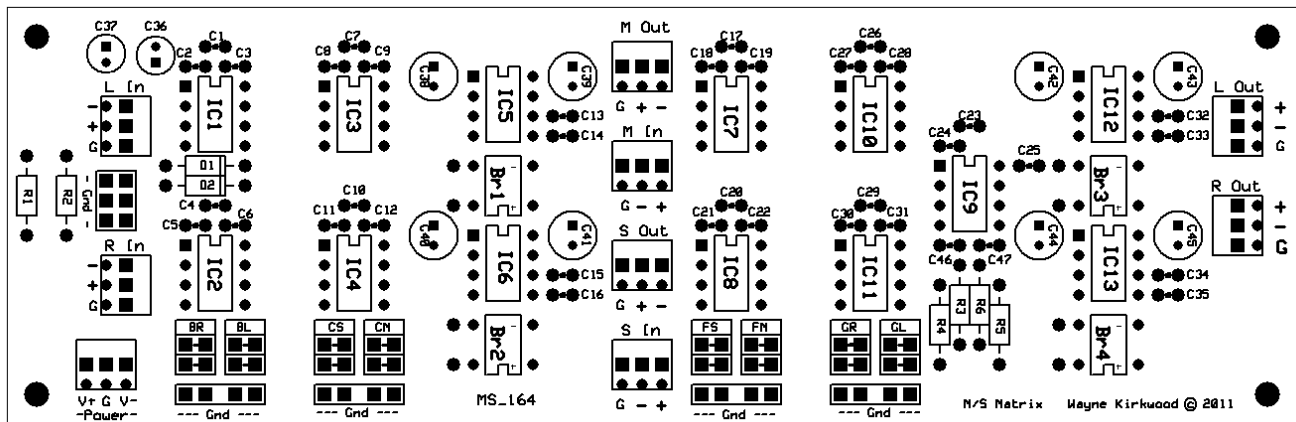


# Assembly Instructions for the KA Electronics Precision MS Matrix



*Precision MS Matrix PC Board Stuffing Guide*

## Install IC sockets

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

Drop 13 8 pin IC sockets into their respective locations. Observe orientation of the notch.

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. This permits all 13 sockets to be installed at one time.

Press the sandwich of PC board, sockets and cardboard together with your thumbs applying pressure to the cardboard and sockets to hold them in place. Grab the PC board at the edges with your fingernails and flip the sandwich over. Lower the sandwich to the bench with the cardboard and sockets face down. Check to make sure that no sockets have dropped out and all the pins are exposed.

Tack Solder only two of the round corner IC pins.

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 sockets solder all of the remaining pins.

Visually check each pin's connection particularly those to the ground plane. Reheat any pins if needed.

## Install resistors and diodes

Install 1R 1W fuse resistor in R1 and R2.

Install 10K 1% at R3 and R6.

Install 20K 1% at R4 and R5.

Install 1N4004 diodes at D1 and D2. Observe polarity.

*Note BR1-BR4 are for phantom power protection and are not usually installed.*

### **Install ceramic capacitors**

Install 22pF at C46 and C47.

Install 100 nF (0.1uF) at C2, C3, C13, C14, C15, C16, C18, C19, C24, C25, C32, C33, C34 and C35.

### **Install 2 pin jumper headers**

Install the jumpers on the header pins. (This allows you to position them while soldering without burning your fingers.)

Install 2 pin headers at BR, BL, CS, CM, FS, FM, GR, and GL.

Tack solder only one pin and reheat it to adjust the position of the header so that its square and flush with the board.

Once you're satisfied with the orientation of the headers solder the remaining pins.

### **Install electrolytic capacitors**

*Note: The + (positive) terminals of the electrolytic have a square pad on the PC board.*

Install 47uF 35V at C36 and C37. The polarity of these capacitors are critical.

The following capacitors to be installed are 10uF 25V. If the builder uses bipolar capacitors polarity is not important. If polar capacitors are used make certain that the positive (long) lead is in the square pad.

Install the 10uF 25V in C38-C45.

### **Install Phoenix three pin connectors**

The Phoenix connectors will be installed at ten locations.

Identify the wire opening side of the Phoenix terminal block connectors.

The Left/Right Inputs and Ground tie point should have the connector wire opening pointing to the left side.

The Power and Mid/Side Input/Output connectors should have the wire opening pointing down.

The Left/Right Outputs should have the connector wire opening pointing to the right.

Tack solder one pin on each connector. Check the alignment of each connector and solder the remaining pins.

Do not install the ICs at this time.

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

## Initial Tests

### DC Tests

Connect a source of bipolar DC power.

Ground is in the middle.

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

There should be no measurable current draw.

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

Check the voltage at pin 6 of IC5. It should be +15V. The voltage at pin 5 should be -15V.

If excess current is drawn check the board for solder bridges and correct polarity of D1, D2, C36 and C37.

Remove power.

### Install the ICS

Install THAT1246 ICs at IC1, IC2, IC7 and IC8.

Install THAT1240 ICs at IC3, IC4, IC10 and IC11.

Install THAT1646 ICs at IC5, IC6, IC12 and IC13.

Install an LME49860 (or NE5532) at IC9.

### Offset and Current Draw Tests

Reconnect power.

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

Measure the DC voltage drop across R1 and R2. It should measure approximately 50 mV. (43-45 mV is typical indicating a current draw of 45 mA.)

Measure the DC voltages relative to ground at pin 6 of IC1, IC2, IC3, IC4, IC7, IC8, IC10 and IC11. They should each measure less than 10 mV.

Measure the DC voltages at pins 1 and 7 of IC9. They should each measure less than 10 mV.

Measure the DC voltages at both pins 1 and 8 of IC5, IC6, IC12 and IC13. They should each measure less than 10 mV.

This completes assembly and DC tests.

## Detailed Parts List

A complete bill of materials is available from Mouser Electronics:

With THAT ICs: <https://www.mouser.com/ProjectManager/ProjectDetail.aspx?AccessID=246710b37f>

Without THAT ICs: <https://www.mouser.com/ProjectManager/ProjectDetail.aspx?AccessID=96947b82d5>

## Generic Parts List

### Semiconductors

- 4) THAT1246 IC1, IC2, IC7, IC8
- 4) THAT1240 IC3, IC4, IC10, IC11
- 4) THAT1646 IC5, IC6, IC12, IC13
- 1) NE5532, LME49860, NJM2114 IC9
  
- 2) 1N4004 D1, D2
- 4) DB-104 Bridge (optional for phantom power protection) BR1-4

### Electromechanical and Connectors

- 10) 3 pin Phoenix terminal blocks Mouser 651-1725669
- 8) 0.1" 2 Pin headers with jumper clips (To bypass various inserts at BR, BL, CS, CM, FS, FM, GR, GL)

### Capacitors

- 2) 22pF/100V Mouser 581-SR151A220JAATR1, C46, C47
- 14) 0.1/100V Mono Ceramic Mouser 581-SR201C104KAR (There are spots for a lot more but 14 are enough)
- 8) 10uf radial NP or polarized 25V or greater C38-41, C42-45
- 2) 47uF/35V C36, C37

### Resistors

- 2) 1R 1/4W R1 and R2 (Flameproof/fusible is better but generic carbon film if that's all that's available)
- 2) 10K 1% Mouser 271-10K-RC, R3, R6
- 2) 20K 1% Mouser 271-20K-RC, R4, R5

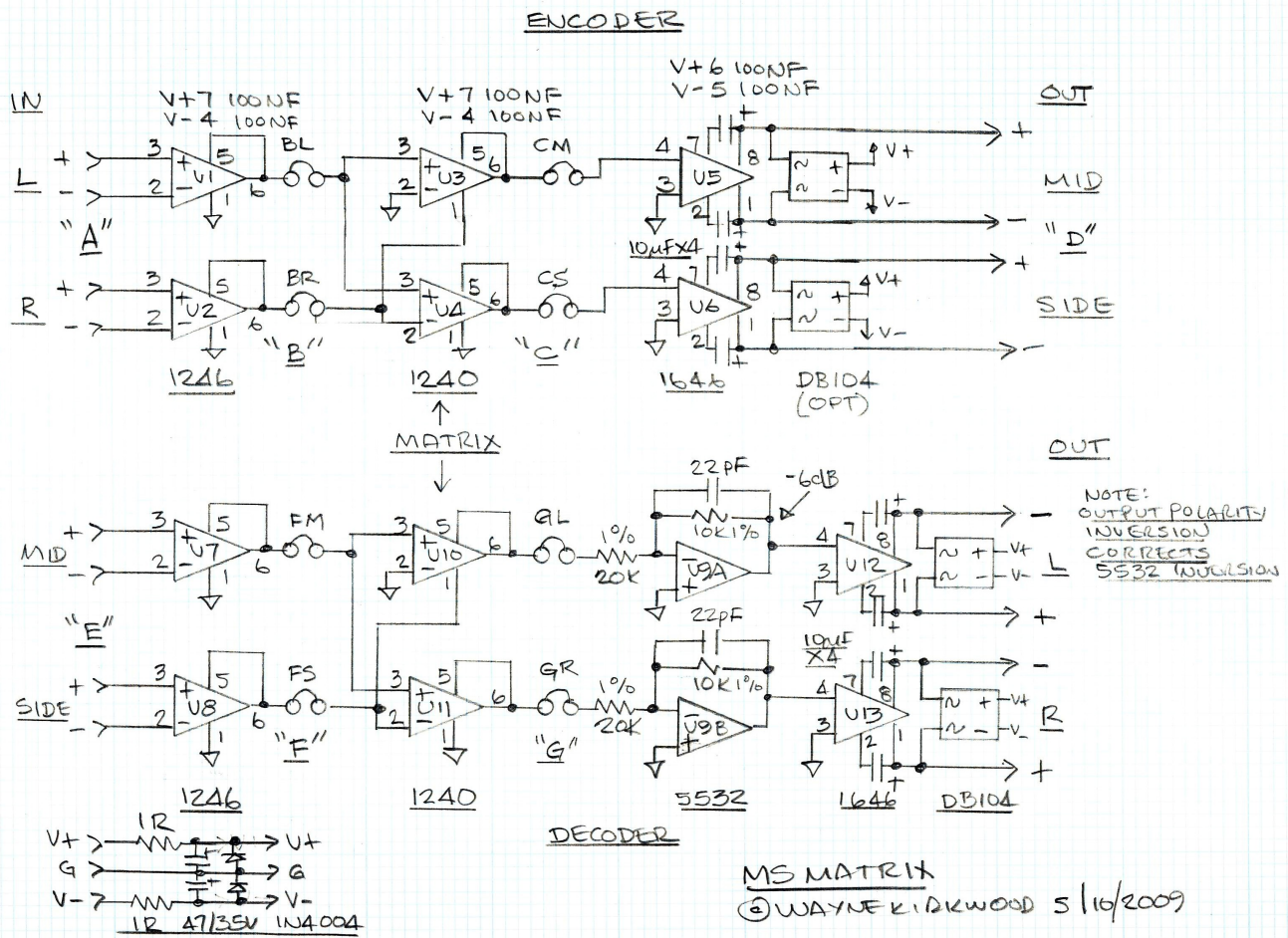
## Other Resources

Pro Audio Design Forum Build Thread:

<http://www.proaudiodesignforum.com/forum/php/viewtopic.php?f=7&t=262>

For more information contact: [sales@ka-electronics.com](mailto:sales@ka-electronics.com)

### Precision MS Matrix Schematic



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