SCA-35 System Capacitor Module Assembly & Instruction Manual

I. Introduction

Thank you for your purchase of our SCA35-CAP System Capacitor Module. It has been designed to replace both the power supply filter capacitors and the output tube cathode bypass capacitors (both large electrolytic "cans") that are prone to failure in stock amplifiers. Included on board is a complete power supply solution including the high voltage rectification, power supply capacitors, filter resistors, output tube cathode bypass capacitors and biasing resistor(s). Note that this design contains independent bias supplies for each channel (unlike the stock design that placed both channels into the same bias circuit) providing better separation and therefore will improve amplifier imaging. Additionally, all of the capacitors, including the most important cathode bypass capacitors are bypassed using high poly-pro capacitors providing a significant improvement in high frequency performance. To meet these performance levels, it is important that you follow our instructions carefully.

This document describes the specific instructions and steps associated with the SCA35-CAP System Capacitor Module project. In addition, I recommend that you visit our web page and download the following tech notes:

a. General Overview Assembly Notes (CAE Tech Note # 1)
b. Soldering Tutorial (CAE Tech Note # 2)
c. Recommended Tools & Test Instruments (CAE Tech Note # 3)

These documents have been prepared from our own assembly experience and will greatly cut your chances for error if not to make the project much more fun. Of particular importance are the use of quality tools and soldering procedure

In the following sections we will guide you through several project phases. Each section has been carefully prepared with our own notes and comments from our customers to be sure that any anticipated question has been considered. The sequence is identical to that which we follow when we complete the fabrication for our customers. Please follow the same sequence to maximize efficiency and eliminate errors. It is also very helpful to read each section before beginning to gain a visual idea of the construction.

Your project will be built in stages. First you will assemble and prepare the pc board module(s). This is a very important project phase as the board modules contain nearly all of the circuitry for your project. There are several important factors to remember:

a. **Proper soldering is crucial**. Please refer to our soldering tutorial and practice on surplus boards until you master the technique. Be especially careful to avoid solder bridges or "cold" solder joints. Our experience shows that nearly **95% of all problems are associated with soldering related errors**.
b. Diodes, transistors, IC's, (all semiconductors) and many capacitors (always electrolytic types) are polar - this means that **there is a right and wrong way to insert polarized components in the board**. If placed backwards, the component and probably others nearby will be damaged upon initial power application. Double check each step associated with these parts and once again later after you have had a chance to take a break.
c. Some components are color coded with their value (mostly resistors, but there may be others). If you are not proficient at reading these codes, use your digital voltmeter to double check the value of each resistor before insertion. It is very easy to confuse a 100 ohm metal film resistor with a 1000 ohm resistor or worse with a 100K ohm resistor.

Once completed, the boards will be placed into the chassis and wired to each other and the associated panel mounted components (switches, connectors, transformers, output tubes, etc.)

Next, you will prepare the amplifier chassis. This phase may involve the removal of old parts and pc boards and will certainly include preparation of the chassis for the new boards and or parts. You can take advantage of the stripped down chassis to access tight nooks and crannies that would otherwise be difficult

to reach and clean dirt and grime that my have accumulated over time. New hardware, connectors and pc boards are then installed.

Next, the newly installed connectors, sockets and pcb boards will be connected followed by a visual inspection before power is applied.

Finally, you will initially apply power and take the initial measurements and complete any adjustments.

About Internal Wiring - Important

Unless otherwise specified, **you should use 20 to 22 gauge stranded wire with teflon insulation**. The Teflon will permit you to apply sufficient thermal energy to the solder connection for proper solder joint formation without worrying about melting the insulation. Thicker wire or solid wire will cause problems - if not now (too much strain on the boards or parts) or later (reliability issues). I really can't overemphasize the importance of this to the long term reliability of your porject.

In many cases you will be directed to "prepare" a length of wire. The preparation process requires you to take 3 steps: 1) Cut the wire to the length indicated, 2) Strip ¼" of insulation from each end and, 3)"Tin" each end of the wire. Please don't try to save time by skipping the tinning step.

In some cases we have specified connections be completed in pairs (2 wires). In these cases you will use a pair of wires together to make an electrically related connection (such as signal + and signal -). It is much easier to prepare a master length of pairs at the beginning of your project and then when required, cut the designated length from this master. For the MQ-100 project, we recommend that you prepare two lengths (one for each amplifier) of 15 foot black / white twisted pair. To prepare a master pair, use the following method:

1. Take the ends of the wires in the group and clamp them in a pair of "vice grip" or other device that can secure the ends of the wires firmly. Now, secure the vice grip.
2. Take the other ends of the wires in the group and stretch them to about 10% greater than the desired length. Cut them at that point and then place them in the jaws of a ¼" variable speed drill. Make sure all wires are of equal length - and while keeping the group taut, begin to slowly twist the assembly. Continue slowly until the turns ratio is about 2 to 3 turns per inch.
3. While keeping the twisted group taut, run your hand along the length of the assembly to stress relieve the elements.
4. Let the assembly sit for about 5 minutes and then release.

During the assembly process when you are directed to use twisted pairs, simply cut the length designated and strip ¼" insulation (unless otherwise directed) and "tin" each conductor.

II. Printed Board Assembly

Unless otherwise noted, components are to be inserted on the non-foil side and soldered on the foil side. The sequence of assembly has been chosen so that the components with the lowest profile (such as jumpers, low power resistors, IC's etc.) are installed first with higher profile components added until the highest profile components are installed last.

You should begin by getting the parts list for this board, opening your kit and grouping the components into categories as follows:

1. ** Diodes (Signal, Power, Zener)
2. Power Resistors (1, 2, 3 ad 5 Watt Resistors)
3. Mylar & Polypropylene Capacitors
4. ** Electrolytic Capacitors (Always Polarized)
5. Hardware (Spacers, Angle Brackets, etc.)

Note that this is a generic list – your project may not have all of the groups listed. **The items tagged (**) are polarized – during installation on to the pc board, they must be orientated and positioned as shown in the diagram.**

Now that you have grouped the items, note that they are grouped in similar physical sizes with group 1 being the smallest and progressing upwards to the larger components. Your assembly of the pc board should begin with the items in group 1 and proceed sequentially upwards to the larger components. Note that unless otherwise notes, the components will be mounted on the non-foil side of the board and solder terminated on the foil side.

Refer to Figure 1 – PC Assembly Diagram.

□ ** Polarized Component Alert – Install the two power diodes first. Note that they are about the size of a small ¼ watt resistor and they have a band indicating their cathode lead. Be sure you install as shown in the assembly diagram.

□ Next install all of the power resistors (1 watt or greater). Again, use your digital multimeter to identify the resistance of the part. These should be mounted so that there is approximately ¼" space between the component body and the pc board surface. This aids the heat dissipation. You may find it useful to install only one or two at a time since the device may shift position while waiting soldering.

□ Install the film (polypropylene) capacitors next. You may need to "work" the leads of the part so that they align with the holes in the pc board. I recommend that you make sure there is some flexibility in the lead from the part board to the pc board – this will lessen the stress on the solder joint over time. Note that these parts are not strictly polarized – that is, although there is frequently a band on the cap identifying one lead, you may insert them in either direction. Some audiophiles have suggested that there is an audible contribution to keeping the positive lead nearest the tube voltage – this is your choice.

□ ** Polarized Component Alert – Install all 8 electrolytic capacitors next. The devices specified are in a radial package. One lead (usually the negative lead, but not always) should be clearly marked – sometimes with a black stripe or designating arrow (usually pointing to the negative lead). Be sure you have identified the leads – this is critically important with electrolytic capacitors. Carefully examine the part to identify both the negative and positive lead. Insert the part as described on the assembly drawing. Solder the parts into place and as a final QC, perform a visual inspection to be sure that the parts are installed correctly.

□ All of your electrical components should now be installed. You can now install the three 4-40 threaded spacers on the bottom side of the board.

□ You will now install all of the wiring that will connect to the board. All of these connections will be made to the bottom (foil side) of the board so that the wires extend from the foil side of the board. Each connection will be made to a terminal that has its label adjacent to the terminal (these are on the bottom side of the board). You should prepare each wire by removing about ¼" of insulation from one end of the wire. After the insulation has been removed always "tin" the wire with solder to aid the subsequent connection. Some of the wires will be connected and then twisted along its entire length with one or more wires as stated.

1. Prepare a 12" length of BLUE wire and connect to terminal "K-L"
2. Prepare a another 12" length of BLUE wire and connect to the remaining terminal "K-L"
3. Twist together both of these blue wires along their entire length

4. Prepare a 12" length of RED wire and connect to one of the "PX-R" terminals
5. Prepare a another 12" length of RED wire and connect to the other "PX-R" terminal
6. Prepare a 12" length of WHITE wire and connect to terminal "OX-R"
7. Prepare a 12" length of GREEN wire and connect to terminal "SIG-GND"
8. Prepare a 12" length of BLACK wire and connect to terminal "GND"
9. Twist together ALL 5 wires along their entire length

10. Prepare a 7.5" length of RED wire and connect to terminal "B10-5"
11. Prepare a 7.5" length of WHITE wire and connect to terminal "B11-2"

Your pc board is now completely assembled and ready for installation into your SCA-35.

III. SCA-35 Chassis Preparation

Before you install it into your SCA-35, it is necessary to remove the original electrolytic capacitors. The two capacitors to be removed are located near the rear left (top-view looking from the front) corner of your SCA-35. Each capacitor is mounted with two screws (or rivets in factory assembled units). Before you remove the caps you will need to cut or de-solder the wires connected as follows:

Refer to Figure 3 (Stock Chassis Quad Capacitor & SCA35-CAP Wiring Diagram):

At the outer capacitor (four outer lugs and two inner terminals):

- ☐ At terminal #1 cut the leads of the 22K resistor and the red wire
- ☐ At terminal #2 cut the other lead of the 22K resistor and the other red wire.
- ☐ At outer lug # D de-solder the black wires.
- ☐ At outer lugs #A, #B and #C, there should not be any connections however if this amp was assembled with connections at these terminals, simply cut any remaining connections.

For the inner capacitor (four outer lugs and four inner terminals):

- ☐ At terminal #1, cut each 2.2K resistor lead.
- ☐ At terminal #2, cut the red wire, black wire and the lead of the 95 ohm power resistor. Label the BLACK wire ("HUM POT") so you can identify it later.
- ☐ At terminal 3, cut the red wire and one lead from the 50 ohm power resistor.
- ☐ At terminal #4, cut the two red wire leads (make the cut near the terminal) and the two leads from the power resistors.
- ☐ At outer lug #A, de-solder the black wire and the red-yellow stripe lead (goes to power transformer).
- ☐ At outer lug #B, cut the black wire and 95 ohm power resistor lead
- ☐ At outer lug #C, de-solder both black leads.
- ☐ At outer lug #D, there should not be any connections however if this amp was assembled with connections at these terminals, simply cut any remaining connections.

You may now remove the two original electrolytic capacitors by removing the two 4-40 screws & nuts for each capacitor.

You will now prepare the 5 pin terminal strip TS-1 located directly below the power transformer

Refer to Figure 4 (Stock Chassis TS-1 & PC-10 Board & SCA35-CAP Wiring Diagram):

- ☐ De-solder the two silicon diodes connected to terminals #4, #5, and # 2. Discard these diodes.

- ☐ De-solder and discard the red lead connected to terminal # 2.

- ☐ De-solder the black wire connected to terminal #3. Note that this will be re-connected later however it is necessary to first remove any oxidation that may be present on all of these terminals to assure that all of your new connections will be electrically reliable.

Using your soldering iron, make a solid thermal connection from the tip of your soldering iron (this is a critical factor in soldering BTW) to terminal #2. After the solder fully liquefies, use your solder sucker to remove all old solder and component lead remnants. You may find it useful to add a little new solder to help aid the thermal transfer process. You should also be sure that you have cleaned and prepped both the "lead" (top side) of each terminal the hole as well as the "body hole" of each terminal that mechanically attaches each terminal to the body of the strip (located on the body of the terminal strip). To aid stubborn and highly oxidized terminals, you can apply heat while feeding new solder as the flux will serve to clean the layer of oxidation. After you have removed the original leads, if you are not certain that you have a clean surface, you may want to use an abrasive tipped tool to mechanically remove the oxidation in preparation. A well prepped surface will accept new solder such that it will flow easily (not ball up on the surface). If you find that your terminal strip is oxidized beyond repair, replace the 5 pin terminal strip (CAE# TS-5).

- ☐ Repeat again for the terminals #1, #3, #4 & #5.

☐ Refer to Figure 4a. Once your terminal strip has been prepped, connect a solid wire jumper (you can use an old resistor lead from your pc board assembly) between terminals #3 & #2. Make the connection on the top side of the terminal strip.

☐ Reattach the black wire originally connected to terminal #3 back to terminal #3.

☐ Locate the POWER transformer RED w/YELLOW stripe lead – it originates at the same hole as the two red wires now connected to pins #4 & #5 of the terminal strip. Cut to a suitable length (leave some spare that is) and connect to #2 in the "body hole" location.

☐ Locate the two RED wires originating from the OUTPUT Transformers (originally connected to terminal #4 of the inner electrolytic capacitor) – they should be near the region originally occupied by the inner quad cap. Be sure you don't confuse with the RED leads from the POWER Transformer (these are already connected to terminals #4 & #5). Dress and route neatly and connect both to terminal #1 of the terminal strip. Make the connection in the "body hole" location. Be sure you have a solid electrical connection.

Referring to Figure 4, locate the two Dynaco power amp pc boards PC-10. Note that they both are labeled "PC-10" – there is one near the front of the amp and another adjacent closer to the center of the amp. We will be making connections to both - I will refer to either the "front" board or the "center" board so be sure you read carefully which one is being addressed.

OK – Locate V5 & V6 on the Center PC-10 board and V7 & V8 on the Front PC-10 board. You are going to de-solder some wires from the tube socket pins next. During this step be careful to be sure that you do not melt the insulation of adjacent wires since space here is pretty cramped.

☐ De-solder the red wire connected to pin 3 of V6 (on the center PC-10 board) and prepare this terminal for a future solder connection. Note – there may be two red wires on this pin – the red wire you will be removing has its other end connected to Pin3 of V8.

☐ De-solder other side of the red wire just de-soldered in the previous step connected to pin 3 of V8 (on the front PC-10 board) and prepare this terminal for a future solder connection.

Your chassis is now prepared for the installation and final wiring of your SCA-35CAP system capacitor module.

IV. SCA-35CAP System Capacitor Module Installation & Final Wiring

Locate your SCA-35CAP System Capacitor Module. Orient the module so that the two smaller electrolytic caps are nearest the power transformer – foil side down of course. As you install route all twisted wires (all but the single 7.5" Red and single 7.5" White wires) into the center most original cap hole. The single Red and White wires should be fed into the Outer original cap hole. Use ¼" 4-40 screws to secure the board in place – three of the original four holes that secured the original electrolytic capacitors will align with the SCA-35CAP mounting spacers. At the mounting hole nearest the front – center of the amplifier, place 2 grounding lugs and secure with the 4-40 screw.

Locate the 5 wire twisted group (Red, Red, White, Green, Black) from the SCA35-CAP module and route along the rear edge of the inner chassis leading towards Terminal Strip TS-1. I recommend running the group along the inner rear edge of the chassis under all existing wiring such that the group emerges near the rear side of TS-1. You will now connect these five wires as described below to TS-1. Note that it will be necessary to trim each wire to length to be sure you have a clean professional installation. Refer to Figure 4a and make the following connections:

☐ Connect one Red wire to terminal # 5 on the topside of this terminal

☐ Connect the remaining Red wire to terminal # 4 on the topside of this terminal.

☐ Connect both the Green and Black wires to the topside of terminal # 2.

☐ Connect the White wire to the topside of terminal # 1.

Refer to Figure 4 for the following steps:

Locate the two wire twisted pair (Blue & Blue) from the SCA35-CAP module and route along the rear edge of the center PC-10 pc board. Route towards V6 on PC-10 center board.

☐ Connect one of the Blue wires to Pin 3 of V5 on the center PC-10 board.

☐ Connect the remaining Blue wire to Pin 3 of V7 on the front PC-10 board.

☐ Locate the wire you previously labeled "HUM POT" and connect to Pin 3 of V5 on the front PC-10 board. Note that on some units this wire may already be connected to this point. However on other units where it may have been originally connected to terminal 4 of the inner electrolytic cap, it may be necessary for you to lengthen this wire.

Refer to Figure 3 for the following steps:

☐ Locate the 7.5" RED wire from the SCA35-CAP module and route along the rear edge of PC-11 and PC-10 towards terminal # 5 of the Center PC-10 pc board. Connect to terminal # 5 of the Center PC-10 pc board.

☐ Locate the 7.5" WHITE wire from the SCA35-CAP module and route along the rear edge of PC-11 towards terminal # 12 of PC-11. Connect to terminal # 12 of the PC-11 pc board.

☐ Locate the Black wires connected to terminals #6 on both PC-10 pc boards. Route cleanly and connect to one of the newly installed ground lugs (near the SCA-35CAP module).

☐ Locate the Black wire connected to terminal # 4 on PC-11. Route cleanly and connect to one of the newly installed ground lugs (near the SCA35-CAP module)

☐ Locate the Black wire originating from the input output connector strip (near the rear of the SCA-35CAP module) and connect to the remaining newly installed ground lug (near the SCA-35CAP module).

OK – your system capacitor module is installed and nearly ready to use.

V. System Checkout

The purpose of this section is to perform a cursory check on the assembly and installation of your SCA35-CAP Module.

You will be making voltage measurements using your Digital Voltmeter for these tests. All tests will be made relative to ground – this means that you will connect the black lead of your DVM to the chassis for all of these tests. Voltage measurements are indicated in DCV (DC Volts) or ACV (AC Volts). Please adjust your meter accordingly.

Once you have confirmed that the voltages are within spec, you will be installing the output tubes finally checking the bias voltage.

You will be using a common Digital Voltmeter (DVM) to take your measurements. All tests will have you connect the Black Lead of your DVM to ground (chassis). Measurements are indicated in DCV (DC Volts). Please adjust your meter accordingly.

SAFETY NOTICE

To personal harm and/or equipment harm, please take the following preparations & precautions:

- Before you begin these tests and measurements, be sure that you WAIT 20 MINUTES to be sure all amplifier capacitors have been discharged.
- Temporarily replace the power fuse – use a 0.5AMP SLO-BLO fuse
- Familiarize yourself with the test point locations on the SCA35-CAP module before you take your measurement.

- Voltage tests will be made with the power applied. Very high DC & AC voltages will be present all over your amplifier as well as the SCA35-CAP PC Board and output tube sockets – use the appropriate safety precautions.

Voltage Test Measurements

Warning: Lethal voltages will be present during the subsequent tests. Please exercise the greatest care to avoid any contact with any components.

☐ Be sure to set you DVM to the DC Volts (NOT AC Volts) position. All voltages given are not exact (the reading you get will be a function of the line voltage and the brand and model of DVM you are using) therefore it is not critical that the reading be exact but rather that there are no significant differences. Be concerned only if your measurement is significantly different than indicated.

☐ Replace the normal (3A) fuse in your amplifier with the 0.5A slo-blow fuse.

☐ Apply power to your amplifier. Make sure your hands are in your pockets - be observant for any signs of stress (do this in a quiet location) including any sounds of stress. Be prepared to remove power if you see any signs of a problem.

Using the Red (positive lead of your DVM) take the following voltage measurements:

☐ Test Point 1 = 383V (+/- 15VDC (See Figure 2)
☐ Test Point 2 = 376V (+/- 15VDC) (See Figure 2)
☐ Test Point 3 = 323V (+/- 15VDC) (See Figure 2)
☐ Test Point 4 = 217V (+/- 15VDC) (See Figure 2)
☐ Test Point 5: (Pin 3 of V7) = 12.2V (+/- 1.2 VDC)
☐ Test Point 6: (Pin 3 of V5) = 12.2V (+/- 1.2 VDC)

Congratulations – your SCA35-CAP Module is fully installed and ready to provide you with years of worry free musical enjoyment.

VI. Troubleshooting

Should any of the tests fail to provide the results defined, you should immediately stop and begin to diagnose the problem. Going further is certain to cause additional problems.

Nearly all of the problems encountered with initial start up are related to poor connections and soldering. Therefore it is imperative that you visually examine all of your connections. If any connection appears suspect follow the instructions in our soldering tech note to repair the connection. Pay particular attention to possible solder bridges especially on the BCS module especially near the wire termination points.

The second most troublesome problem is with components that have been inserted incorrectly (polarity). Be sure the diodes, transistors, integrated circuits, and electrolytic capacitors are in the proper location and correctly oriented. Once again a visual inspection compared against the stuffing guide will resolve a great number of problems.

Finally, on several occasions, we have seen components installed that are not the correct value. This is most common with color coded parts such as resistors. For example a 100 ohm 1% metal film resistor has color bands - brown/black/black/black/brown while a 1000 ohm 1% metal film resistor has color bands - brown/brown/black/black/brown. It is very easy to confuse the two.

If you assembled your pc boards as suggested (in component type groups) hopefully you measured the value of each resistor with your ohmmeter before insertion as described. Also check capacitor values carefully. It would be easy to mistake a 0.001 uF disc capacitor with a 100 pf capacitor.

Infrequently wiring errors arise. If you have confirmed the previous items you can begin checking suspect wiring by either 1) tracing each wire mechanically or 2) by resistance checks with you ohmmeter set to its lowest setting. Look for 0 OHMS from end to end. If you obtain a reading of 10 ohms or so you are probably not looking at the same lead. Where you have used twisted groups be sure you have not interchanged the wiring. This is most common with twisted pairs where the “WHITE” lead is reversed with

the “BLACK” lead. Check for 0 OHMS readings from closely adjacent PC board terminals to check for solder bridging.

Once you have located a suspect component(s) always power down and wait 20 minutes for the electrolytic capacitors to discharge - then replace the part. During the process be careful not to disturb the wiring - always examine the integrity of the wiring after you have made the repair to avoid creating additional problems.

If you should encounter a defective part, be sure to consider both the cause and the effect. If for example you find an overheated resistor, consider what may have caused it to overheat and replace that part as well.

These steps will usually resolve 90 % of all problems. However if you prefer not to get into this kind of diagnosis, please feel free to call us for preparation for return to our lab for resolution.

Figure 1 – PC Assembly Diagram

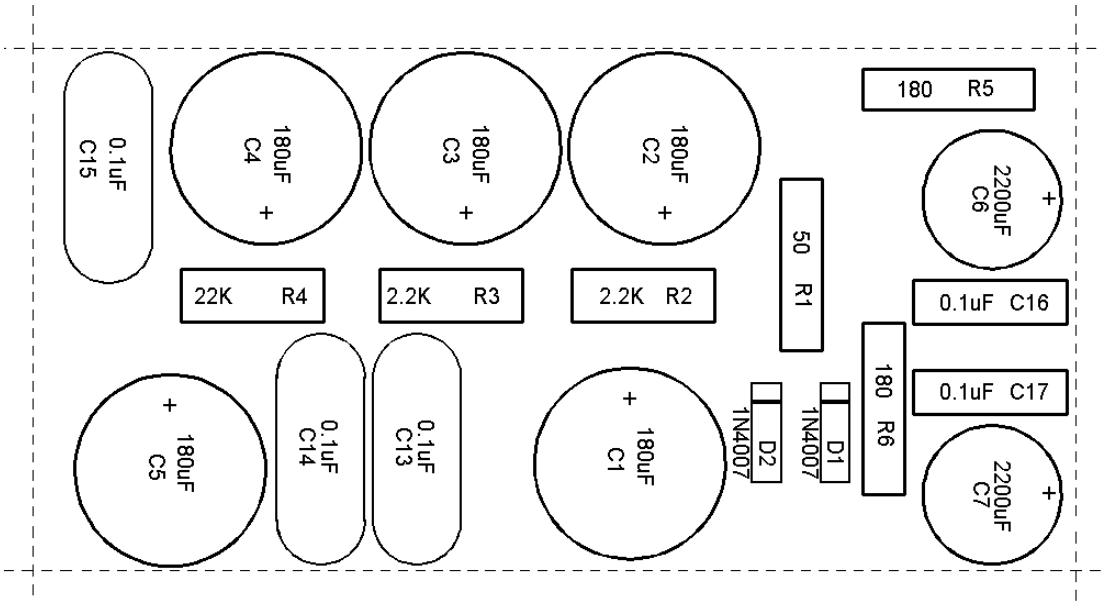


Figure 2 – PC Test Point Locations

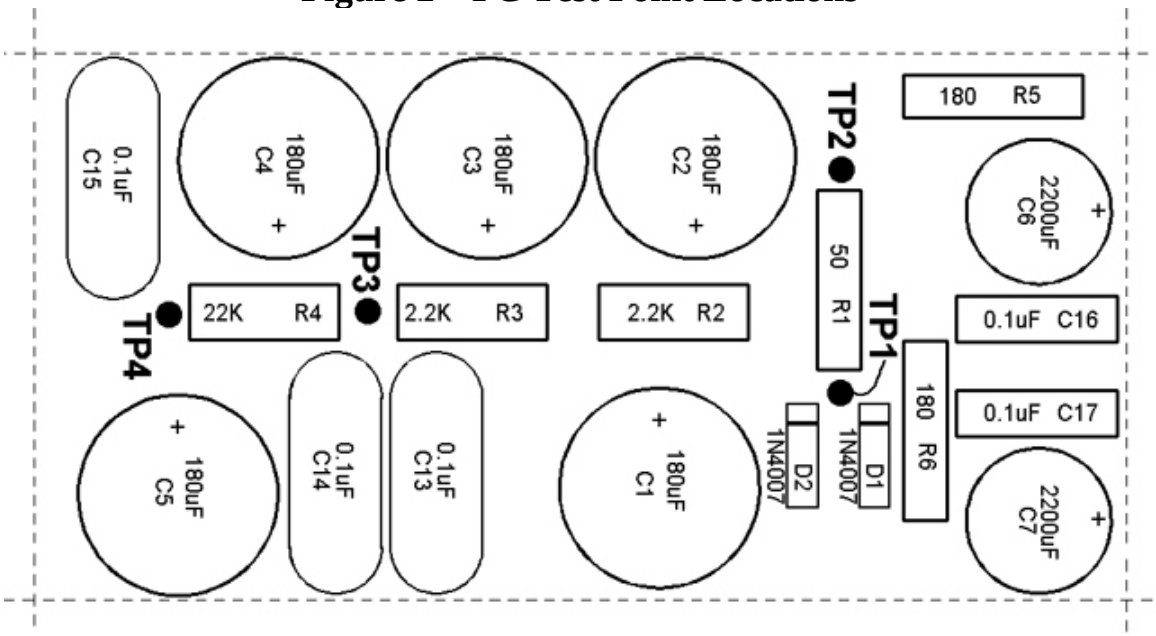


Figure 3 – Stock Quad Capacitor Location
& SCA35-CAP Wiring Diagram

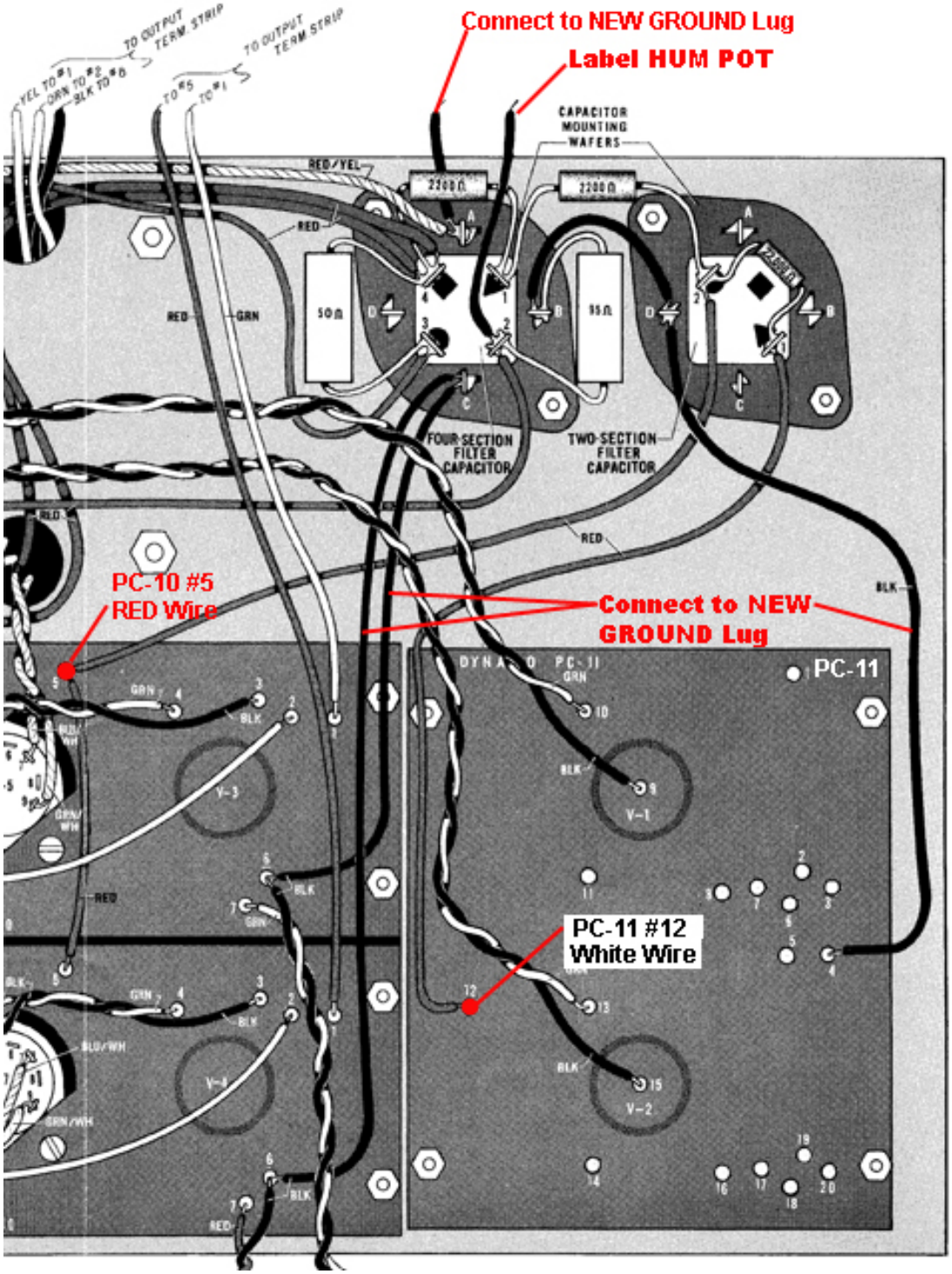


Figure 4 – Stock Chassis TS-1 & PC-10 PC Boards & SCA35-CAP Wiring Diagram

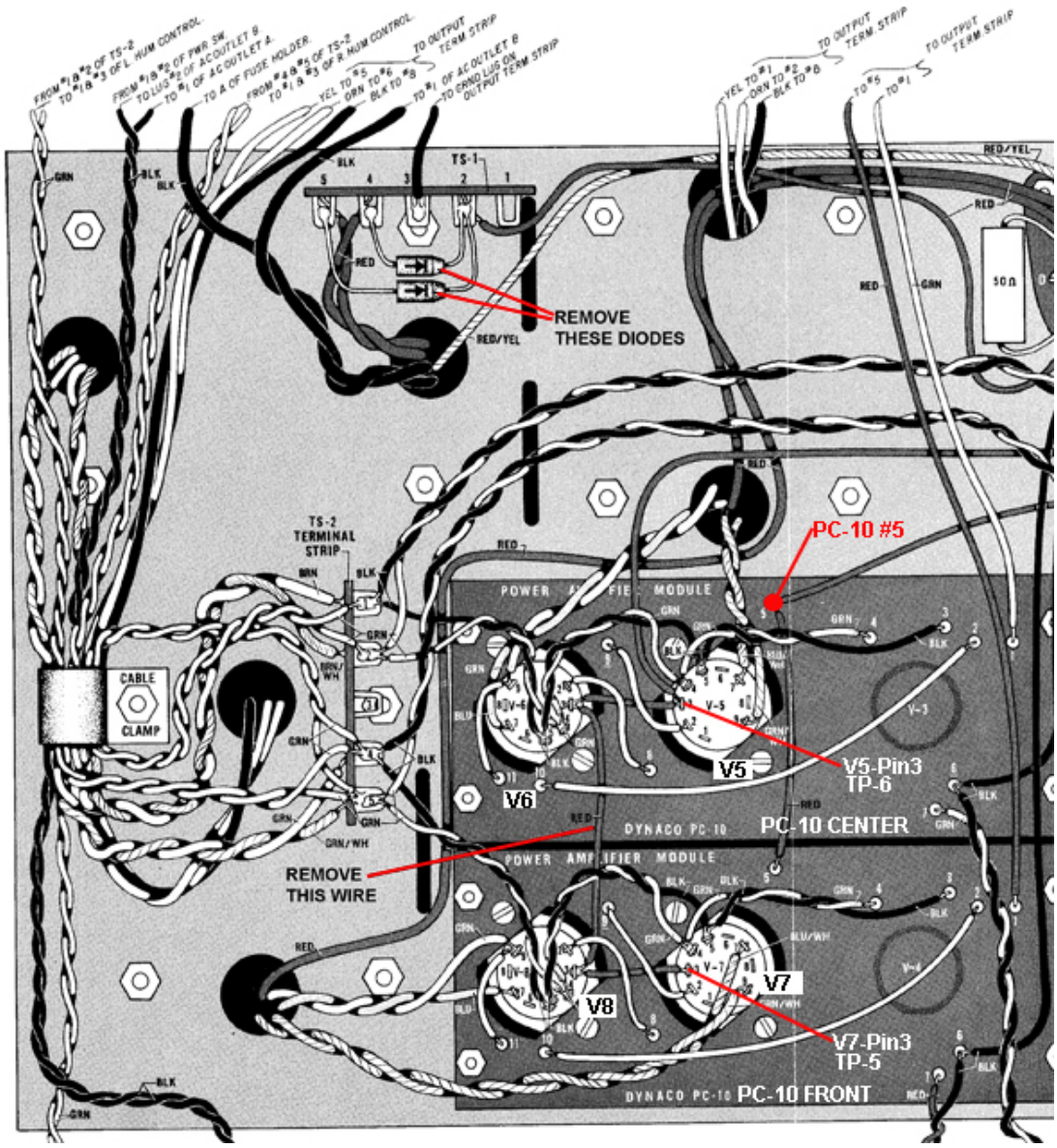


Figure 4A – Five Lug (TS-1) Terminal Strip Wiring Diagram

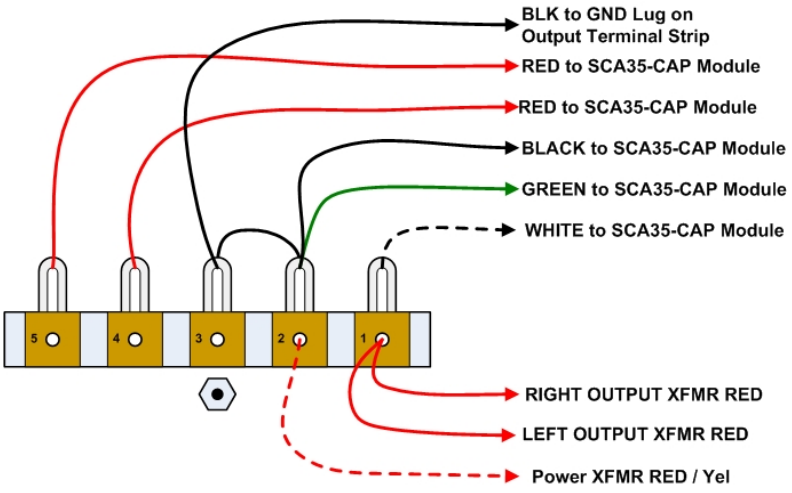
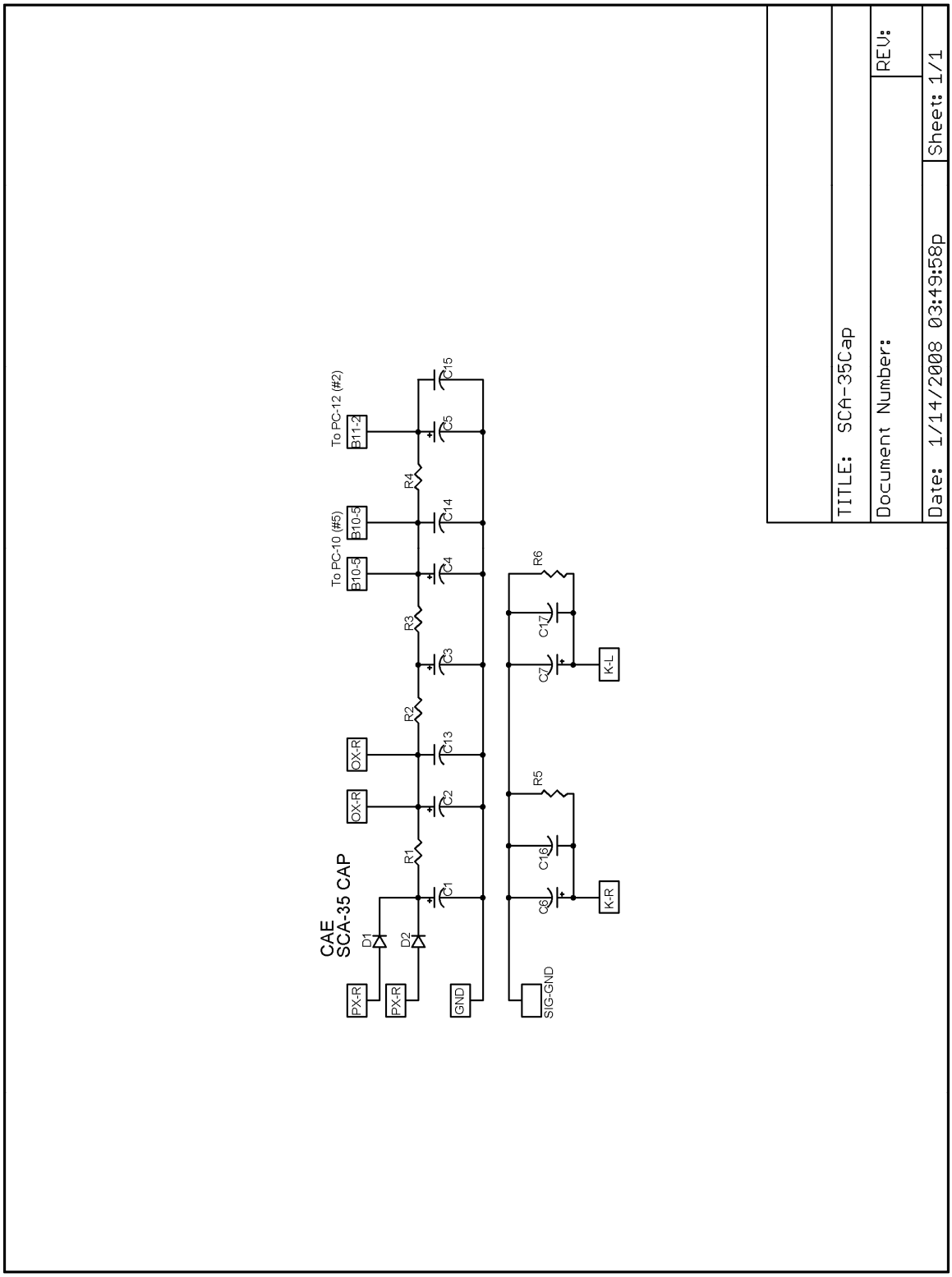


Figure 5 – SCA-35 Capacitor Module Schematic Diagram



CAE SCA-35 Capacitor Module

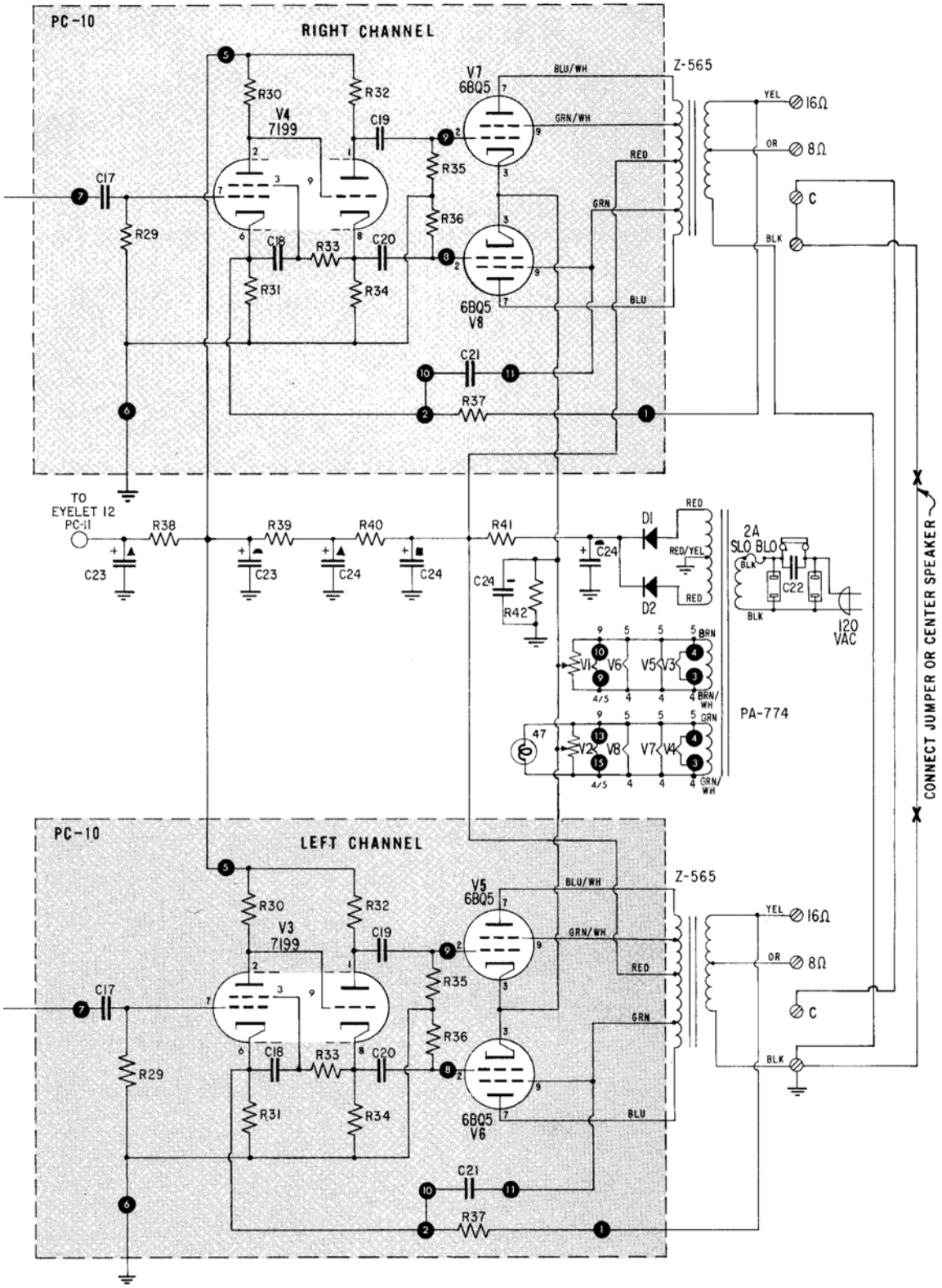
R0

SCA-35 Capacitor Replacement Module, CAE# ASM-SCA35-CAP

DESIG	DESCRIPTION	QNTY	PART NUMBER	VAL / VOLT
C1,2,3,4,5	CAPACITOR, ELECTROLYTIC (RADIAL)	5	MSR# 140-LS181M2W-2250	180uF / 400 VDC
C6, C7	CAPACITOR, ELECTROLYTIC (RADIAL)	2	MSR#140-XLR50V2200	2200uF / 50VDC
C13, C14, C15	CAPACITOR, MYLAR	3	MSR#1429-6104	0.1uF/400VDC
C16, C17	CAPACITOR, POLYPRO (WIMA, MKP)	2	CAE# W1-160	0.1uF/160VDC
D1, D2	DIODE, POWER	2	MSR#583-1N4007	1000 V / 1A
R1	RESISTOR, POWER	1	MSR#71-CW5-50	50 OHMS / 5W
R2, R3	RESISTOR, MET OXIDE	2	MSR#283-2.2K-RC	2.2K / 3W
R4	RESISTOR, MET OXIDE	1	MSR#283-22K-RC	22K / 3W
R5, R6	RESISTOR, MET OXIDE	2	MSR#71-CW5-180	180 OHMS / 5W
X2	PRINTED CIRCUIT BOARD	1	B-SCA35-CAP	
X3	THREADED SPACERS	4	MSR # 534-2202	4-40 x 0.375 "
X4	TERMINAL STRIP (Optional)	0	CAE # TS-54C	
X6	TEFLON WIRE KIT (Optional)	0	CAE# TWK	

NOTES : 1. Original Dynaco Components (P/N indicated) located external to B-S7-R-P
CAE# - Curcio Audio Part Number
DK# - DigiKey Part Number MSR# - Mouser Part Number

Stock SCA35 Schematic – Power Amplifiers (PC-10) & Power Supply



Stock SCA35 Schematic – Phono Amplifier (PC-11)