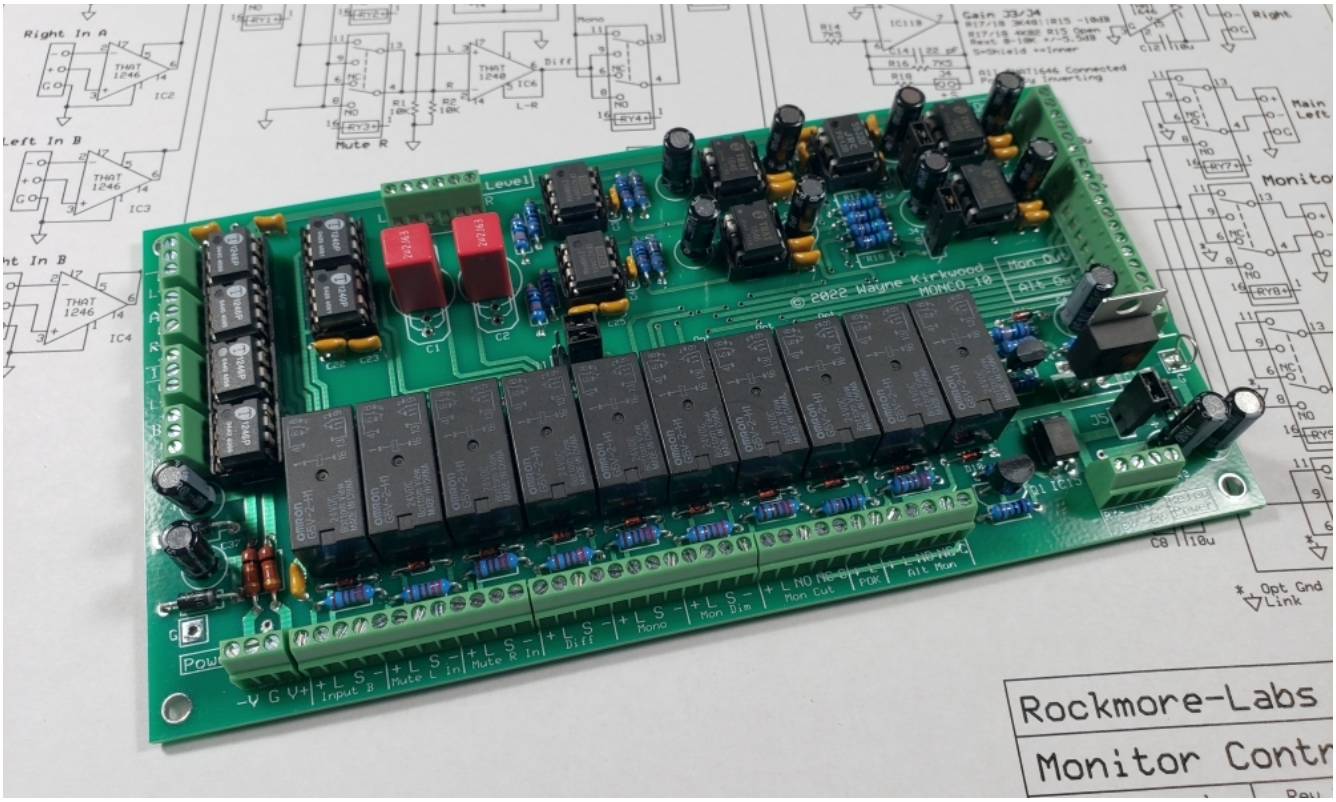
Assembly Instructions for the KA Electronics Monitor Controller

12.11.25



Monitor Controller PC Board

Install IC sockets

Place the PC Board on the work bench silkscreen side face up.

Place (**13)** 8 pin IC sockets into their respective locations. Observe orientation of the notch. Make sure that you do not place the sockets in the bypass capacitor holes.

Tip: Lift the board up and place a piece of cardboard on top of the board to form a sandwich of PC board, sockets and cardboard. The cardboard is used to hold the sockets in place so the board can be turned over without the sockets dropping out. Flip the board over.

Tack Solder only two of the corner IC pins. Put downward pressure on the PC board to make certain the sockets are seated on the board as you solder.

Once all the IC sockets are tack soldered, flip the board over.

Make certain that each socket is correctly oriented, fully seated on the board and square.

If you're satisfied with the placement of the sockets, solder all of the remaining pins. Do not overfill the connection with solder because it can run underneath the socket and form a short between pins.

Visually check each pin's connection particularly those to the ground plane. Reheat any pins if needed. Do not trim the IC socket leads.

Install resistors and diodes

Install **(7)** 10KΩ 1% resistors at R1, R2, R9, R10, R38, R43 and R44.

Install **(3)** 100KΩ 1% resistors at R3, R4 and R40.

Install **(3)** 1KΩ 1% resistors at R5, R6 and R45.

Install **(2)** 4K99Ω 1% resistors at R7 and R8.

Install **(2)** 1K1Ω 1% resistors at R11 and R12. (-20dB Dim. For -10dB use 4K64Ω.)

Install **(4)** 7K5Ω 1% resistors at R13-R16.

Install **(2)** 3K48Ω 1% resistors at R17 and R18. (-10dB J3/J4 Aux attenuation. For +/-5 dB variable gain use 4K02. See switch drawing and notes.)

R19 and R20 are not used.

Install **(2)** 1Ω 1W fusible resistors at R21 and R22.

R23-R29 are not used.

Install **(8)** LED current limiting resistors R30–R37. The value of these resistors depends on the desired LED brightness. If the LEDs are internally-ballasted and rated at 24V install bus wire links using resistor leads trimmed in previous steps. If the LED requires an external series resistor test the brightness at whatever operating current is desired. The BOM provides 2K21Ω for 10 mA LED current. For approximately 5 mA install 4K99Ω.

Check the area around R30-R37 for solder bridges between the ends of the resistors.

R39 is not used.

Install **(1)** 11KΩ at R41.

Install **(1)** 121KΩ at R42.

Install diodes in the following locations.

Install **(11)** 1N4148 diodes at D1-D11. Observe polarity.

Install **(4)** 1N4004 diodes at D12-D15. Observe polarity.

Install ceramic capacitors

Install **(4)** 22 pF at C3, C4, C13 and C14.

Note: Designations C15-C19 are not used.

Install **(18)** 100 nF (0.1uF) at C20-C35, C41 and C43.

Install jumper headers

Install the jumper shunts onto the header pins before you solder them. (The shunts serve as insulators that allow you to position them while soldering without burning your fingers.)

You will need **(6)** shunts. The shunts are positioned during installation in the locations that will be used in final test.

The shunts should be installed with small openings on the bottom. The shunts also have openings on the sides which also require that they be pointed outward on J1 and J2.

When installing the headers, tack solder only one pin and reheat it to adjust the position of the header so that it's square and flush with the board. Once you're satisfied with the orientation of the headers solder the remaining pins.

Install **(1)** 6 pin header at J1 and J2. The shunt on J1 and J2 should be in the left-hand "A" position.

Install **(4)** 2 pin headers at J3-J5. Install shunts on J3-J6.

Install Phoenix connectors

When installing the Phoenix connectors make sure the openings for the wires point outward to the edge of the board. When installing the connectors, tack solder only one pin and reheat it to adjust the position of the connector so that it's square and flush with the board. Once you're satisfied with the orientation of the connector, solder the remaining pins.

Install **(5)** 3 pin Phoenix connectors at the A and B Inputs and the Power Connector.

Install **(1)** 4 pin Phoenix connector at Relay Power input.

Install **(2)** 6 pin Phoenix connectors at the Level and Aux output.

Install **(3)** 12 pin Phoenix connectors end-to-end for the Relay connections at the lower edge of the PC board.

Install **(1)** 12 pin Phoenix connector at the Main and Alt Monitor output.

Install electrolytic capacitors

Note: The + (positive) terminals for the electrolytic capacitors have a square pad. Where space permits there is also a "+" silkscreen marking. The longer capacitor lead is the positive lead.

Bipolar capacitors, which do not have a polarity, will also be installed in eight locations. Make certain that you have the right type of capacitor before soldering it.

Install **(8)** 10uF 35V (or 50V) bipolar electrolytic capacitors at C5-C12.

Install **(2)** 47uF 35V polarized electrolytic capacitors at C36 and C37. The

polarity of these capacitors are critical.

C38 and C39 are not used.

Install **(3)** 10uF 50V polarized electrolytic capacitors at C40, C42 and C44. The polarity of these capacitors are critical.

Note: Film capacitors C1 and C2 will be installed in a later step.

Install the relays

The relay coils are usually 24V DC. (The Mouser BOM specifies 24V coils.) An optional 7824 regulator can be installed, in a later step, at IC16 for use with the +/-15V bipolar audio or external >24V supplies.

Tip: This step eases relay installation and makes soldering easier. Place all ten relays on the PC board and adjust them so they visually line up. Attach a long strip of adhesive masking tape to bridge the tops of the relays. The tape helps hold them together to allow soldering them as a group. Once the tape is attached, make certain the relays are still square and even relative to each other. At this point the corner pins of each relay may be tack-soldered in the following step.

When soldering the relays tack-solder the corner pins on each relay first. This will allow you to adjust the relays so they line up correctly. When you are certain that each relay is flush with the PC board and aligned with its neighbors solder the remaining pins. Each relay has 8 pins. Mentally count each pin as you solder it on each relay to make certain no pin is missed.

Install **(10)** relays at RY1-RY10.

Install optional relay voltage regulator

Install an LM7824 regulator.

Mount a small TO-220 heat sink onto the LM7812 (or 7824) before installing it with a 1/4” 4-40 screw, #4 fiber washer and 4-40 nut. Thermal grease is not required.

Insert the regulator and heat sink assembly onto the circuit board making sure that the lower edge of the lead, where it flares, is flush with the PC board. Depending on the regulator leads the bottom of the heat sink should clear the top of the PC board by about 0.2”.

Solder only the center pin of IC18 making certain that the regulator is mounted square. If you are satisfied with the orientation of the regulator solder the remaining pins. If it is not square re-heat the pin and adjust it.

J5 must be linked for the regulator to supply power to the relay coils. Open J5 if an external 24V relay supply is used and the on-board regulator is not needed.

Install delayed turn-on semiconductors

Install a TL431 at IC14.

Install a PS2501-1 at IC15.

Install a 2N3904 at Q1.

Install film capacitors

Install (2) 4.7 µF film capacitors at C1 and C2.

Note: Do not install the ICs at this time.

Check all solder connections and reheat or re-flow them if necessary

When component leads are trimmed after soldering the solder joint becomes fractured. It is always a good idea to reflow all solder connections after lead trimming while checking for bridges or pins which may have missed being soldered.

If you add solder during this step do so sparingly particularly under IC sockets. Solder can flow through the PC board vias to the underside of the IC socket and cause shorts between pins.

If you prefer to remove the solder flux residue from the PC board now is a very good time to do it.

When you're finished cleaning the PC board inspect every joint under magnification.

Install spacers

Install **four** 4-40 threaded hex spacers at the board mounting holes. Place the **four** fiber washers between the PC board and the hex spacer and secure using four 4-40 1/4" screws. Four additional screws and fiber washers are in the bill-of-materials for securing the PC board to the chassis.

Initial Tests

The board should be tested on a power supply before installing the ICs.

Initial DC Tests

Connect a source of bipolar DC power.

If a variable power supply is used, slowly raise the voltage to about +/-15V.

There should be no measurable current draw. If excess current is drawn check the board for solder bridges and correct polarity of D15 and D16 and all the electrolytic capacitors.

Check the voltages at pin 7 of IC1-IC6. It should be +15V. The voltages at pin 4 of the aforementioned ICs should be -15V.

Check the voltage at pin 8 of IC7, IC8 and IC11. It should be +15V. The voltage at pin 4 should be -15V.

Check the voltage at pin 6 of IC9, IC10, IC12 and IC13. It should be +15V. The voltages at pin 5 should be -15V.

Check the relay power supply if it is installed. Connect the +15V supply to Phoenix connector terminal "U+." Connect the -15V supply to Phoenix terminal

"RY-." J5 should be linked. Measure the voltage between "Relay -" and "Relay +." It should measure approximately 24V depending on the voltage regulator installed.

If any of the voltages are out of range look for solder bridges or an un-soldered pin or component lead.

Remove power.

Install the ICS

Install **(4)** THAT1246 at IC1-IC4.

Install **(2)** THAT1240 at IC5 and IC6.

Install **(2)** OPA2134 at IC7 and IC8.

Install **(4)** THAT1646 at IC9, IC10, IC12 and IC13.

Install **(1)** NJM5532 at IC11.

Offset and Current Draw Tests

Reconnect power.

If a variable power supply is used slowly raise the voltage to about +/-15V.

Measure the voltages across R21 and R22, the 1Ω resistors. The voltages should typically be less than 70 mV indicating a current draw of less than 70 mA.

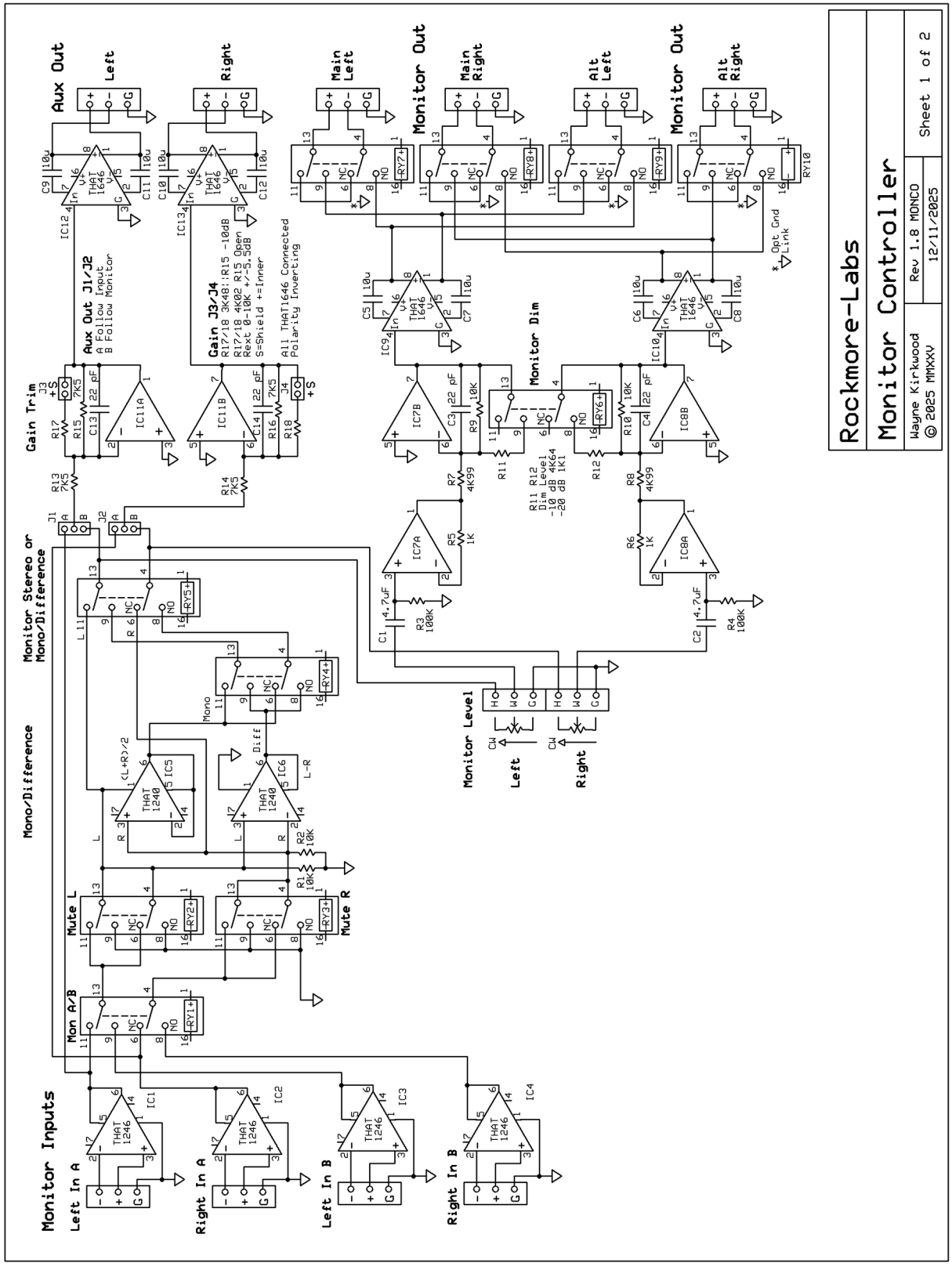
Measure the DC voltages of the IC pins listed below. No input or output should be pinned to a supply rail. Typical offsets will be +/- 15 mV or less.

IC1-IC6 pin 6 output.

IC7, IC8 and IC11 pins 1 and 7.

IC9, IC10, IC12 and IC13 pins 1 and 8.

Remove power.


Rockmore-Labs
Monitor Controller
Wayne Kirkwood
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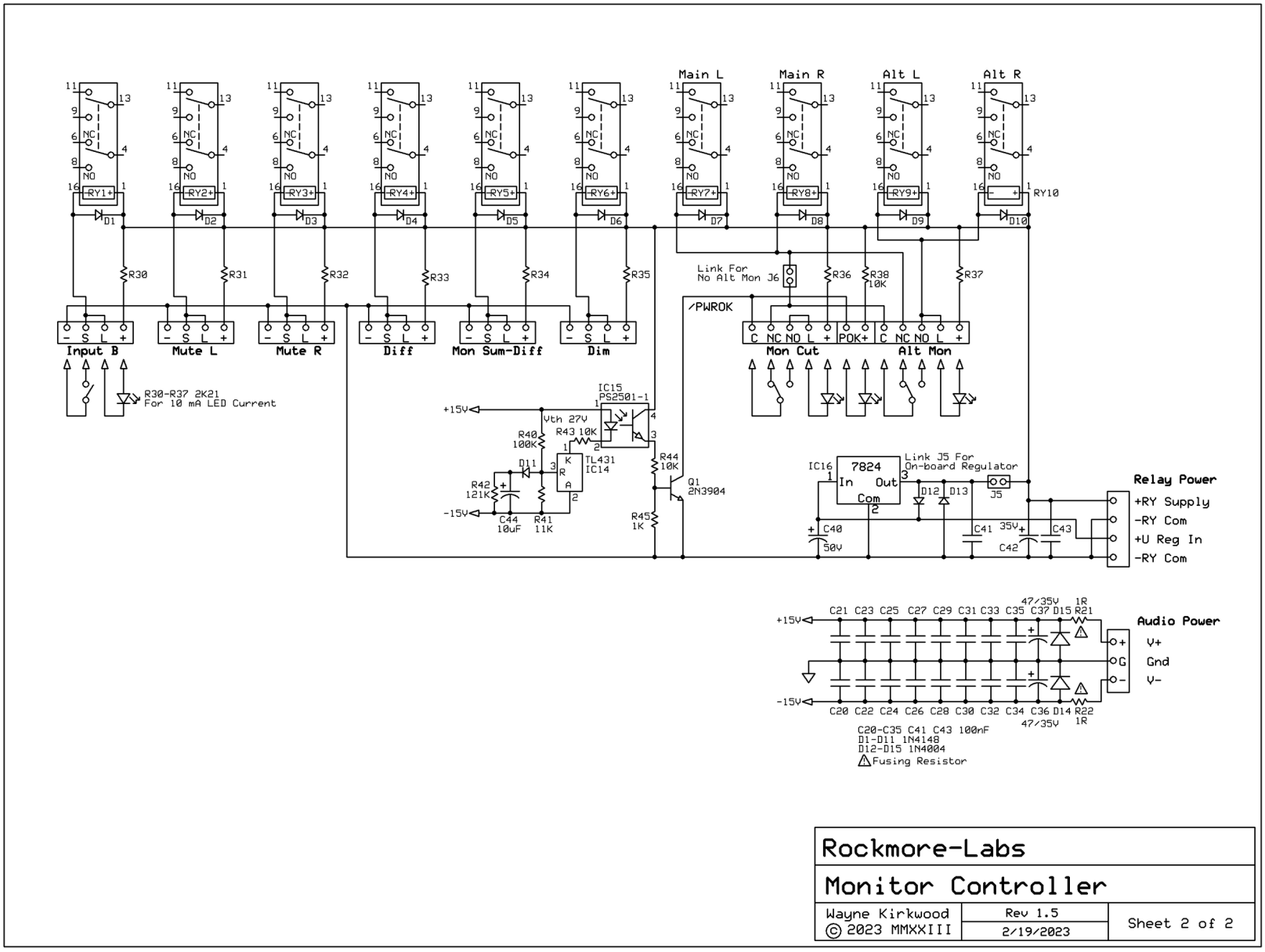
Rev 1.8 MONCO
12/11/2025
Sheet 1 of 2
Monitor Inputs
Left In A
Right In A
Left In B
Right In B
Mon A/B
Mute L
Mute R
Mono/Difference
Monitor Stereo or Mono/Difference
Aux Out
Left
Right
Aux Out J1/J2
A Follow Input
B Follow Monitor
Gain Trim
Gain J3-J4
R17/18 3K48:1R15 -10dB
R17/18 4K02 R15 Open
Rext 0-10K +/-5.5dB
S=Shield +=Inner
All THAT1646 Connected
Polarity Inverting
Monitor Out
Main Left
Main Right
Alt Left
Alt Right
Monitor Dim
Monitor Level
Left
Right
Opt Gnd Link



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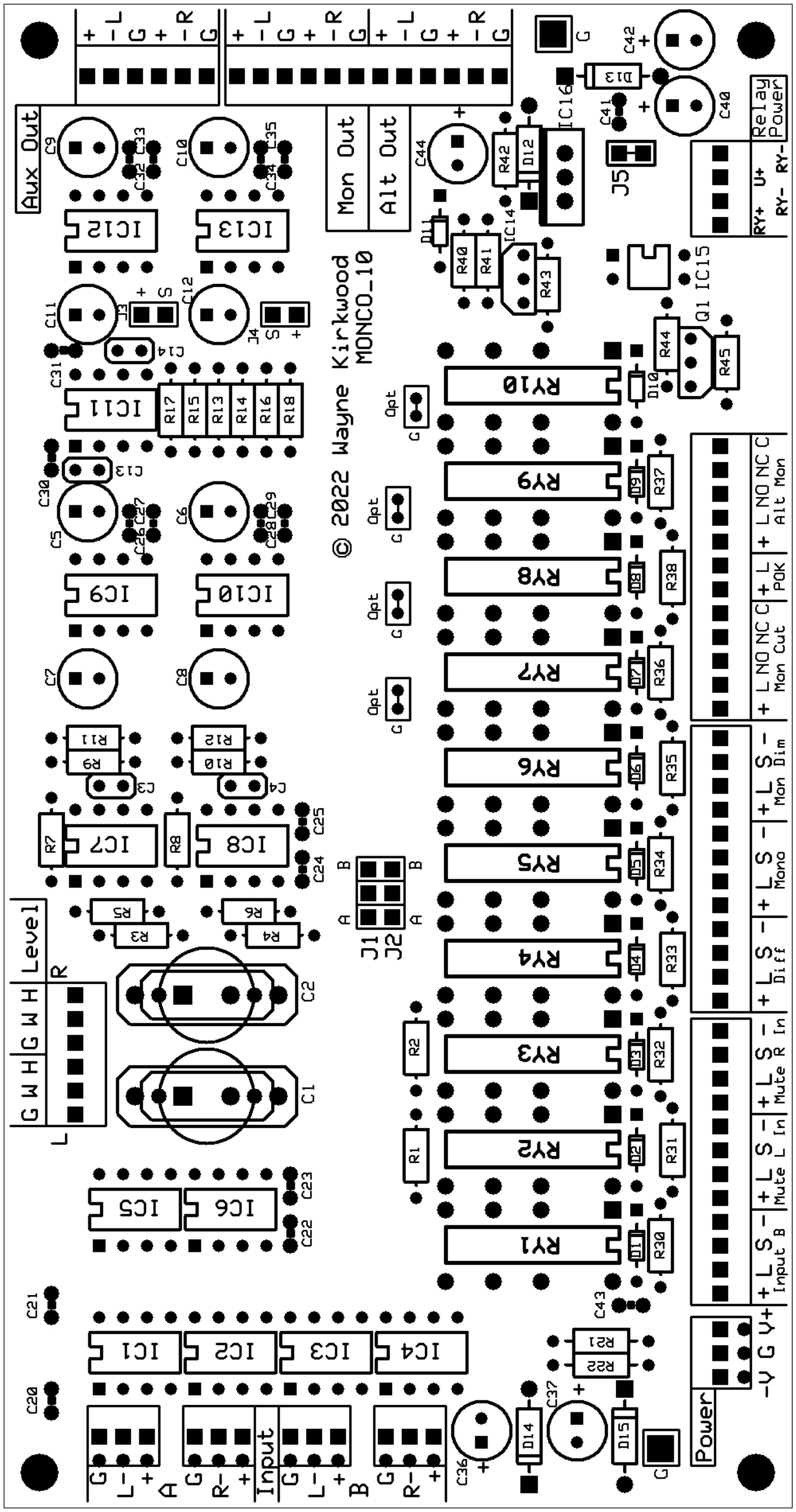
Monitor Controller		
Wayne Kirkwood © 2023 MMXXIII	Rev 1.5 2/19/2023	Sheet 2 of 2


Aux Out
Mon Out
Alt Out
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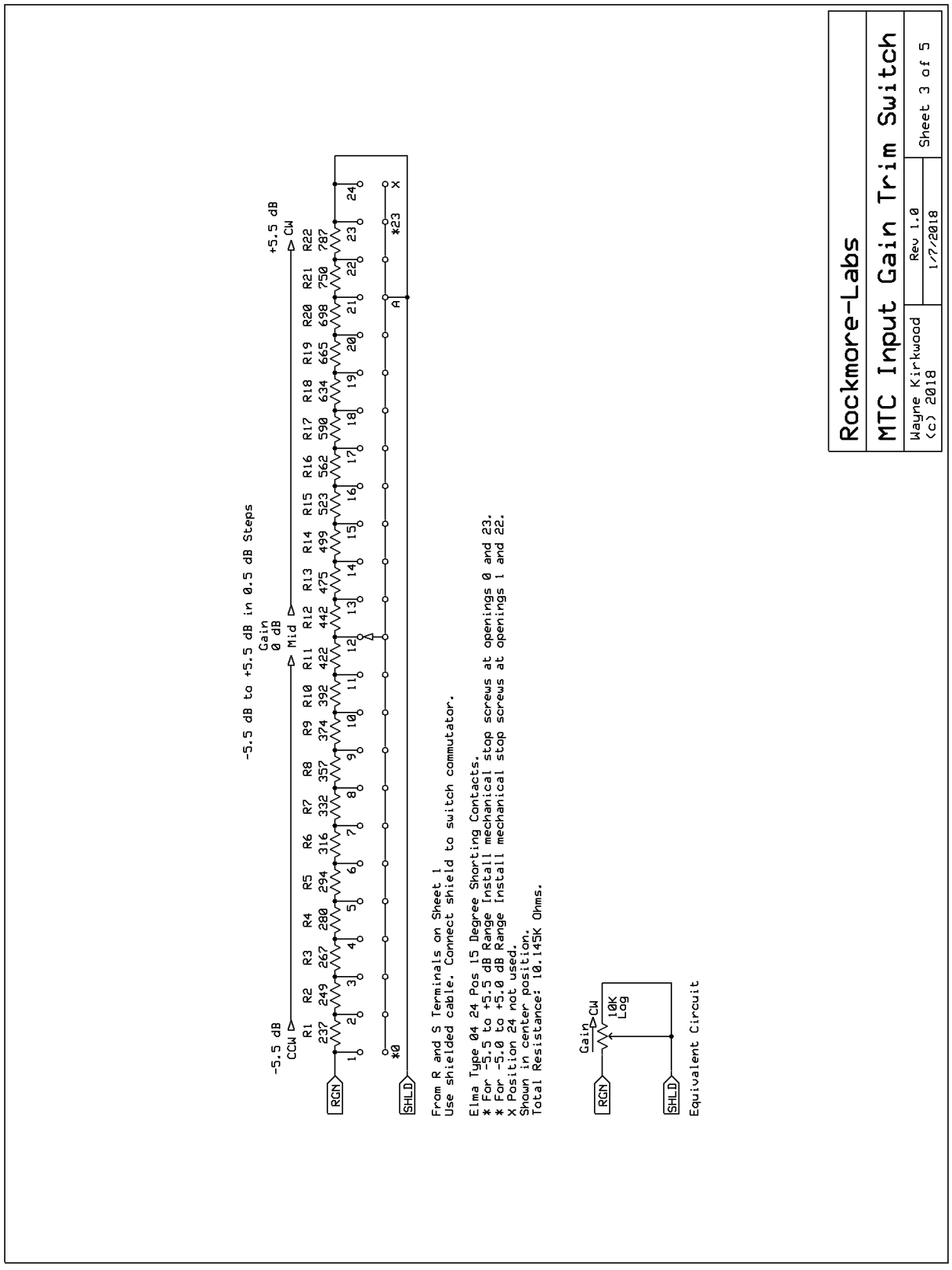
MONCO_10
Relay Power
Level
Input
Power

Note: Gain Trim Switch Wiring Inserted into J3 and J4. Remove R15 and R16.



Detailed Parts List

A complete bill of materials is available from Mouser Electronics:

Monco Bom V10 PCB with THAT and TI ICs and 24V Relays:

https://www.mouser.com/ProjectManager/ProjectDetail.aspx?AccessID=2f8c3b63d1

Other Resources

Pro Audio Design Forum Monitor Controller Build Thread:

https://www.proaudiodesignforum.com/forum/php/viewtopic.php?t=1309

For more information contact: sales@ka-electronics.com