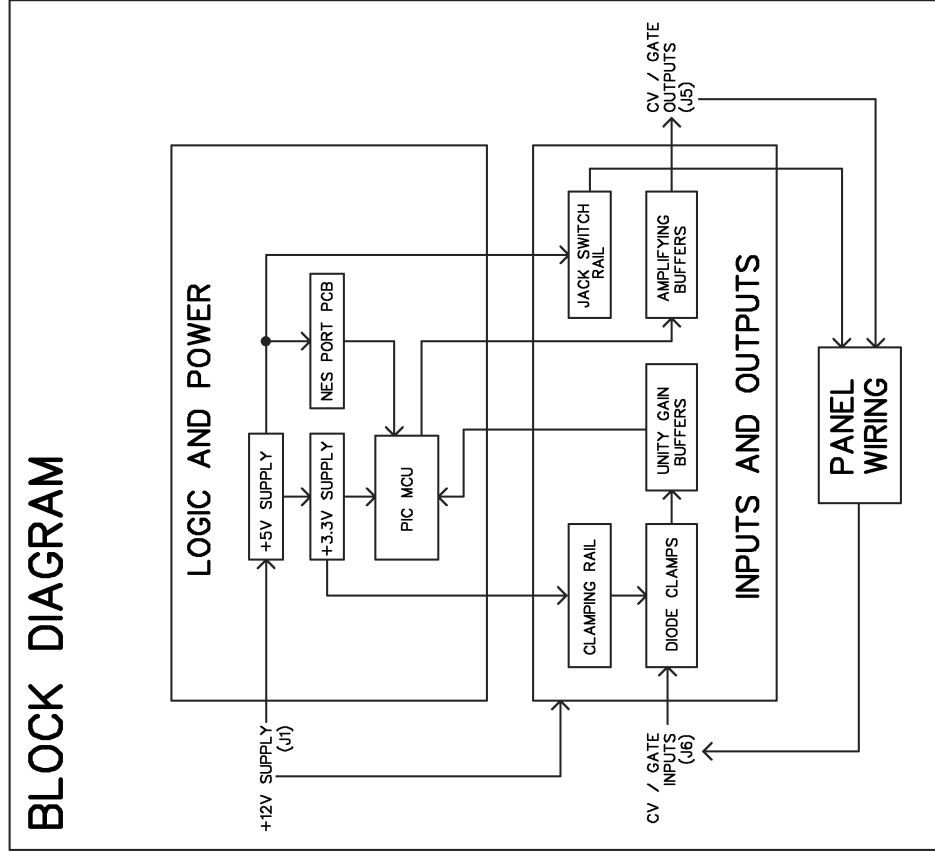


MING MECCA CONTROL CORE

DESIGNED BY JORDAN BARTEE IN PROVIDENCE, RI, SUMMER 2011
REVISED WINTER 2013

BLOCK DIAGRAM



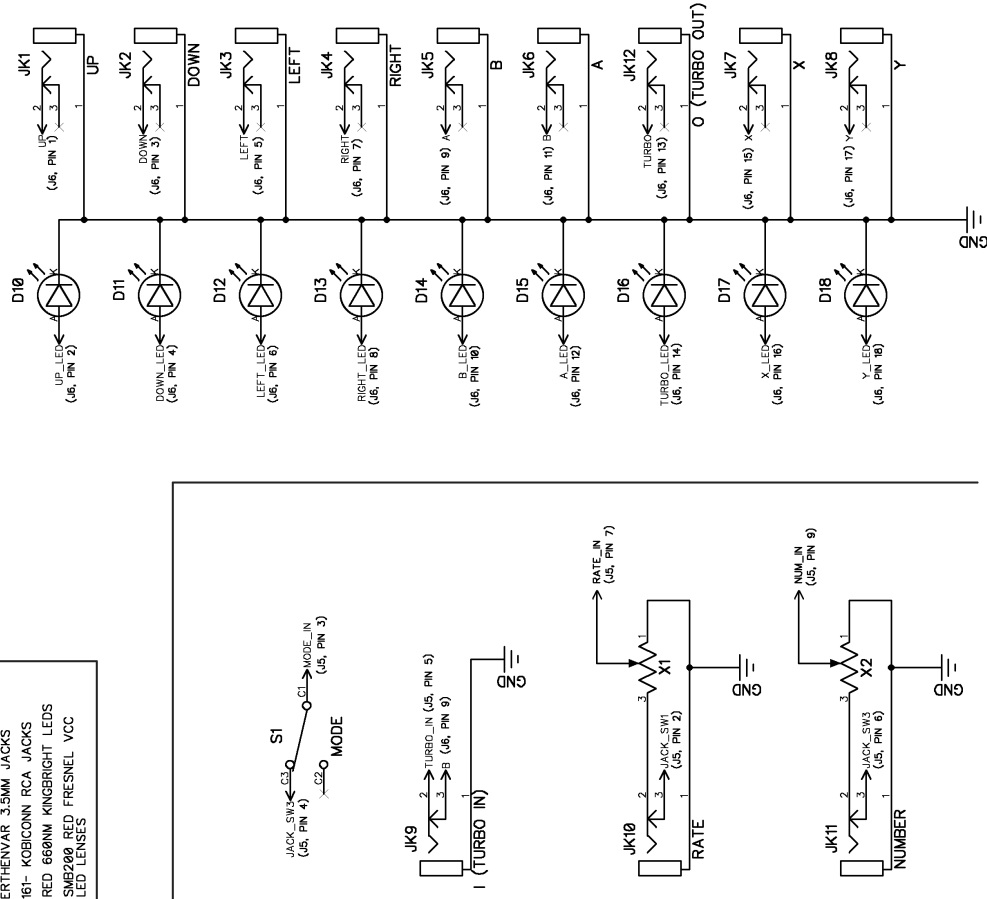
SSS-MM02-REV2

PANEL WIRING

PREFERRED HARDWARE:

- RV16AF 16MM ALPHA POTS
- SERIES M NKK TOGGLE SWITCHES
- ERTHENVAR 3.5MM JACKS
- 161- KOBICOON RCA JACKS
- RED 660NM KINGBRIGHT LEADS
- SMB2000 RED FRESNEL VCC LED LENSES

TOGGLE SWITCH S1 IS SPDT. SPST MAY BE SUBSTITUTED WITHOUT ISSUE.
ALL POTENTIOMETERS ARE 10K LINEAR.
LEADS SHOULD BE SELECTED FOR A FORWARD VOLTAGE OF 2.5V AND A FORWARD CURRENT OF 20 ma (APPROXIMATE).



LOGIC AND POWER

THIS DESIGN IS SPREAD ACROSS TWO PCB'S JOINED AT J3 / J4. THE MAIN PCB CONTAINS THE PIC MCU POWER SUPPLY AND CV PROCESSING (WHICH IS SHOWN ON THE "INPUTS AND OUTPUTS" SHEET). THE NES PORT PCB CONSISTS OF ONLY A PARALLEL NES CONTROLLER PORT CLONE AND A SCHMITT TRIGGER IC FOR SIGNAL INTEGRITY.

THE 7805 AND 7833 REGULATORS SHOULD BE HEATSINKED AND RATED FOR AT LEAST 130 mA EACH.

GROUND PINS 5 AND 6 ON POWER CONNECTOR J1 ARE INTENTIONALLY LEFT UNCONNECTED TO PREVENT DAMAGING SHORTS FROM OCCURRING IF J1 IS CONNECTED BACKWARDS DUE TO USER ERROR. PINS 1, 2, AND 13 - 15 ARE ALSO LEFT UNCONNECTED.

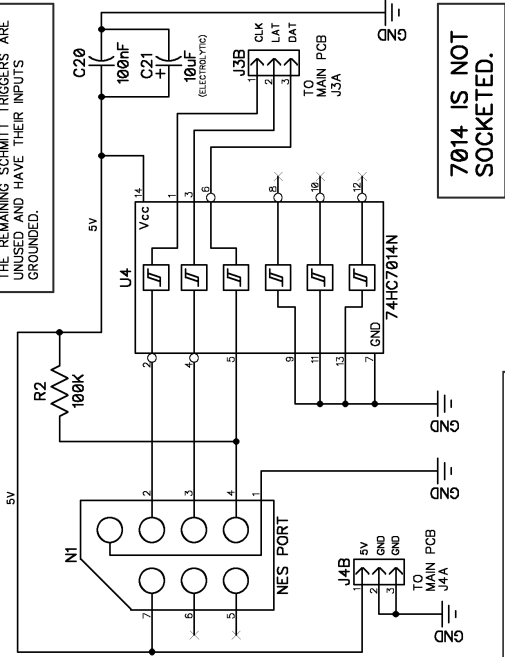
FOR OP AMPS, THE ABSOLUTE MINIMUM DECOUPLING CONFIGURATION IS SHOWN, CONSISTING OF A SINGLE 10µF CERAMIC CAPACITOR PER IC AND A 6.8µF OF POLYMER TYPE. HOWEVER, IT IS RECOMMENDED THAT EACH IC BE GROUPED CLOSELY TOGETHER SINCE THEY SHARE THE TANTALUM CAPACITOR. ADDITIONAL DECOUPLING MAY BE NECESSARY DEPENDING ON PCB DESIGN.

ALL RESISTORS ARE 5% TOLERANCE, EXCEPT FOR R27 AND R28, WHICH ARE 1% OR BETTER.

ALL CAPACITORS ARE CERAMIC EXCEPT WHERE NOTED.

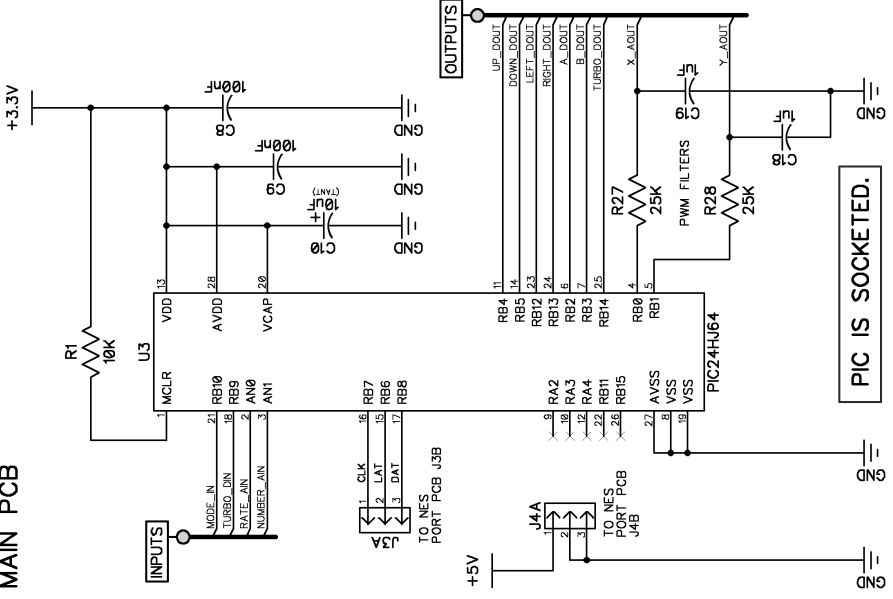
NES PORT PCB

NOTE THE SIGNAL FLOW ON U4: THE SCHMITT TRIGGERS ON CLK AND LAT LINES ARE INVERTED RELATIVE TO THE DAT LINE.



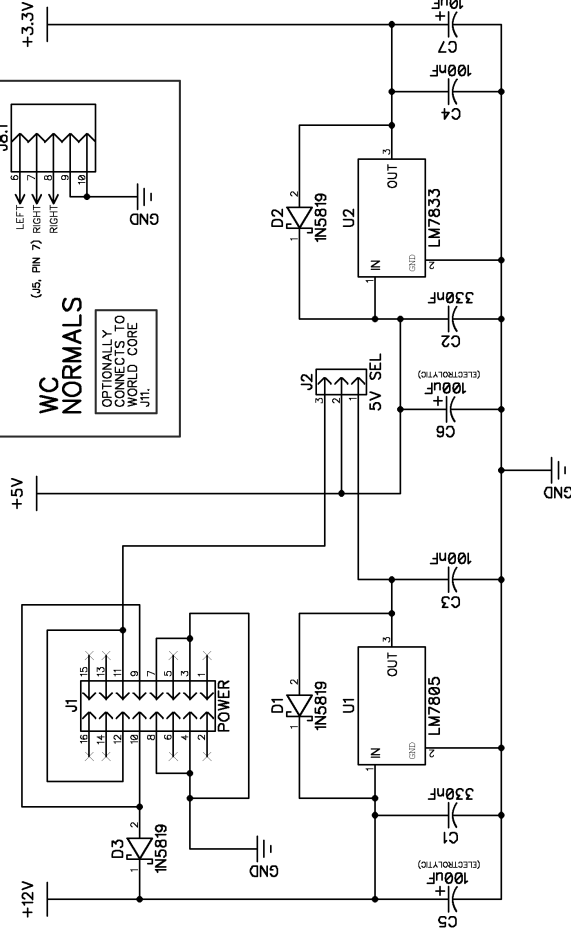
7014 IS NOT SOCKETED.

MAIN PCB



PIC IS SOCKETED.

POWER (MAIN PCB)



12V SUPPLY

OP AMPS U5 - U8

5V SUPPLY

SCHMITT TRIGGER U4

NES PORT X1

3.3V SUPPLY

PIC MCU U3

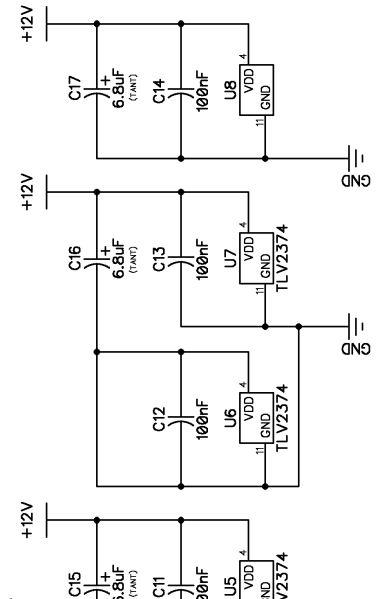
TOTAL CURRENT

CONSUMPTION

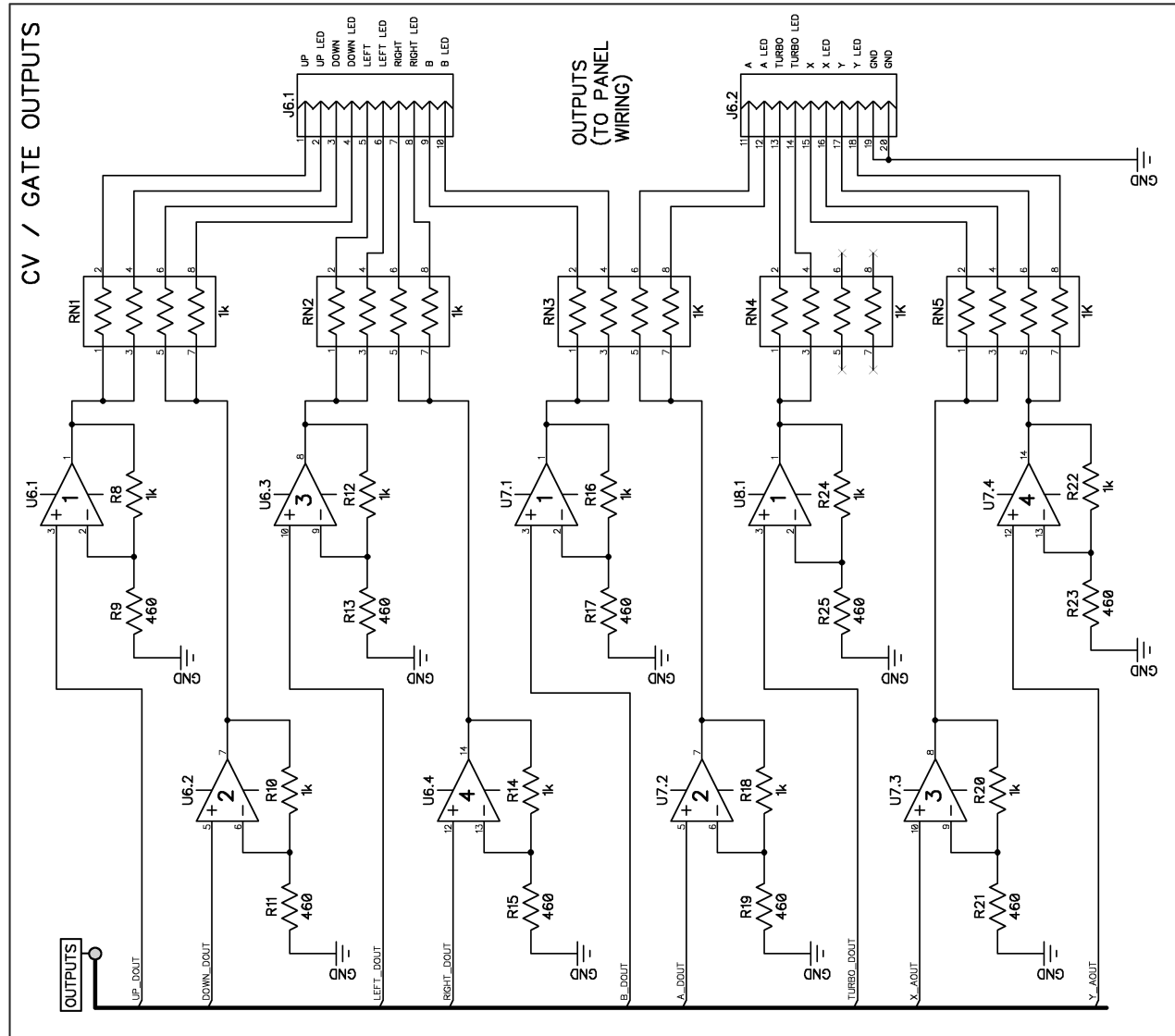
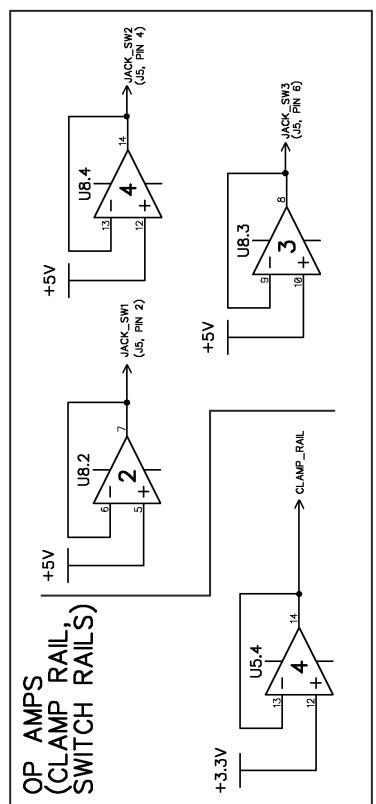
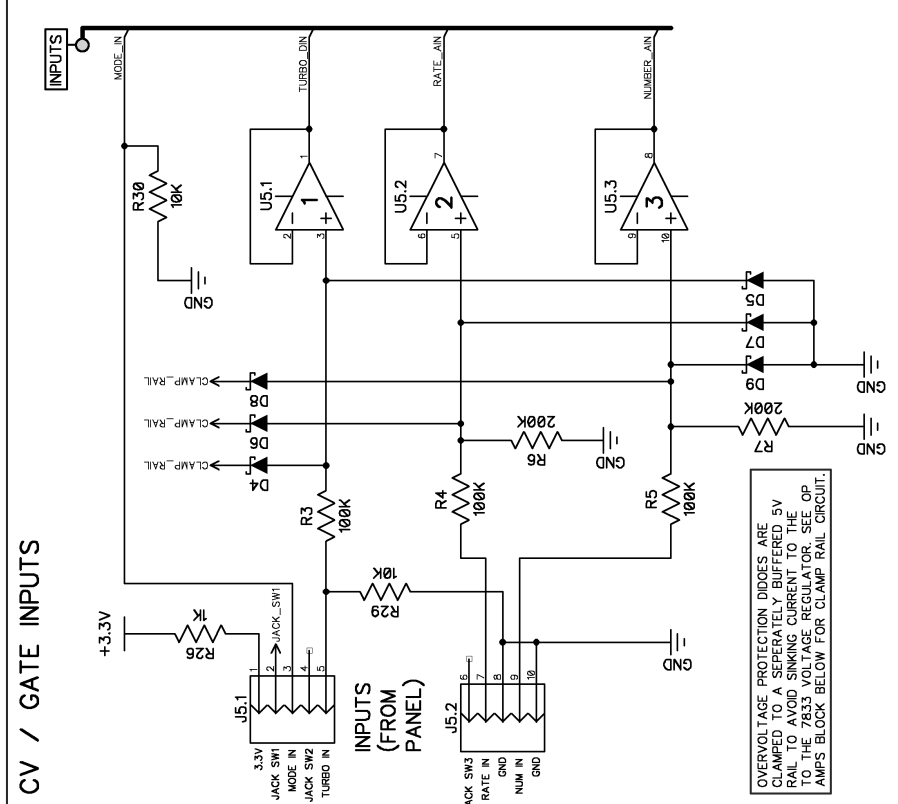
APPROX. 130 mA

OP AMP SUPPLY (MAIN PCB)

OP AMPS ARE NOT SOCKETED.



INPUTS AND OUTPUTS (MAIN PCB)



ALL OP AMPS ARE TLV2374. SEE POWER SHEET FOR SUPPLY AND DECOUPLING INFORMATION. OP AMP GAIN IS CALIBRATED FOR 10.5V GATE OUTPUTS. ALL RESISTOR NETWORKS ARE 5% TOLERANCE. R4 - R24 ARE 1% TOLERANCE OR BETTER. R3 AND R30 ARE 5% TOLERANCE. ALL DIODES ARE BAT855.