PC
PLIFIER

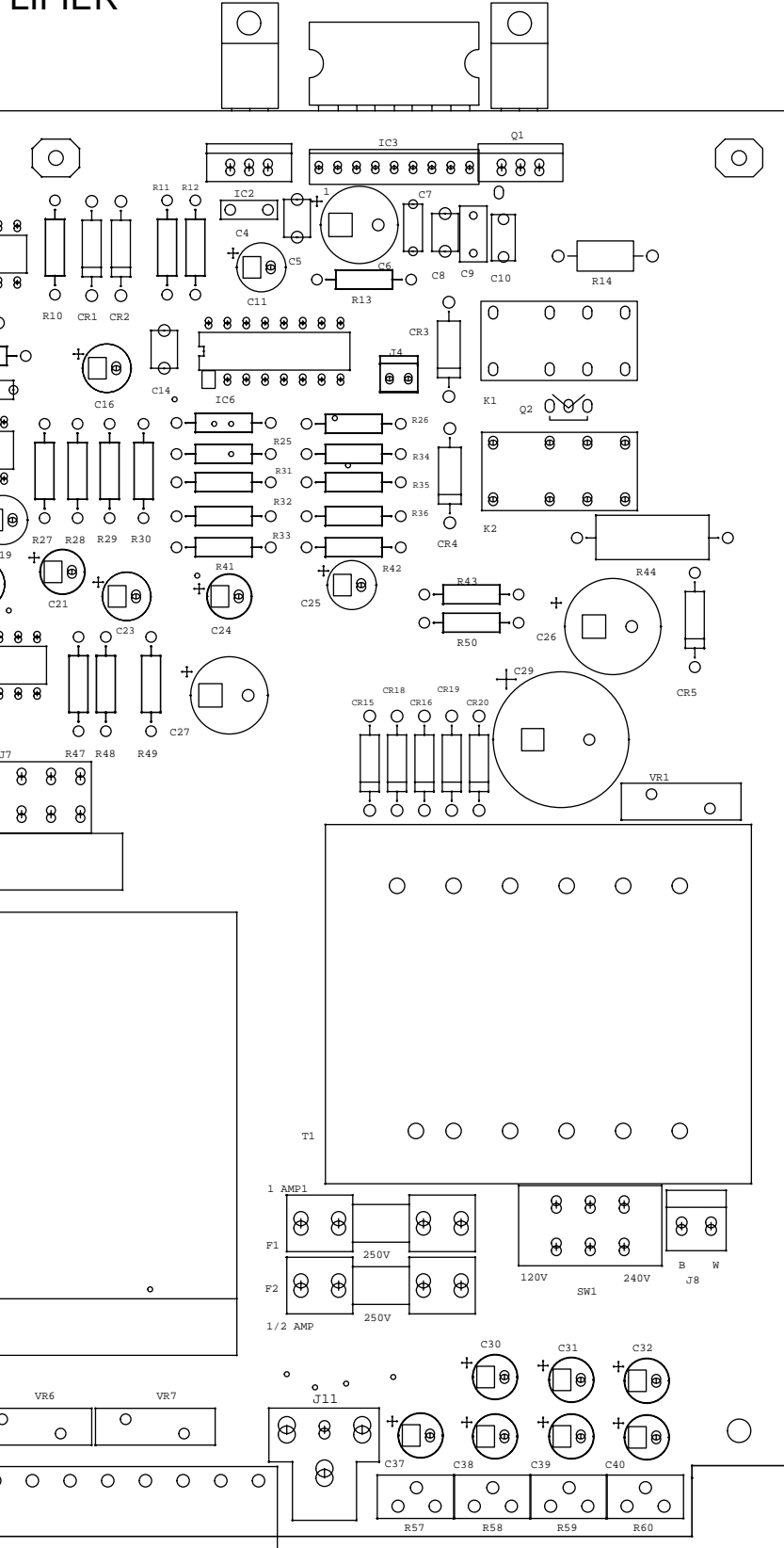


Figure 5-1. Model 300VSC Mother Board Parts Location.

PARTS MODEL 300VSC-1

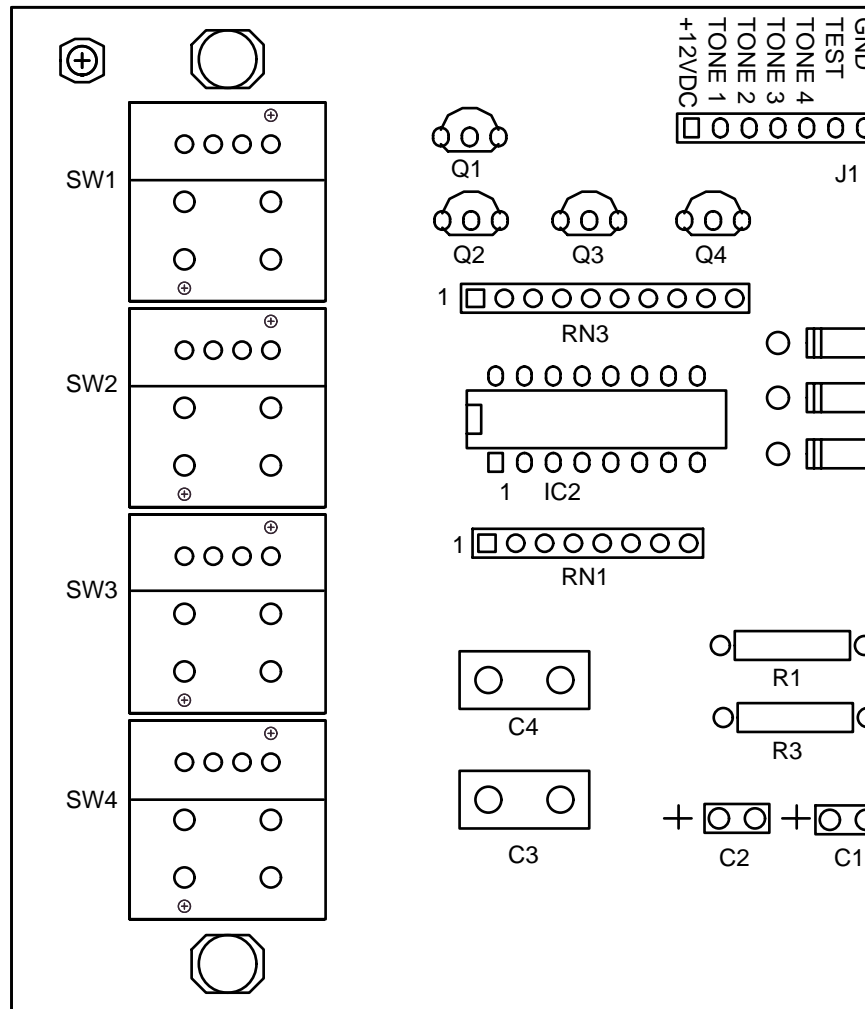
<u>Identification. Number</u>	<u>Part Number.</u>	<u>Description</u>
C1, C2, C5, C9, C10, C12, C13, C25, C34	107A1001-03	CAPACITOR, MONO .1, 50V
C3, C28, C30, C35, C36, C37, C43, C44, C45, C46, C47, C48, C49	108A142	CAPACITOR, LYTIC 2.2, 25V
C4	107A907	CAPACITOR, MONO .33, 50V
C6, C15, C27, C31	108A143	CAPACITOR, LYTIC 10, 35V
C7, C21, C23	108A146	CAPACITOR, LYTIC 100, 16V
C8	107A261	CAPACITOR, DISC .02, 25V
C11	107A402	CAPACITOR, MYLAR.0022, 100V
C14, C16, C19, C20, C22	107A1026	CAPACITOR, MONO .01, 50V
C17, C24	107A232	CAPACITOR, DISC 12pf, 100V
C18, C26, C29	108241	CAPACITOR, LYTIC 22, 35V
C32, C33	108A153	CAPACITOR, LYTIC 330, 50V
C38	108A251	CAPACITOR, LYTIC 3300, 50V
C39, C40, C41, C42	108A245	CAPACITOR, LYTIC 22, 50V
CR1 , CR2, CR3, CR4, CR5, CR7, CR9, CR10, CR11 , CR13, CR16, CR20, CR22, CR23, CR25	115A313	DIODE, 1N4006
CR18, CR19, CR21	115B301	DIODE, 1N5059
CR12	115A242	DIODE, 1N5253B
CR28	115A601	BRIDGE, RECT, BFW-50
FC1, FC2, FC3, FC4	144A125	CLIP, FUSE
F1	148A155-01	FUSE, 1 AMP
F2	148A155	FUSE, 1/2 AMP
IC1	128A208	IC, ILD-1, OPTO ISO, DUAL
IC2	128A066	IC, MC7812, 12V REG.
IC3	128258	IC, TDA1521, AMP
IC4, IC7	128A059	IC, MC14584B, INV
IC5	128A060	IC, 4532BE, 8 BT
IC6	128A062	IC, 4051, 8 CHANNEL
IC8	128A043-02	IC, LM555C, TIMER
IC9	128A267	IC, 2139, DUAL OP AMP
IC10	128A159	IC, 7805UC, 5V REG.
IC11	128A045	IC, LM358, DUAL OP AMP

LIST

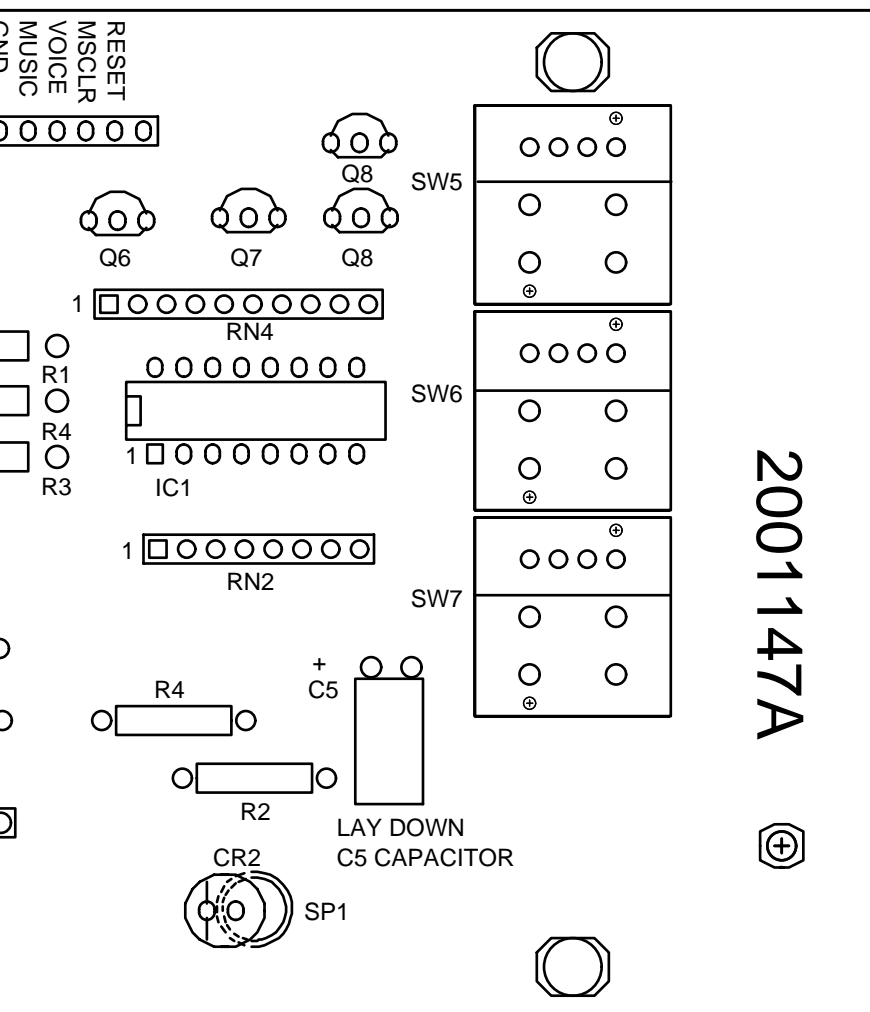
MOTHER BOARD

<u>Identification. Number</u>	<u>Part Number.</u>	<u>Description</u>
J1, J2	142121	JACK, PHONE
J3	140A235-04	HEADER, 12 POSITION
J4	140A235	HEADER, 2 POSITION
J5, J7	139A290	CONNECTOR, EDGE
J6	139A151	CONNECTOR, EDGE, 6 POSITION
J8	139A289-17	HEADER, 17 POSITION
J9	139A289-16	HEADER, 16 POSITION
J10	142A123	JACK, RCA
J11	140302	HEADER, 2 POSITION
K1, K2, K3, K4, K5, K6, K7, K8	131A130-01	RELAY, 12 VOLT
PCB1	130537D	PCB, 300VSC
Q1, Q4	125A447	TRANSISTOR, MPS-A05
Q2	125B415	TRANSISTOR, 2N5296
Q3	125B133	TRANSISTOR, TIS93
Q5	125A113	TRANSISTOR, 2N3702
RN1, RN2	100A825	RESISTOR, NW 5 X 47K OHM, 2%
RN3	100A817	RESISTOR, NW 5 X 10K OHM, 2%
R1, R31	100A298	RESISTOR, CF 4.7K OHM 5%, 1/4W
R2, R3, R24, R26, R29, R39	100A225	RESISTOR, CF 2.2K OHM 5%, 1/4W
R4, R5, R6, R7, R47, R49	100A262	RESISTOR, CF 100K OHM 5%, 1/4W
R8, R9, R11	100A258	RESISTOR, CF 18K OHM 5%, 1/4W
R10, R16, R28, R30, R37, R42, R44, R45, R46, R50	100A257	RESISTOR, CF 10K OHM 5%, 1/4W
R12, R32, R36, R51	100A226	RESISTOR, CF 150K OHM 5%, 1/4W
R13, R22, R35	100A230	RESISTOR, CF 82K OHM 5%, 1/4W
R14, R43	100A215	RESISTOR, CF 1 MEG OHM 5%, 1/4W
R15, R27, R44	100A249	RESISTOR, CF 470K OHM 5%, 1/4W
R17, R18, R20, R23, R25, R34, R42	100A228	RESISTOR, CF 47K OHM 5%, 1/4W
R19	100A234	RESISTOR, CF 8.2 OHM 5%, 1/4W
R21	100A308	RESISTOR, CF 220 OHM 10%, 1/2W
R33	100A213	RESISTOR, CF 220K OHM 5%, 1/4W
R38	105A278	POTENTIOMETER, 50K OHM
R40	100A259	RESISTOR, CF 22K OHM 5%, 1/4W
R41	100A605	RESISTOR, CF 120 OHM 10%, 2W
R48	100A313	RESISTOR, CF 680 OHM 10%, 1/2W
R49, R50, R51, R52	105A248	POTENTIOMETER, 5K OHM
S1	122279	SWITCH, DPDT
T1	120B255	TRANSFORMER, 24VAC
VR1, VR2, VR3, VR4, VR5, VR6	114A103	VARISTOR, 18V
VR7	114A102	VARISTOR, 39V

Identification Number	Part Number	Description
C1	107A645	Capacitor, Tant .47 35V
C2	107A645	Capacitor, Tant .47 35V
C3	107A1026	Capacitor, Mono .01 50V
C4	107A1026	Capacitor, Mono .01 50V
C5	108A143	Capacitor, Lytic 10 35V
CR1	115A313	Diode, 1N4006
CR2	147A112-02	LED, Green
CR3	115A313	DIODE, 1N4006
CR4	115A313	DIODE, 1N4006
IC1	128A067	IC, 4044B, R-S Latch
IC2	128A067	IC, 4044B, R-S Latch
J1	140308-12	HEADER, 12 Position
PCB1	130531A	PCB, 300VSC Switch
Q1	125B132	Transistor, TIS92
Q2	125B132	Transistor, TIS92
Q3	125B132	Transistor, TIS92
Q4	125B132	Transistor, TIS92
Q5	125B132	Transistor, TIS92
Q6	125B132	Transistor, TIS92



Identification Number	Part Number	Description
Q7	125B132	Transistor, TIS92
Q8	125B132	Transistor, TIS92
RN1	100A809	Resistor Network, 7X1K, 2%
RN2	100A826	Resistor Network, 7X330K, 2%
RN3	100A802	Resistor Network, 5X10K, 2%
RN4	100A802	Resistor Network, 5X10K, 2%
R1	100A240	Resistor, CF 100 OHM 5% 1/4W
R2	100A233	Resistor, CF 1K OHM 5% 1/4W
R3	100A262	Resistor, CF 100K OHM 5% 1/4W
R4	100A233	Resistor, CF 1K OHM 5% 1/4W
SP1	230A151	Spacer, Plastic, #6
SW1	122A297	Switch, SPDT, Red LED
SW2	122A297	Switch, SPDT, Red LED
SW3	122A297	Switch, SPDT, Red LED
SW4	122A297	Switch, SPDT, Red LED
SW5	122A297	Switch, SPDT, Rde LED
SW6	122A297	Switch, SPDT, Rde LED
SW7	122A297-01	Switch, SPDT



290A2845

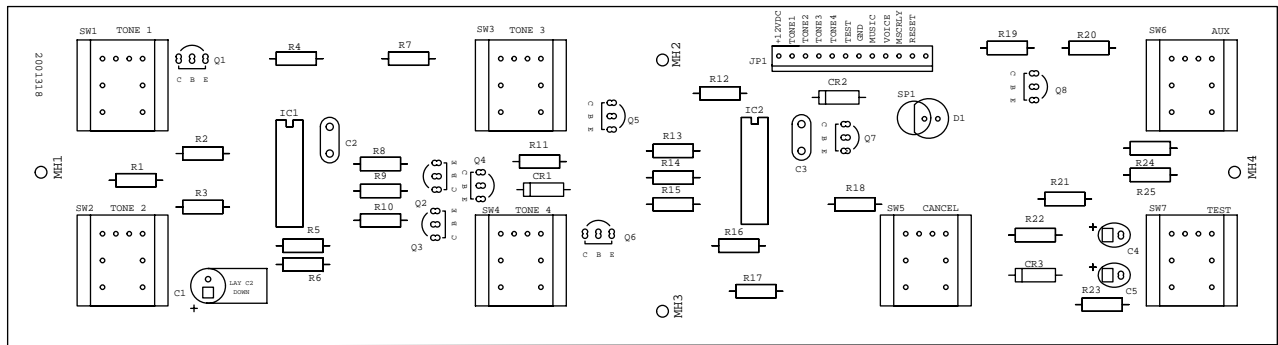
Figure 5-2. Model 300VSC-1 Switch Board Parts Location.

Identification Number

Part Number

Description

PCB	130705A	PC BOARD
R1, R4, R6, R7, R14, R22, R24, R25	100A233	RES, CF 1K
R2, R3, R5, R13, R15, R16	100A212	RES, CF 330K
R8, R9, R10, R11, R12, R18, R19, R20, R23	100A257	RES, CF 10K
R17	100A262	RES, CF, 100K
R21	100A240	RES, CF 100
C2, C3	1071040	CAP, MONO, 0.1uF
C1	108A143	CAP, LYTIC, 10uF
C4, C5	107A645	CAP, TANT, 0,47uF
D1	147A112-02	LED, GREEN
CR1, CR2, CR3	115A119A	DIODE, IN4007
IC1, IC2	128A067A	I.C, 4044B, QA
Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8	125B132	TRANS, TIS92, NPN
SW1, SW2, SW3, SW4, SW6, SW7	122A297	SWITCH WITH LED
SW5	122A297-01	SWITCH, SPDT
JP1	140308A-12	HEADER, 12 pos.
SP1	230A151A	SPACER, PLASTIC



290A3617