

## Replacement McIntosh Input PCB 128-165-PAE

For MC2100, MC2105, MC2300 (Assy. 043-795, 044-331, 044-650)

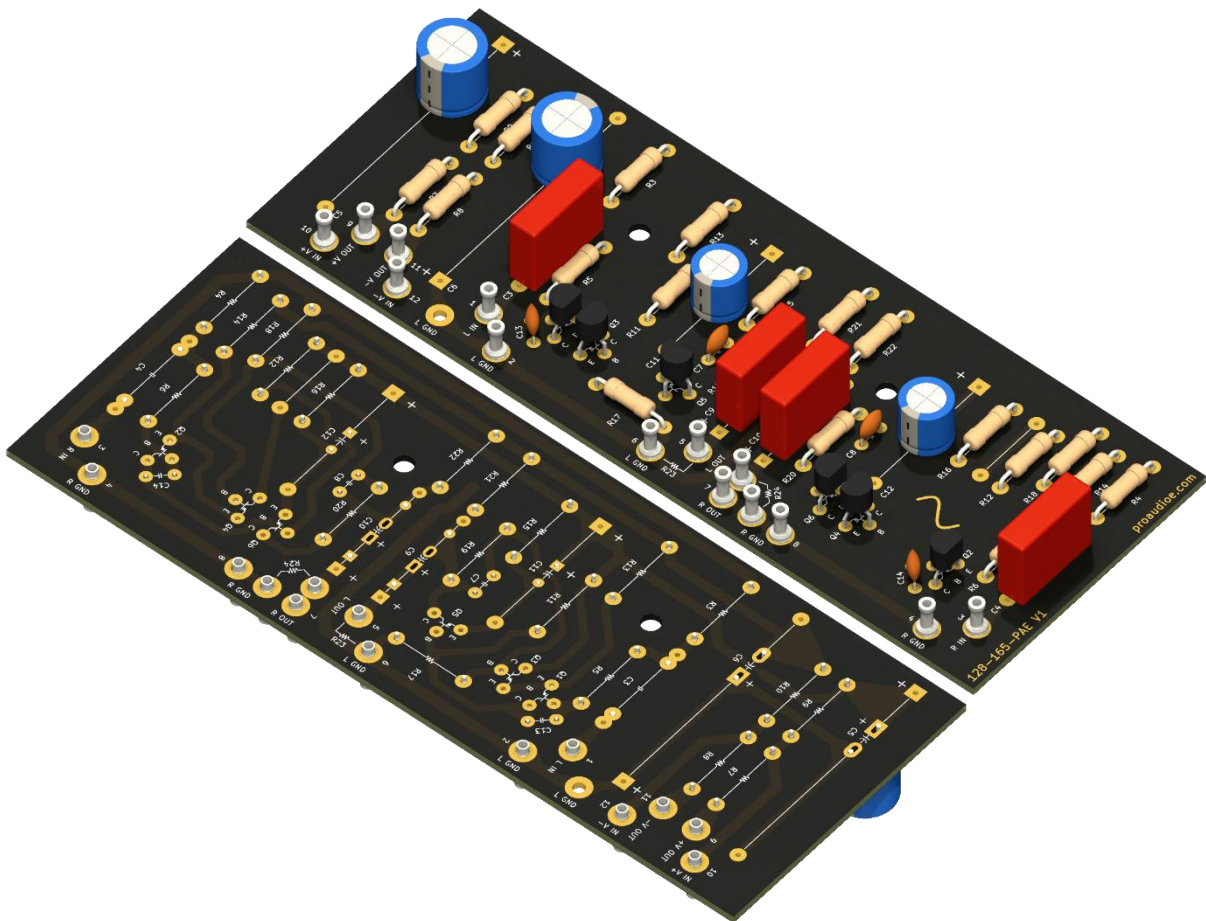
ProAudio Electronics [www.proaudioe.com](http://www.proaudioe.com)

Thank you for your order! This is a replacement input preamplifier PCB used in the McIntosh MC2100, MC2105, and MC2300 power amplifiers. It is designed to be a drop-in replacement, and no changes were made to the schematic. The main differences are described below:

The new PCB uses 2 oz. copper with a gold finish, plated through-holes, slightly wider traces, and silkscreen labels on both sides. Electrolytic capacitor footprints were modified to allow the use of modern radial capacitors, and the output electrolytic caps can be substituted with film caps of the appropriate size. Robust wiring turrets replace the original hollow posts that the supply and signal cables connect to.

This kit includes all necessary wiring turrets, but other components (resistors, capacitors, transistors, etc.) are not included. Please refer to the included schematic, board layout, parts list, and cross reference table which compiles information from the MC2100, MC2105, and MC2300 service manuals. I recommend having the original McIntosh service manuals (available online) on hand to double check component values as you populate the board.

**Please do not attempt to populate and install these boards if you are not thoroughly familiar with safely diagnosing, repairing, and testing amplifiers at the component level with test equipment (sig gen, oscilloscope, load, etc.) and a current-limited power supply.**



## Capacitor Sizing Guide

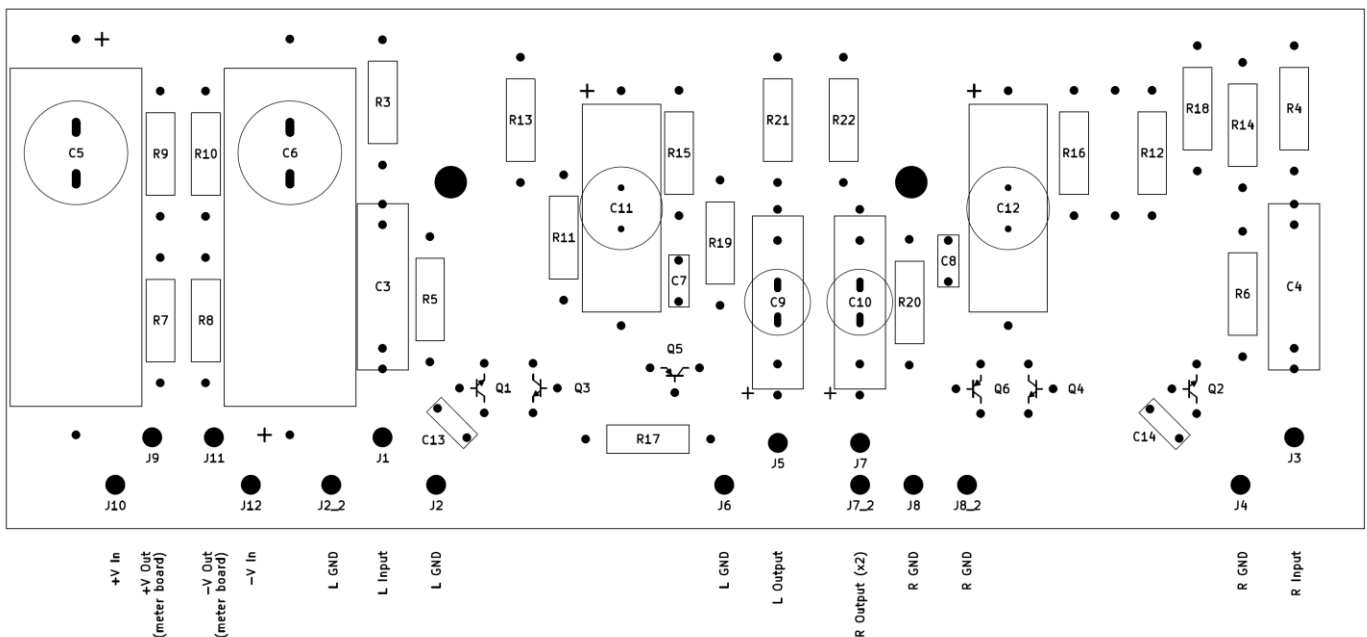
All electrolytic, film, and ceramic capacitor footprints are spaced to fit the original parts. Additional pads were added to accommodate both axial and radial components of different lead spacings. Use the table below to help choose substitute capacitors of the appropriate sizes:

Reference Designator	Original Values*	Original Size**	Ideal Radial Lead Spacings	Max Radial Size	Notes	Example Radial Parts
C3, C4	470nF 250V Mylar	Rectangular 6mm x 20.5mm 20mm LS	15mm 20mm	Rectangular: 7mm x 24mm		WIMA MKP4F034704D00KSSD
C5, C6	470 – 680uF 25 – 50V Aluminum Electrolytic	Axial 16.2mm D 41mm L	5mm 7.5mm	Round: 16mm D		Nichicon UVZ1E471MPD1TD
C9, C10	1.5uF – 10uF 25V Aluminum Electrolytic	Axial 6.2mm D 21mm L	3.5mm 5mm 15mm <b>22.5mm</b> <i>Smaller spacings preferred</i>	Rectangular: 9mm x 26mm  Round: 9mm D	Can be substituted with film caps	WIMA MKS4B051004J00MSSD  Nichicon UKT1H100MDD1TD
C11, C12	100uF 16V Aluminum Electrolytic	Axial 9.5mm D 25mm L	5mm	Round: 10mm D		Nichicon UKZ1E101MPM

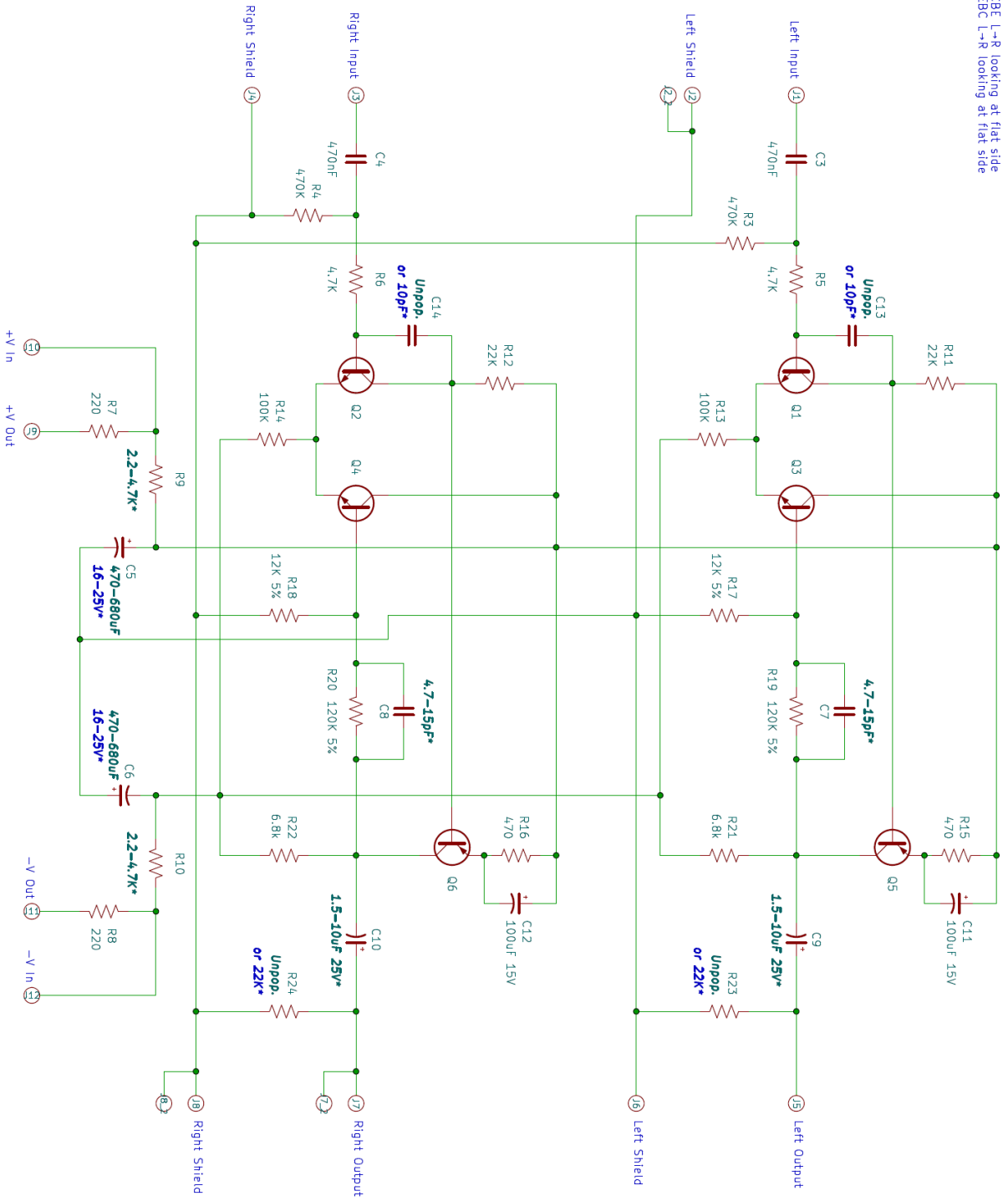
D = Diameter, L = Length, LS = Lead Spacing

\* Some capacitor values changed between serial number ranges. Please see the “Schematic Notes” section of your service manual.

\*\* Based on measurements from an MC2100 board. Depending on your unit, parts of slightly different sizes may have been used.



*New PCB component layout, not to scale*



Notes:

- Original MC2100, MC2105, and MC2300 schematics have two differences between the schematic and PCB:
- 1.) Junction of C9 and C6 is tied to L GND, not R GND
- 2.) R3 ties to R Gnd, not L Gnd
- Reference designators are the same as in the MC2105 and MC2300 schematics. Numbers differ in the MC2100
- For the original schematics, all resistors are 10% tolerance 1/2 watt unless otherwise specified
- **Bold, italicized component values have different values depending on model and serial number**

**McIntosh Input Board 128-165**  
 Original Schematic and Design: McIntosh Laboratories  
 Used In MC2100, MC2105, MC2300

**ProAudio Electronics**

Size: USLetter Date: 2023-09-01

Drawn By: MSJ

**Rev: 1**  
 Id: 1/1

## Parts List

- Parts highlighted in **red** may have different values or part numbers depending on serial number. Please refer to the “Schematic Notes” section in your McIntosh service manual.
- Original resistors were 10% tolerance, ½ watt unless otherwise specified.
- This parts list combines information from the MC2100, MC2105, and MC2300 service manuals. It is possible that some component value changes were not recorded in the McIntosh documentation; please compare your component values and part numbers against those on your original board and service manual.

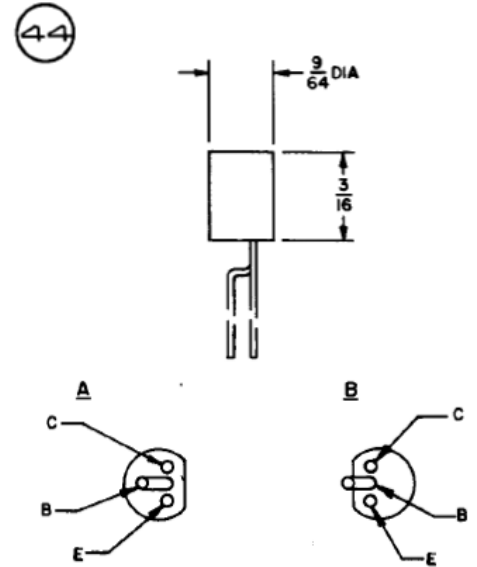
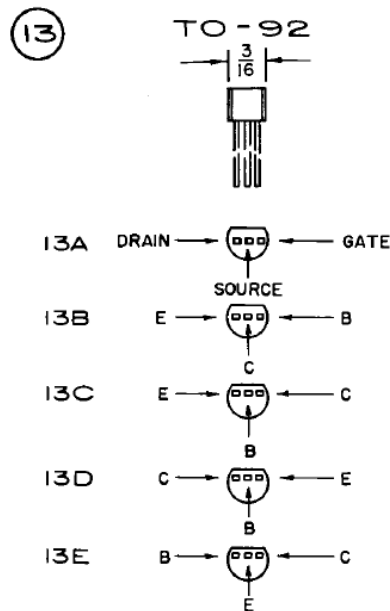
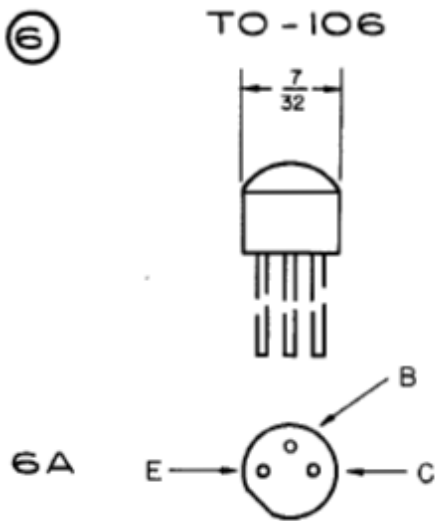
Reference Designator	MC2100	MC2105	MC2300	Remarks
R3, R4	470K	470K	470K	
R5, R6	4.7K	4.7K	4.7K	
R7, R8	220	220	220	
R9, R10	2.2K – 3.3K	3.3K – 4.7K	3.3K	
R11, R12	22K	22K	22K	
R13, R14	100K	100K	100K	
R15, R16	470	470	470	
R17, R18	12K 5%	12K 5%	12K 5%	
R19, R20	120K 5%	120K 5%	120K 5%	
R21, R22	6.8K	6.8K	6.8K	
R23, R24	<i>Unpopulated</i>	<i>Unpopulated</i>	<i>Unpopulated Or 22K</i>	
C3, C4	470nF 250V Mylar	470nF 250V Mylar	470nF 250V Mylar	
C5, C6	470uF 25V Aluminum Electrolytic	500uF – 640uF 16V – 25V Aluminum Electrolytic	470uF – 680uF 25V Aluminum Electrolytic	Board supports axial and radial
C7, C8	4.7pF Ceramic Disc	4.7pF Ceramic Disc	15pF Ceramic Disc	
C9, C10	10uF 25V Aluminum Electrolytic	10uF 25V Aluminum Electrolytic	1.5uF – 10uF 25V Aluminum Electrolytic	Board supports axial and radial, film and Aluminum Electrolytic
C11, C12	100uF 15V Aluminum Electrolytic	100uF 15V Aluminum Electrolytic	100uF 15V Aluminum Electrolytic	Board supports axial and radial
C13, C14	<i>Unpopulated Or 10pF</i> Ceramic Disc	<i>Unpopulated Or 10pF</i> Ceramic Disc	10pF Ceramic Disc	
Q1, Q2, Q3, Q4	132-092	132-054	132-092	NPN BJT
Q5, Q6	132-056	132-031 132-056	132-056	PNP BJT

Value in microfarads (uF) <i>micro = 10<sup>-6</sup></i>	Value in nanofarads (nF) <i>nano = 10<sup>-9</sup></i>	Value in picofarads (pF) <i>pico = 10<sup>-12</sup></i>
0.001	1	1,000
0.01	10	10,000
0.1	100	100,000
0.47	470	470,000
1	1,000	1,000,000

## McIntosh Semiconductor Cross Reference Information

- The semiconductor cross reference information below is borrowed from the McIntosh 1975 semiconductor cross reference datasheet. Commercial (non-McIntosh) part numbers from the datasheet are *italicized*. The column on the right can be used to write down your own substitute part numbers.

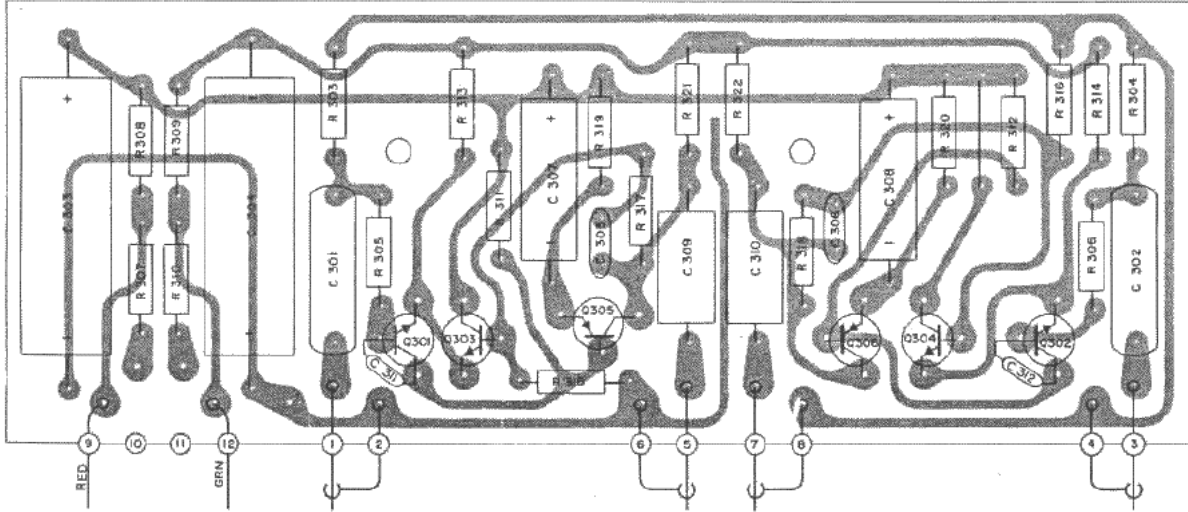
McIntosh P/N	Type	Case Style	Substitutes	Chosen Substitute
132-031	PNP BJT	6A	132-096 <i>2N4250</i>	
132-054	NPN BJT	13C	132-094 132-095 <i>2N5210</i>	
132-056	PNP BJT	13C	132-096 <i>2N5087</i>	
132-092	NPN BJT	44A	<i>SIEM./BC238C</i>	
132-094	NPN BJT	44A	<i>SIEM./BC414C</i>	
132-095	NPN BJT	6A	<i>GE/X32W6047</i>	
132-096	PNP BJT	44A	<i>SIEM./BC416C</i>	



## Original Board Layouts

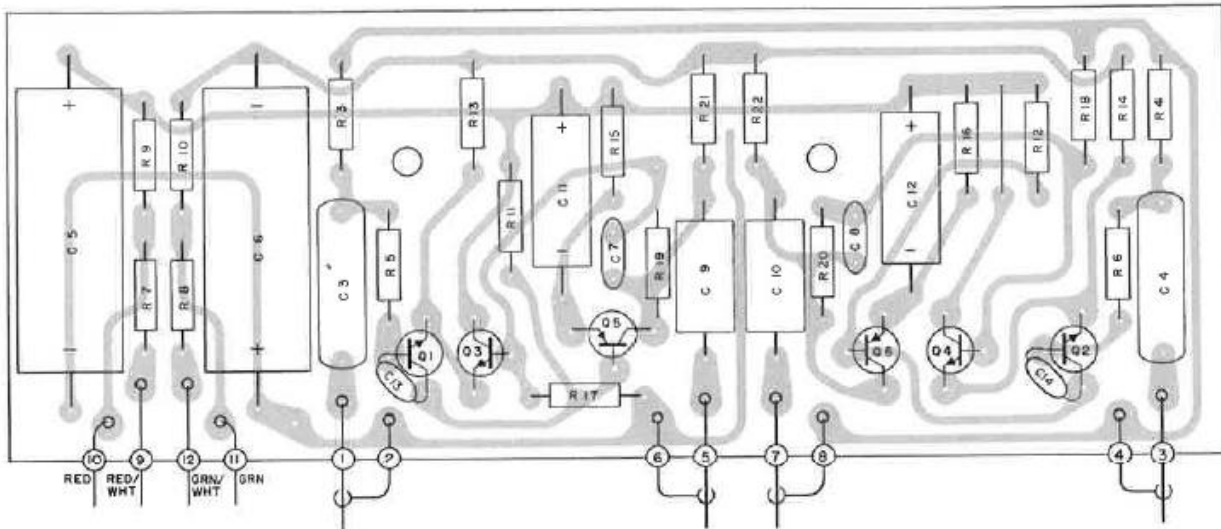
INPUT SECTION PRINTED CIRCUIT BOARD 043 - 795

MC2100



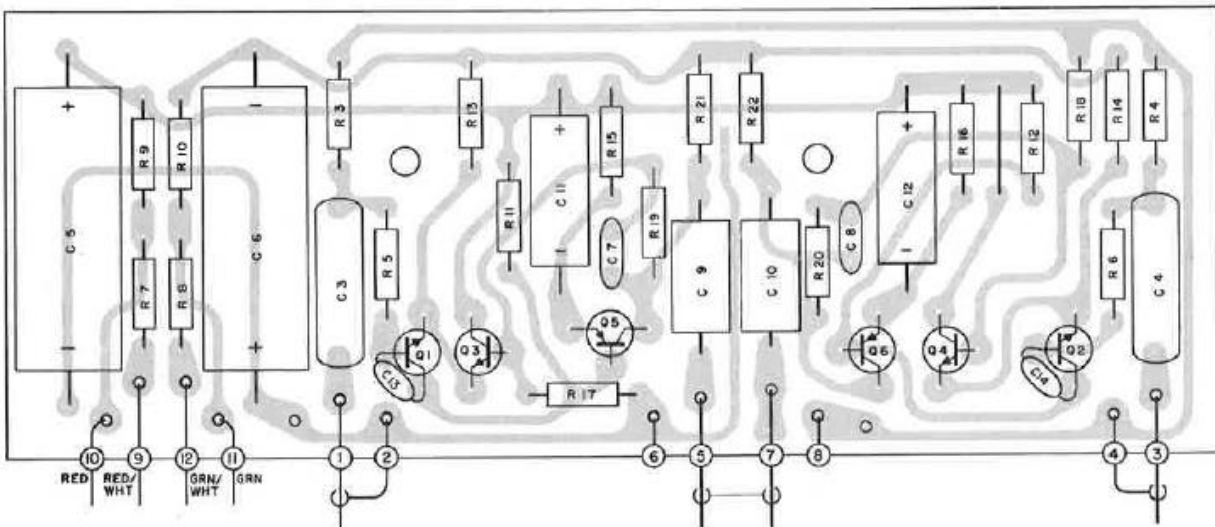
INPUT SECTION PRINTED CIRCUIT BOARD 043 - 795

MC2105



INPUT SECTION PRINTED CIRCUIT BOARD 044 - 650

MC2300

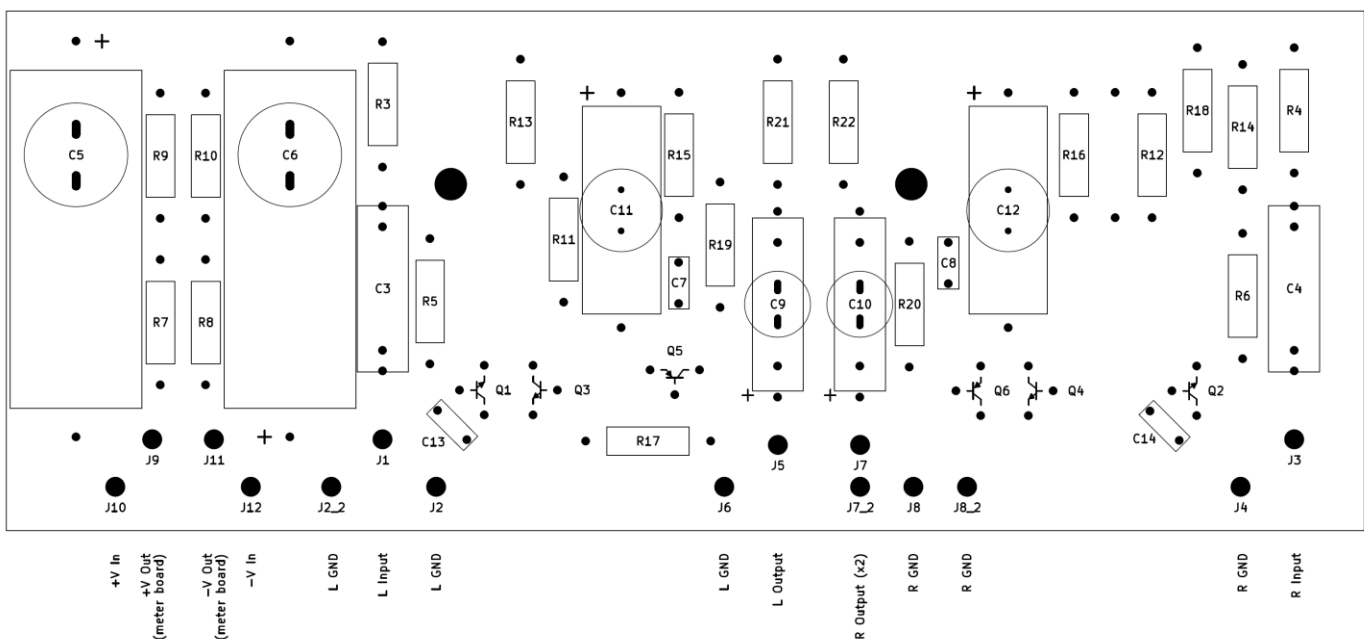


*Note: In the MC2105 and MC2300 service manuals, pins 11 and 12 are swapped on the board layout diagram and do not match their corresponding schematics. This was a simple numbering error and does not affect the wiring scheme.*

## Installation

It is recommended that you test your original unit first before replacing the input board. Replacement will not remedy problems that exist elsewhere in the unit, such as in the power supply and power amp stages.

1. Take pictures or make diagrams of your original installation. **All cables will connect to turrets in the same spots on the new board.**
2. Remove the original input board. Try to leave the cables as long as possible.
3. Install all included turrets onto the new board. Place the long side of each turret on the component side (the side with the gold part number and URL on the right), crimp the short end with pliers to create a strong mechanical connection, then solder them in place.
4. When populating the board:
  - a. Try to use capacitors that fit the sizing guide on page 2. The positive terminals of the electrolytic capacitors have square pads and a plus sign next to them on the silkscreen.
  - b. **Triple check your work.** If you have your original board on hand, setting them side by side makes it easy to check each component one-by-one.
  - c. If you have an adjustable bipolar power supply, this board can also be tested externally. Note that just like the original input boards, the right input shield (R GND) terminal must have a DC return path to supply ground in order for the input bias currents for both channels to flow, otherwise the board will not function properly. In the MC2100/2105/2300, this is accomplished by grounding the input RCA jacks directly to the chassis, hence why step 6 is emphasized.
  - d. We recommend cleaning excess flux off the board with isopropyl alcohol after finishing assembly.
5. Solder the cables to the turrets. All cables will connect to the same positions on the new board as they did on the old board, but it's good to double check with the picture/diagram of your original installation.
6. **Make sure the shields of the input RCA jacks are making a solid connection to chassis ground, and that these ground connections are solid all the way from the jacks to the volume pots and the input preamp board.**
7. We recommend using a "dim bulb" tester (i.e., an incandescent bulb used as a line current limiter) when performing your initial tests on the amplifier as a whole.



## Other Notes

- **It is imperative that the “L GND” and “R GND” terminals on the input board have a solid electrical connection to chassis ground via the shielded cables and input RCA connectors.** If your RCA connectors are the original riveted type, we recommend replacing them with “bulkhead” type chassis mount connectors that bolt down with a hex nut and tooth lock washer.
- While servicing your unit, it’s a good idea to clean any internal connectors and switches with DeoxIT or similar contact cleaner. Make sure the driver card connectors are tight and secure. Tighten any internal screws that make electrical connections such as those used with the large screw terminal electrolytic capacitors.
  - **For MC2100 units, it is critical that the stereo/mono switch be in good working order while operating the unit in mono mode.** Because both 4 Ohm taps of the autoformers are tied together in mono, a failing switch could potentially result in a situation where both channels are not receiving the same signal, causing the output stages to drive each other. Avoid switching the stereo/mono switch while the unit is powered on.
- If your unit still has the original silver multi-sector can capacitor, it is worth considering replacement as these parts age over time. We offer ready-made kits for this (066-095-PAE) as well as unpopulated 4-in-1 capacitor mounting boards. We would also recommend replacing any other original aluminum electrolytic capacitors in your unit for the same reason.
- All output transistor heatsinks are electrically “hot” and **MUST** be floating from chassis. Carefully inspect around the heatsinks and check that there are no shorts between them and chassis. We have seen cases where flakes of rust have bridged this gap.
  - If you are doing work to the output transistor heatsinks, also note that there is one TO-3 transistor on each negative heatsink that uses an insulator. This is due to the use of a collector resistor for current sensing.
- If you are repairing your unit, it’s a good idea to monitor the output stage bias current for both channels to make sure they stabilize and do not “run away.” McIntosh schematics indicate that there should be about 50 mV across each 0.56 Ohm emitter resistor of the first set of TO-3 output transistors.