

# PACKAGE 1 ASTROCADE SYSTEM UPGRADE\*

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## DRAWING COMMENTS

RAM BOARD VIDEO RAM SCHEMATIC - TYPE 4116 DYNAMIC RAM IS USED IN LIEU OF TYPE 4027 SINCE IT IS GENERALLY CHEAPER AND EASIER TO OBTAIN.

RAM BOARD LAYOUT - CLOSE TO ACTUAL SIZE

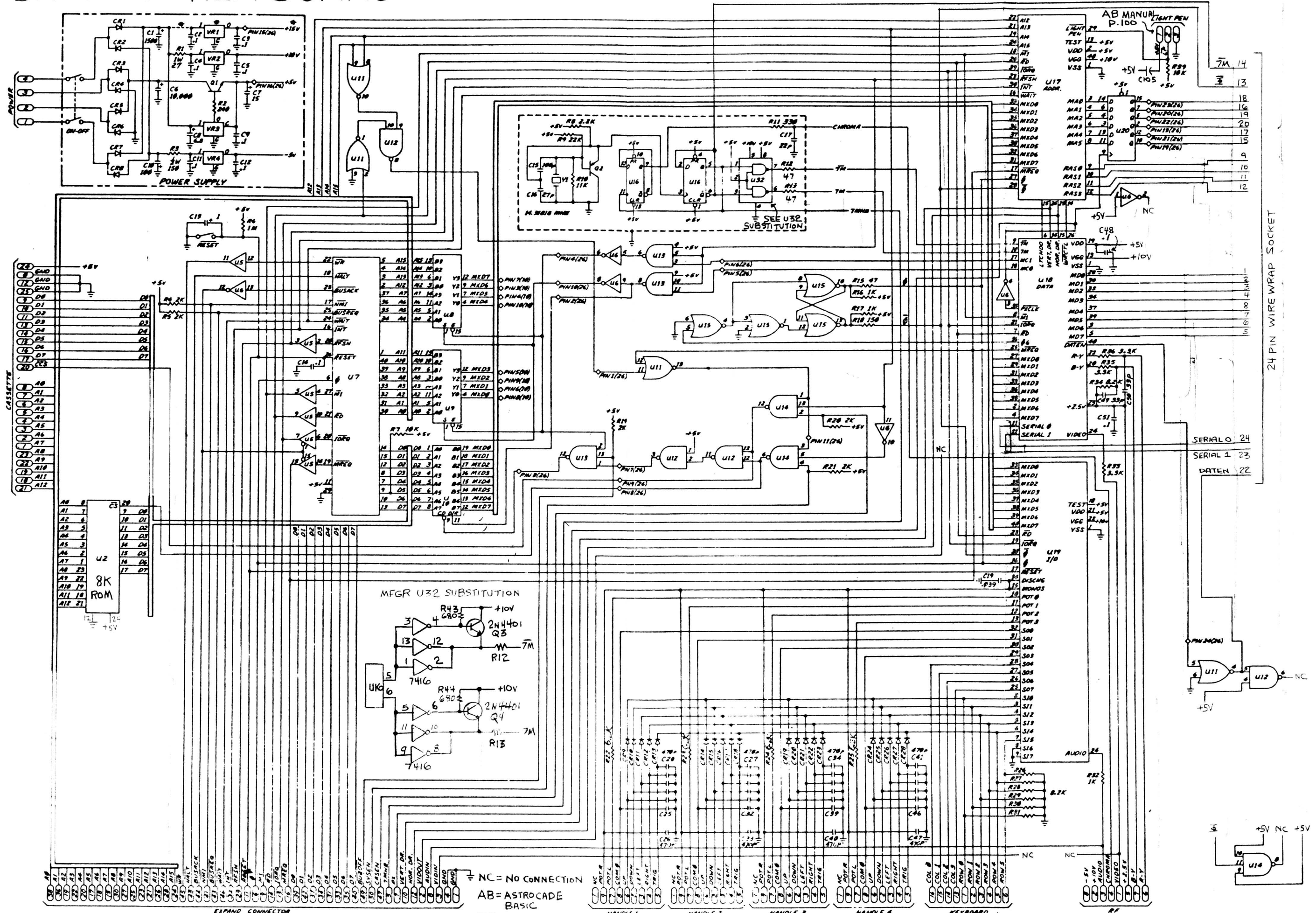
RAM BOARD OPTIONAL 16K ROM DECODER SCHEMATIC - SCHEME IS UNTESTED

AUDIO/VIDEO BOARD LAYOUT - TYPE LM377 AUDIO AMPLIFIER CHIP IS PROBABLY DISCONTINUED. OTHER AUDIO AMPLIFIERS CAN BE SUBSTITUTED. RADIO SHACK, FOR EXAMPLE, HAS SEVERAL AUDIO AMPLIFIER CHIPS.

AUDIO/VIDEO BOARD LAYOUT - CLOSE TO ACTUAL SIZE

\* LOW OR HIGH RESOLUTION GRAPHICS, USER RAM, COMPOSITE COLOR VIDEO OUTPUT AND AUDIO OUTPUT.

# BALLY MOTHER BOARD



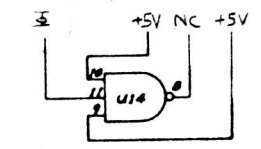
EXPAND CONNECTOR  
SEE AB MANUAL P.99

NC = NO CONNECTION  
AB = ASTROCADE BASIC  
BB = BALLY BASIC

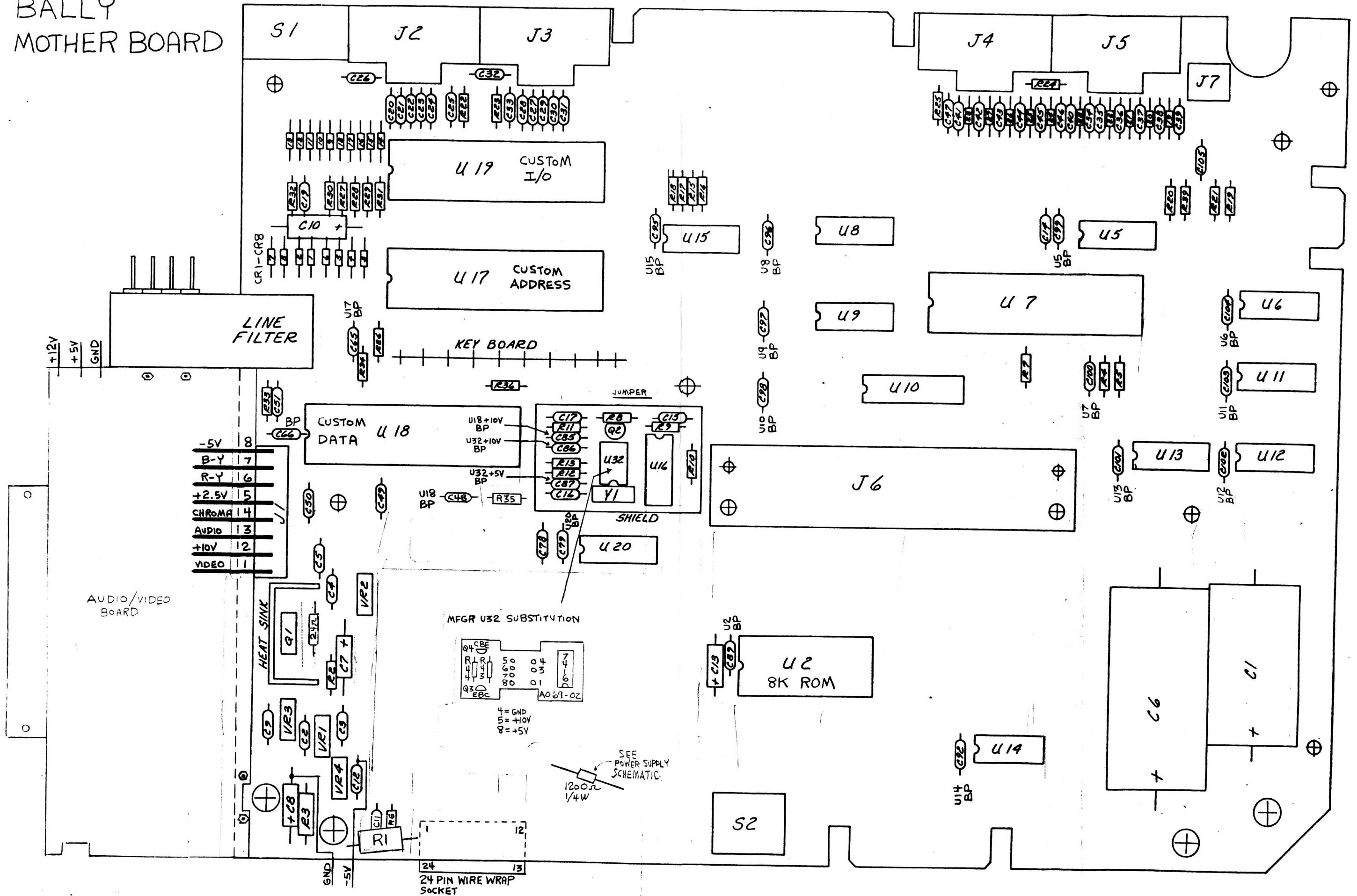
HANDLE 1  
HANDLE 2  
HANDLE 3  
HANDLE 4  
SEE AB MANUAL P.100

KEYBOARD  
SEE BB HACKER'S GUIDE P.7

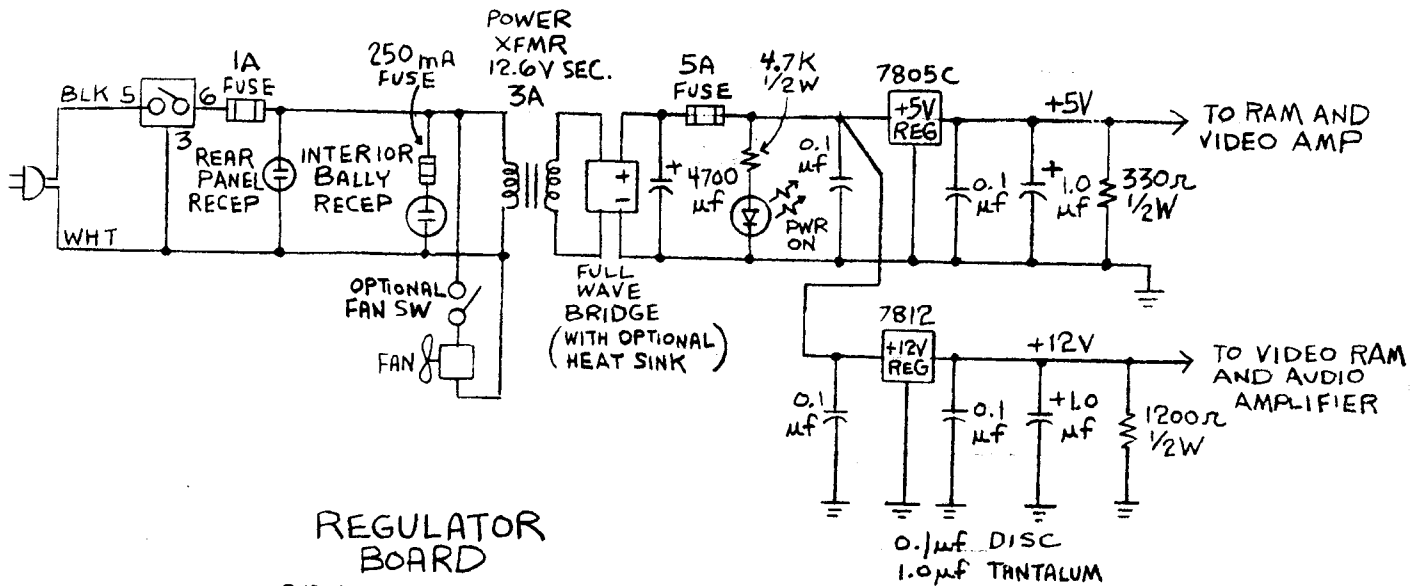
24 PIN WIRE WRAP SOCKET



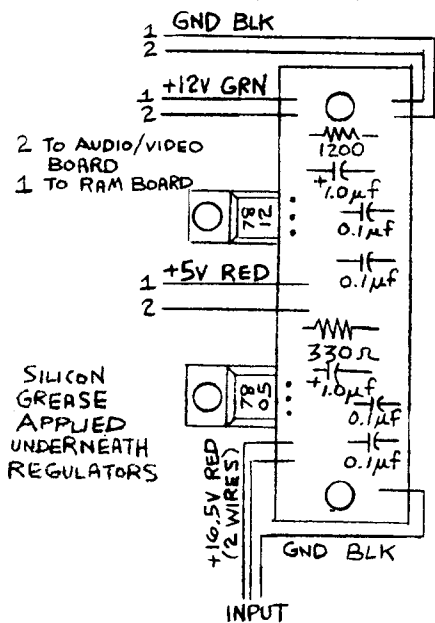
# BALLY MOTHER BOARD



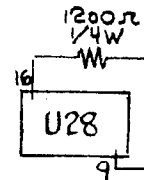
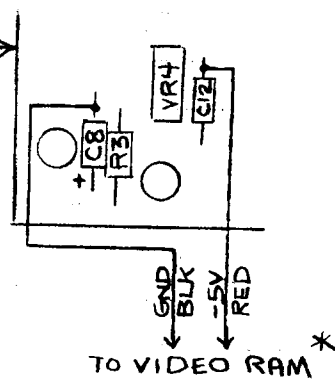
# COMPUTER POWER SUPPLY



## REGULATOR BOARD



## BALLY MOTHERBOARD



SOLDER TO ONE OF MOTHER BOARD VIDEO RAM PATTERNS (U24-U31) TO DISCHARGE BALLY +12V CAPACITORS WHEN POWER IS OFF.

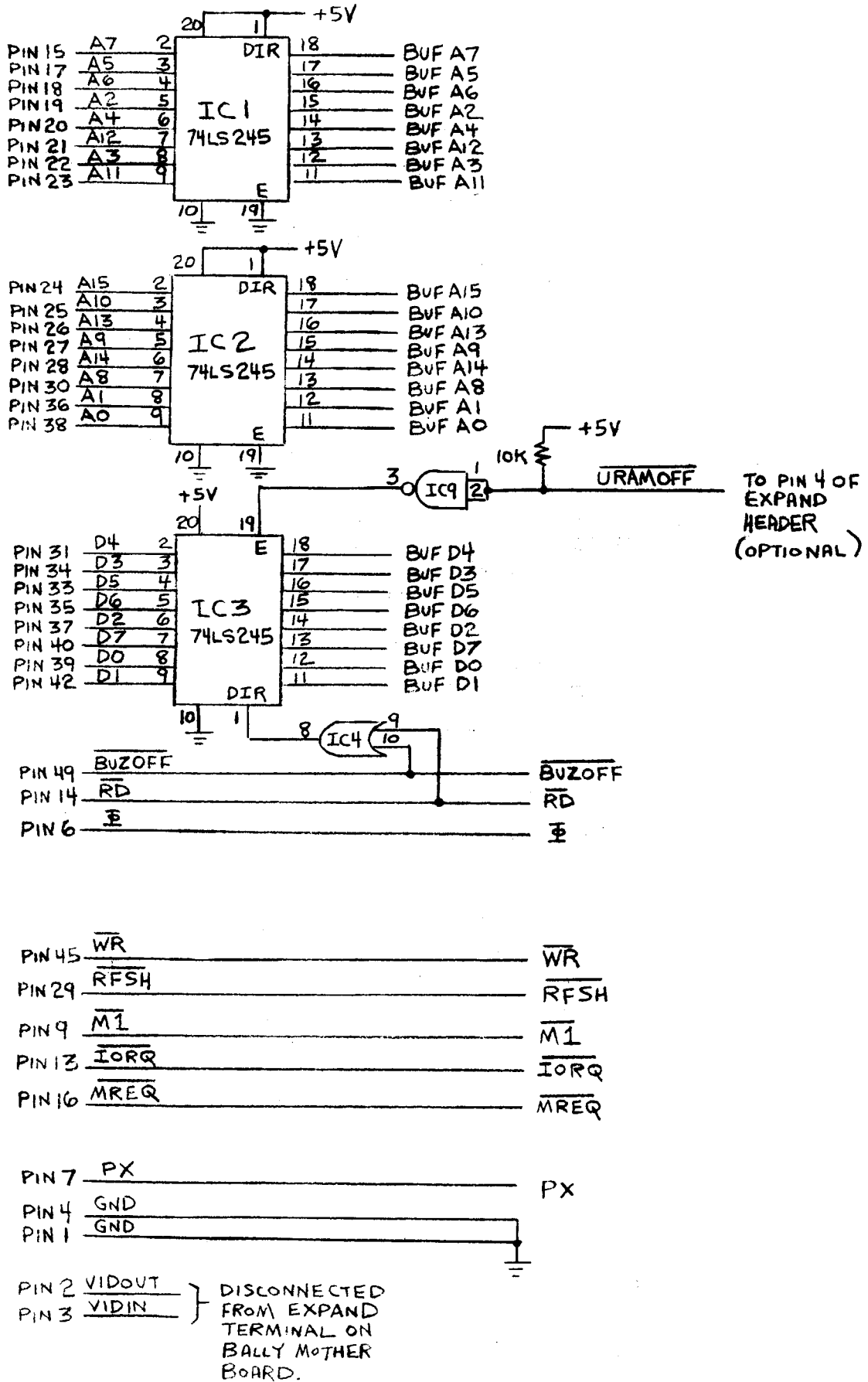
## PARTS LIST

PART	RADIO SHACK CAT. #
PRIMARY FUSE HOLDER	270-365
BALLY XFMR FUSE HOLDER	270-1281
FULL WAVE BRIDGE	276-1180
4700µf ELECTROLYTIC	272-1022
SECONDARY FUSE HOLDER	270-739
+5V REGULATOR	276-1770
+12V REGULATOR	276-1771
POWER XFMR	273-1511

\* EXIT CUTOUT IN BALLY CABINET BOTTOM (AVOID CONTACT WITH RESISTOR R1).

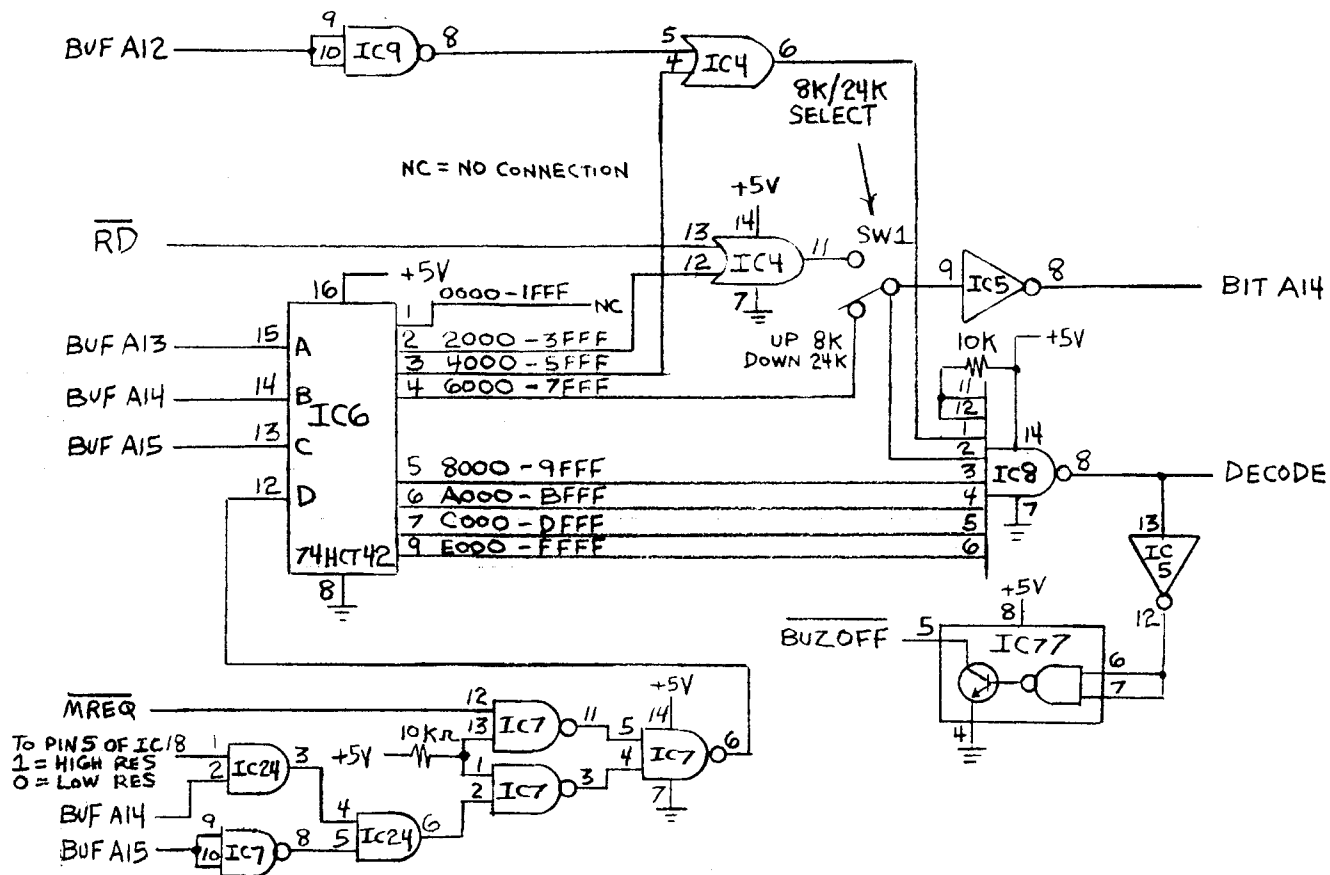
# RAM BOARD

50 CONTACT (PIN) ①  
EXPAND  
INTERFACE



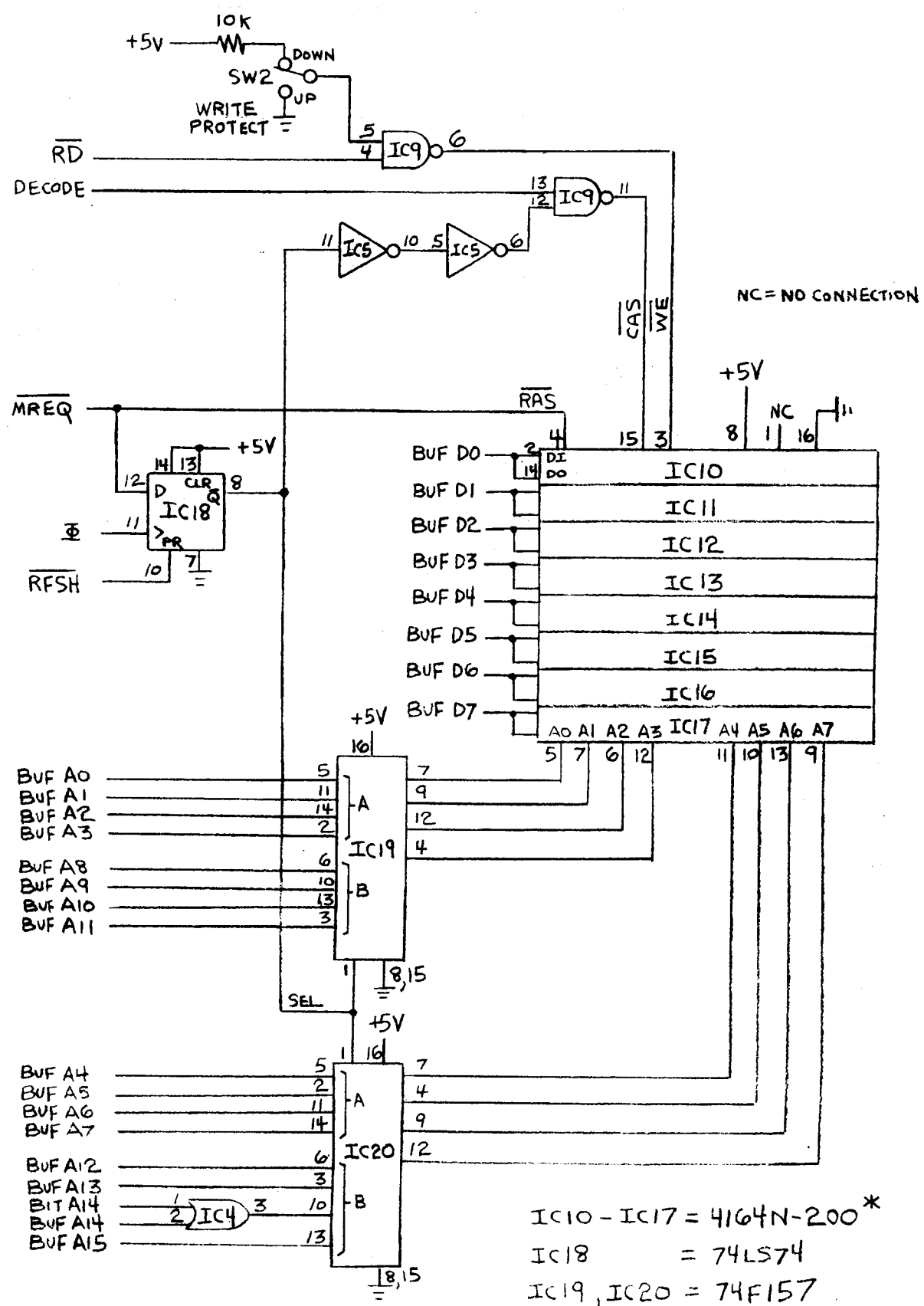
# RAM BOARD

USER RAM ②  
DECODER



- IC4 = 74LS32
- IC5 = 74LS04
- IC6 = 74LS42
- IC7 = 74LS00
- IC8 = 74LS30
- IC9 = 74LS00
- IC77 = 75451 (DUAL PERIPHERAL DRIVER)

# RAM BOARD

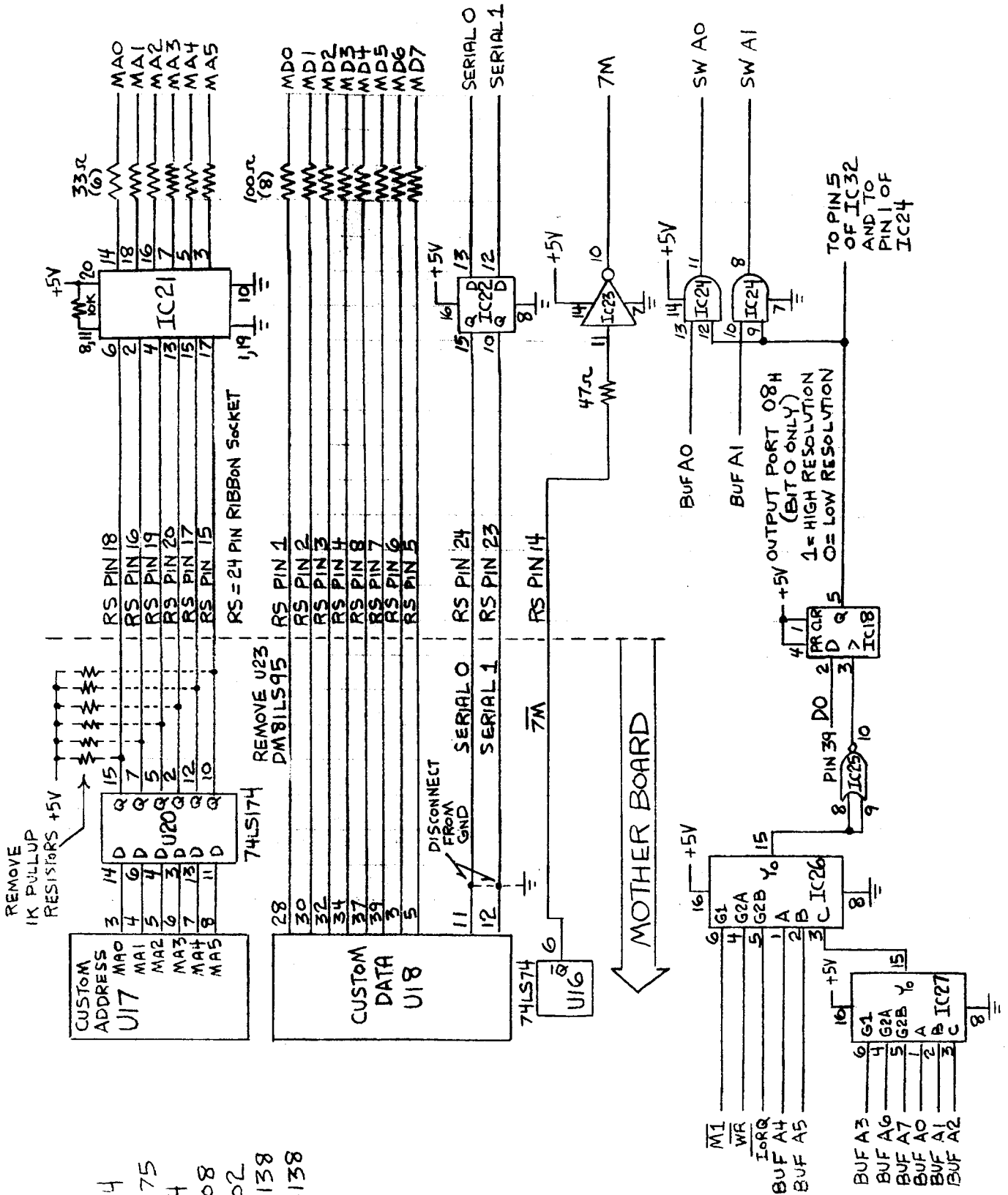


NC = NO CONNECTION

IC10 - IC17 = 4164N-200\*  
 IC18 = 74LS74  
 IC19, IC20 = 74F157

\* NO REFRESH PIN 1 (NO CONNECTION)

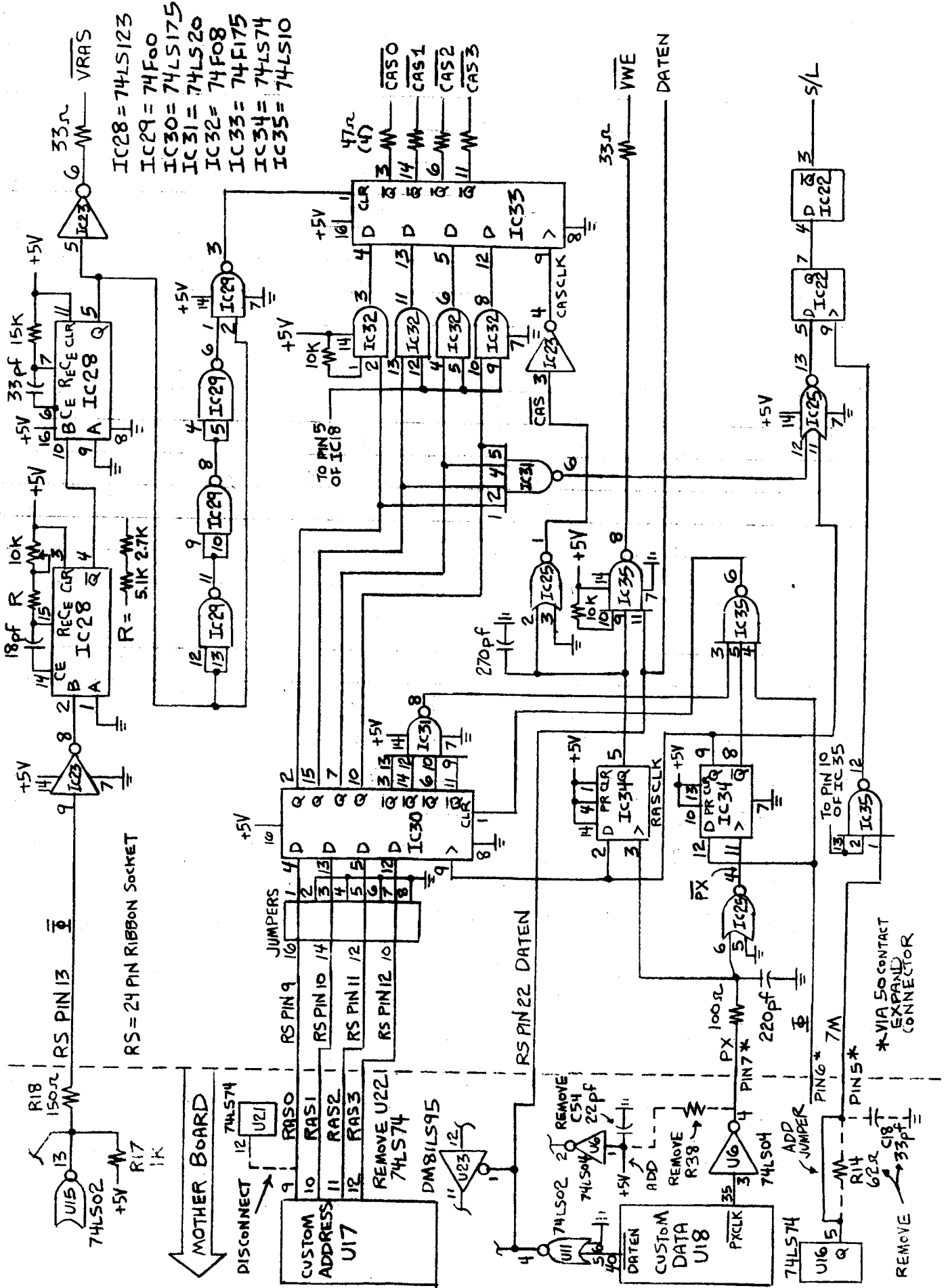
# RAM BOARD

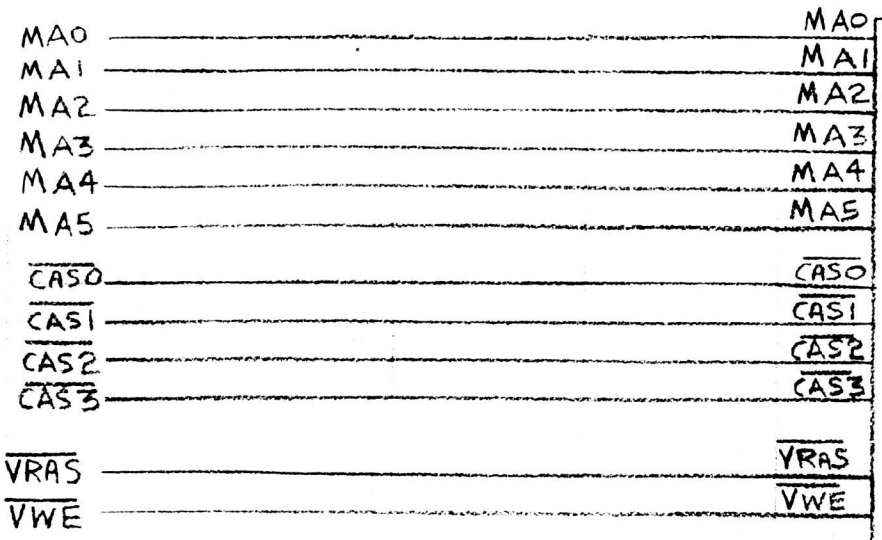


- IC21 = 74F244
- IC22 = 74LS175
- IC23 = 74F04
- IC24 = 74LS08
- IC25 = 74LS02
- IC26 = 74LS138
- IC27 = 74LS138



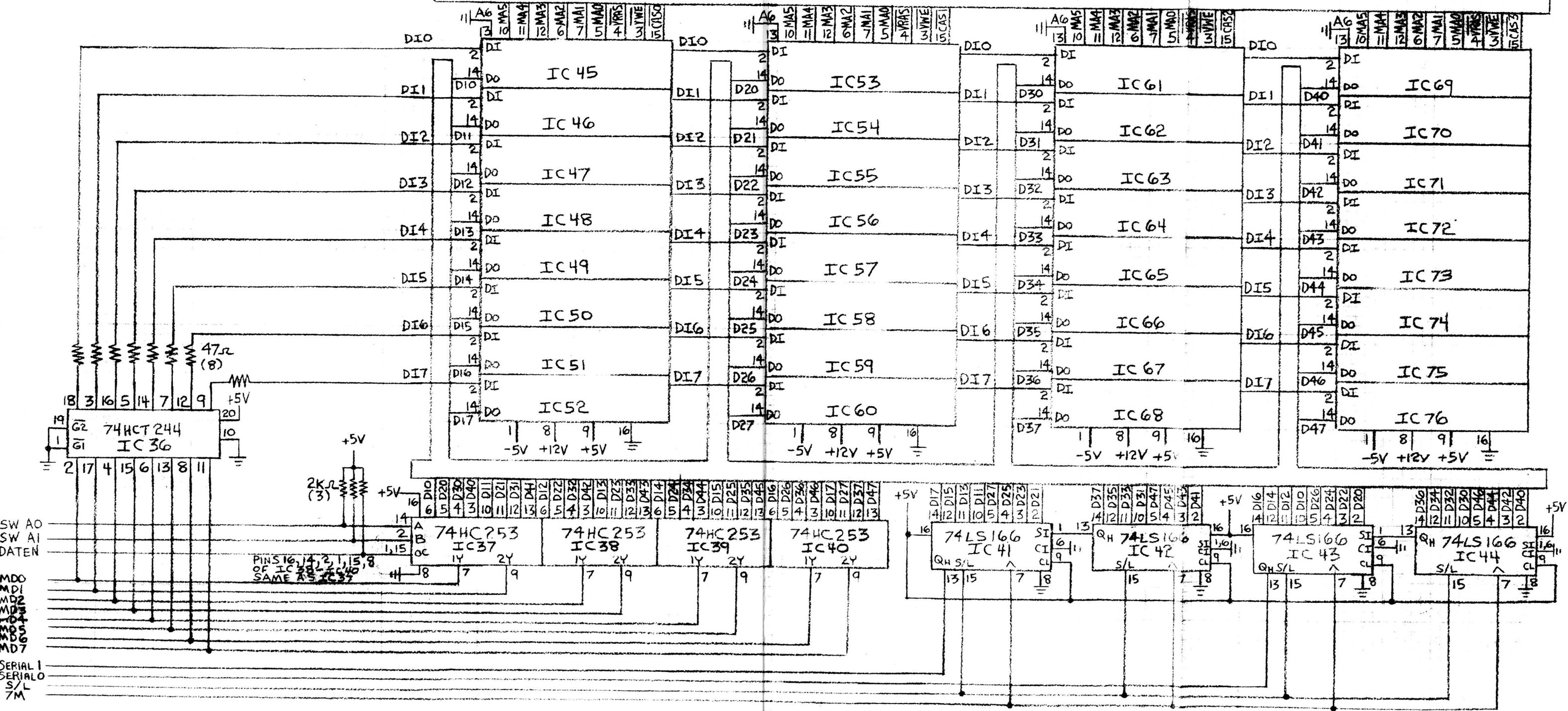
# RAM BOARD





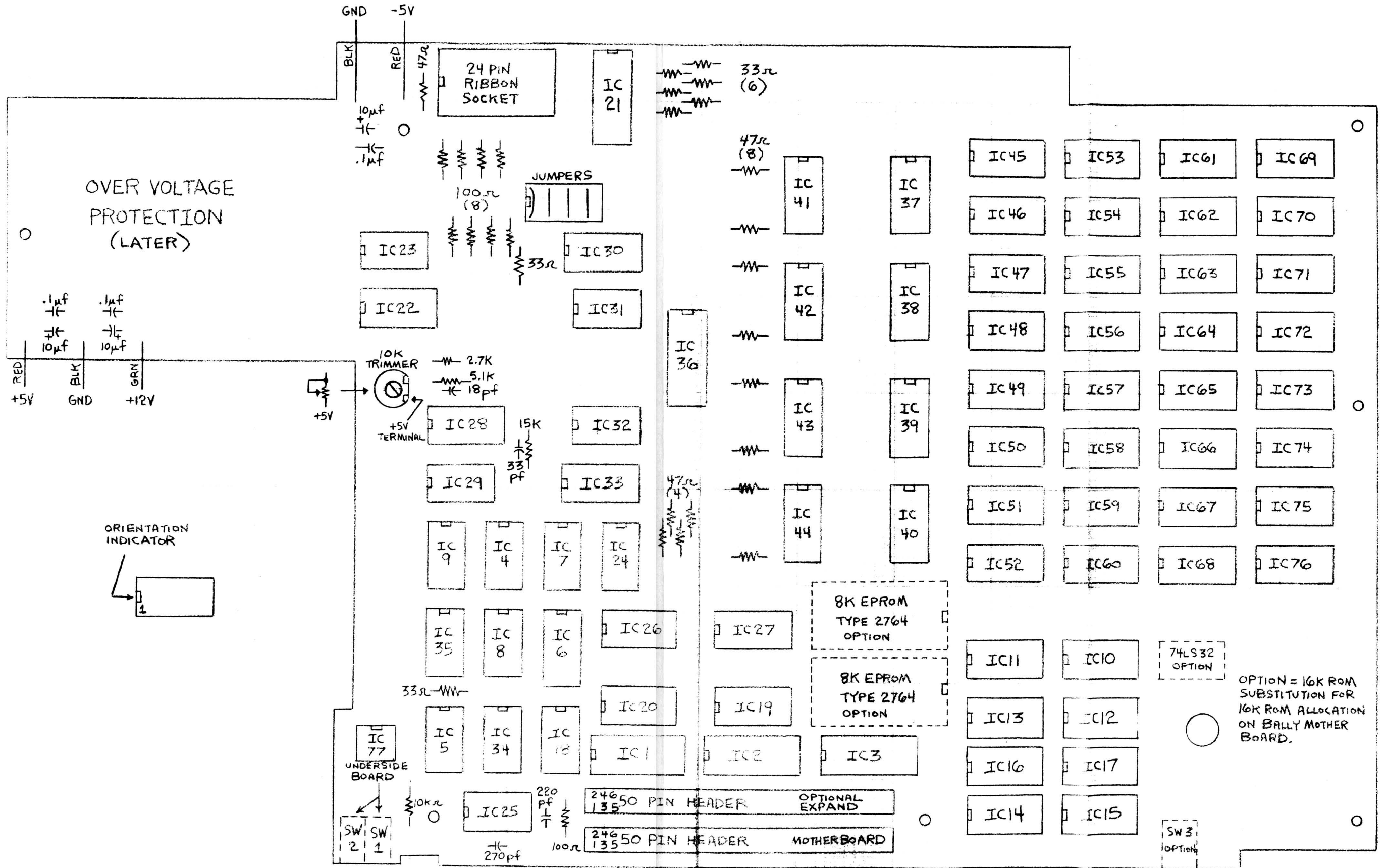
# RAM BOARD

IC45 - IC76 = TYPE 4116  
DYNAMIC RAM  
200 OR 250NS



SW A0  
SW A1  
DATEN  
MD0  
MD1  
MD2  
MD3  
MD4  
MD5  
MD6  
MD7  
SERIAL I  
SERIAL O  
S/L  
7M

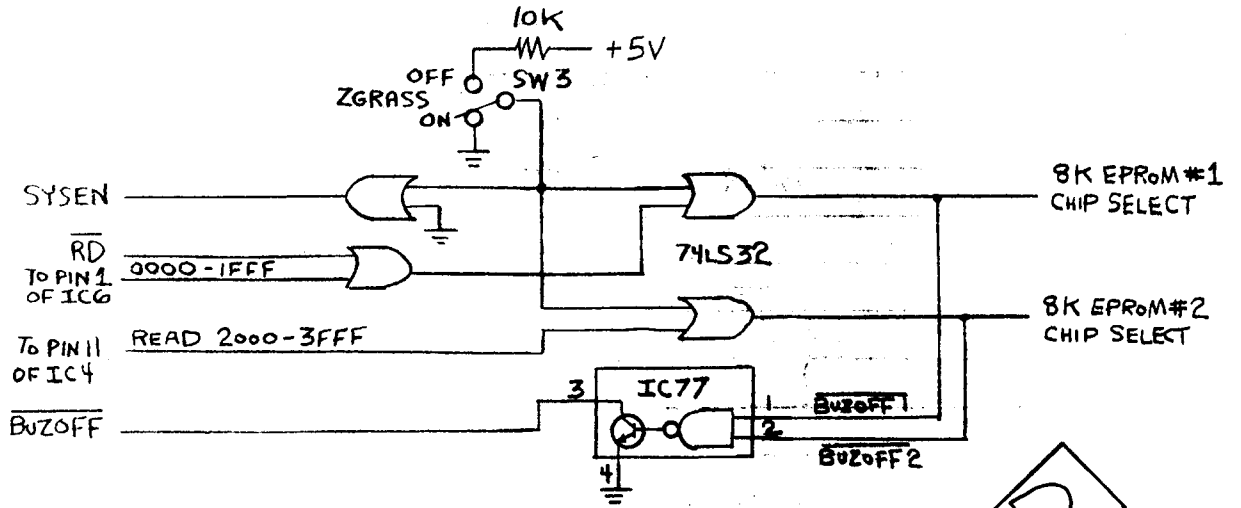
# RAM BOARD



OPTION = 16K ROM  
SUBSTITUTION FOR  
16K ROM ALLOCATION  
ON BALLY MOTHER  
BOARD.

# RAM BOARD

OPTIONAL 16K ROM (8)  
(ZGRASS) DECODER.  
SEE NOTE 2.



## ZGRASS DISABLE PROCEDURE

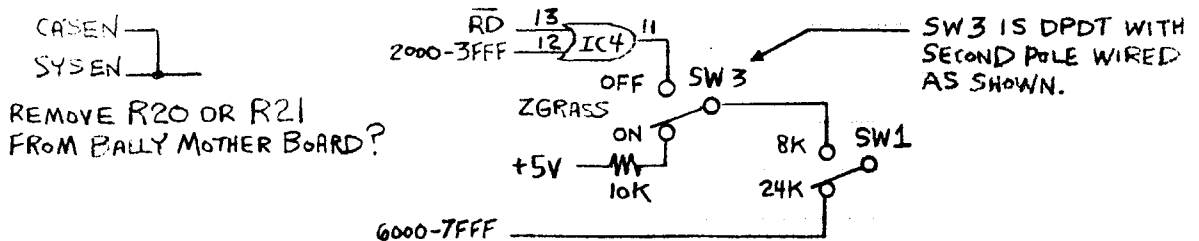
- ① FLIP ZGRASS SWITCH TO OFF POSITION.
- ② PRESS SYSTEM RESET BUTTON.

## ZGRASS ENABLE PROCEDURE

- ① REMOVE ANY CARTRIDGE FROM CASSETTE SLOT.
- ② FLIP 8K/24K SELECT SWITCH TO 24K POSITION.
- ③ FLIP ZGRASS SWITCH TO ON POSITION.
- ④ PRESS SYSTEM RESET BUTTON.

## NOTES

1 ZGRASS ENABLE PROCEDURE ① AND ② CAN BE ELIMINATED BY ADDING:

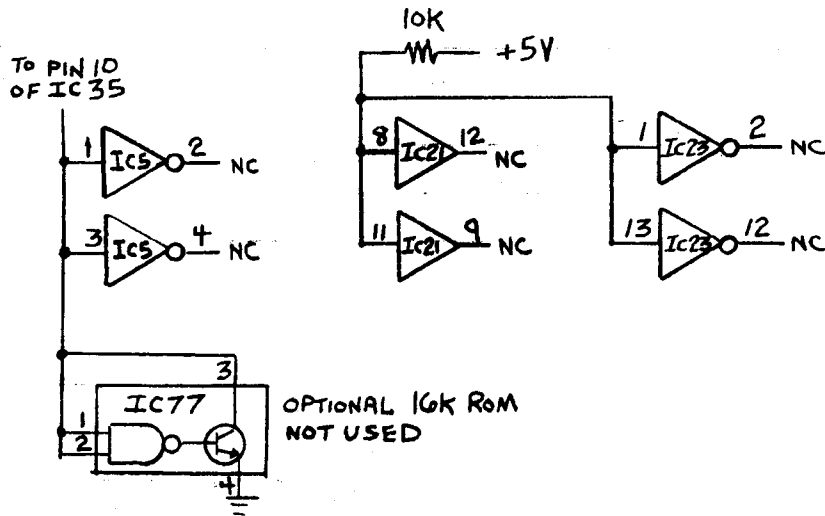


2. SUBSTITUTES 16K ROM ALLOCATION ON BALLY MOTHER BOARD.

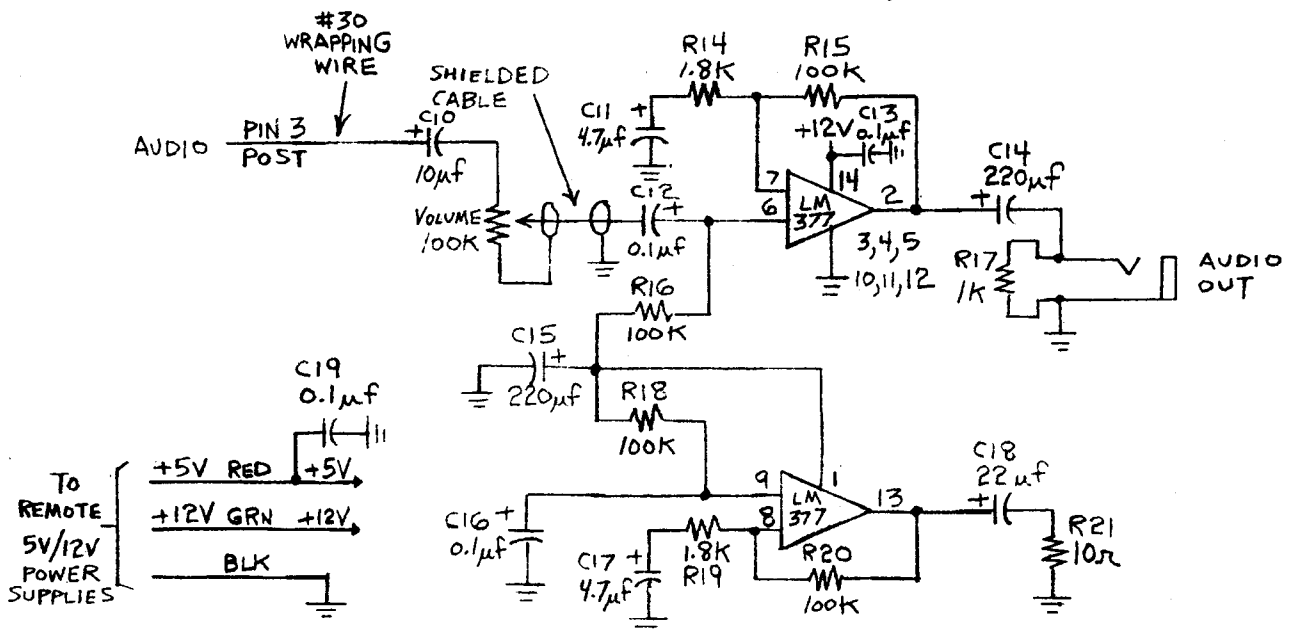
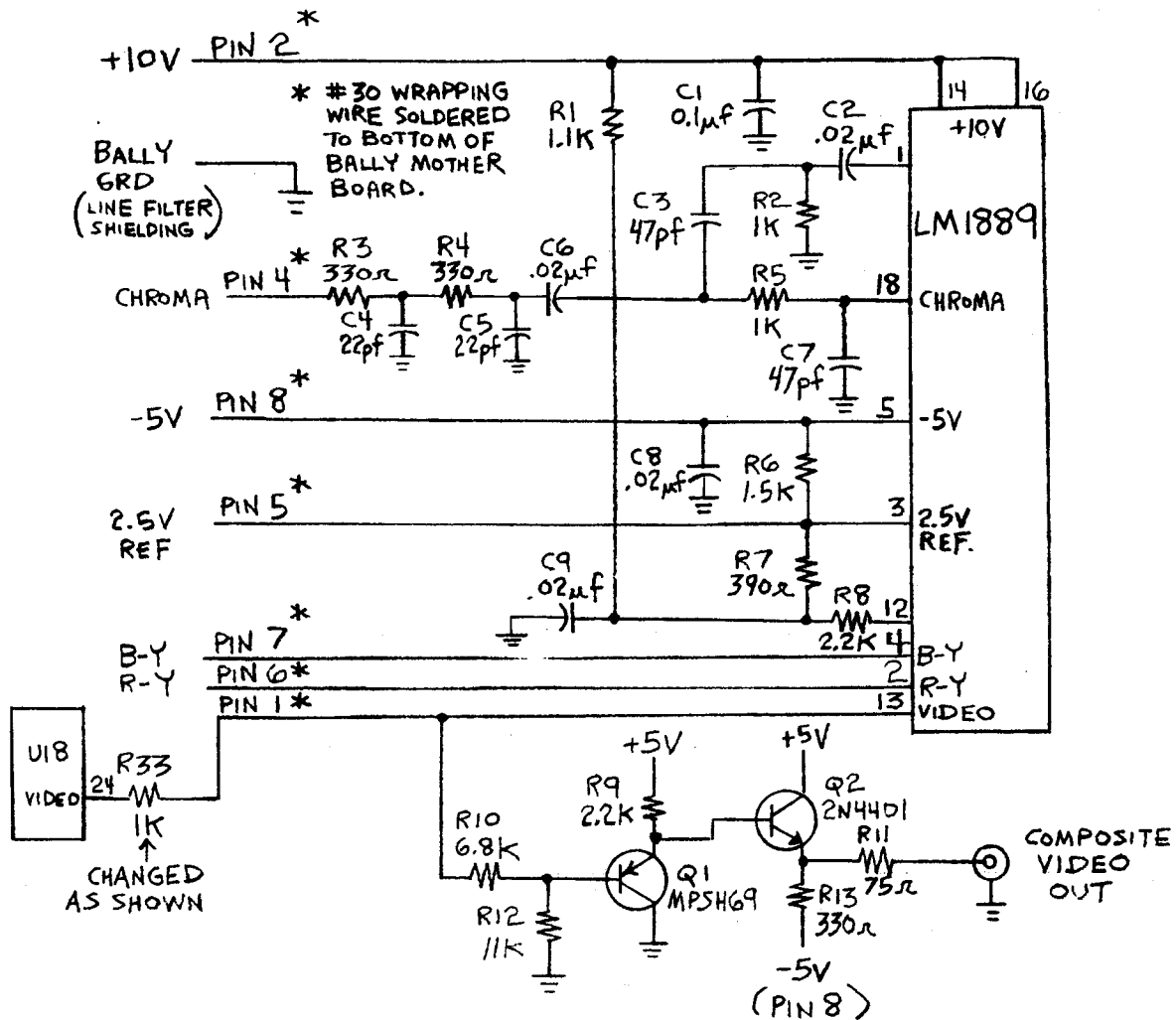
UNTESTED

# RAM BOARD

SPARES ⑨

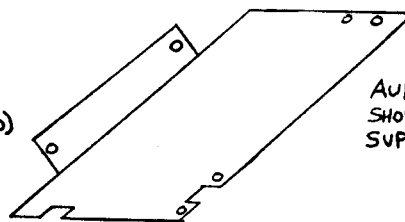
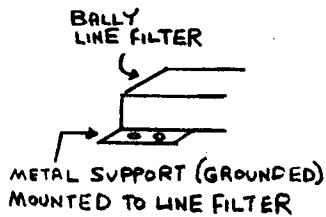
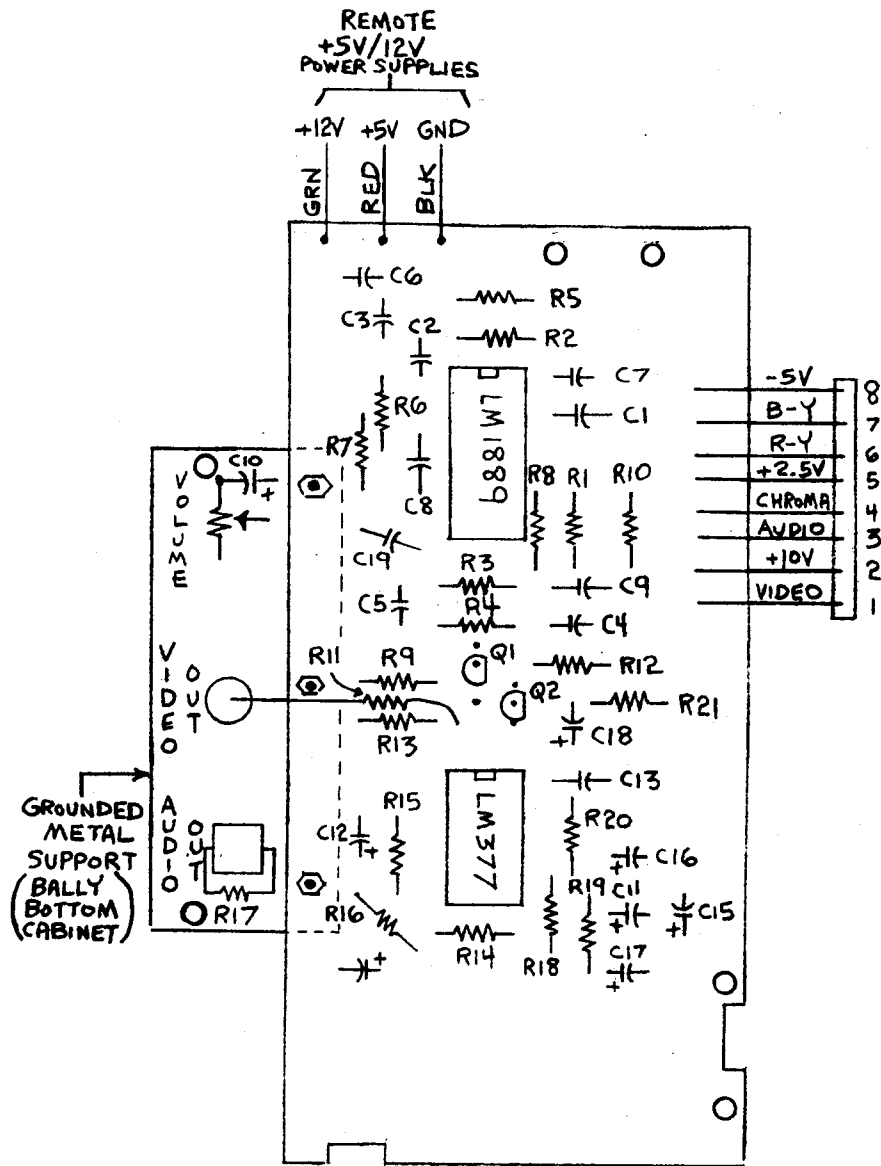


# AUDIO/VIDEO BOARD



# AUDIO/VIDEO BOARD

LAYOUT ②



AUDIO/VIDEO BOARD SHOWN WITH MOUNTING SUPPORT AND HOLES