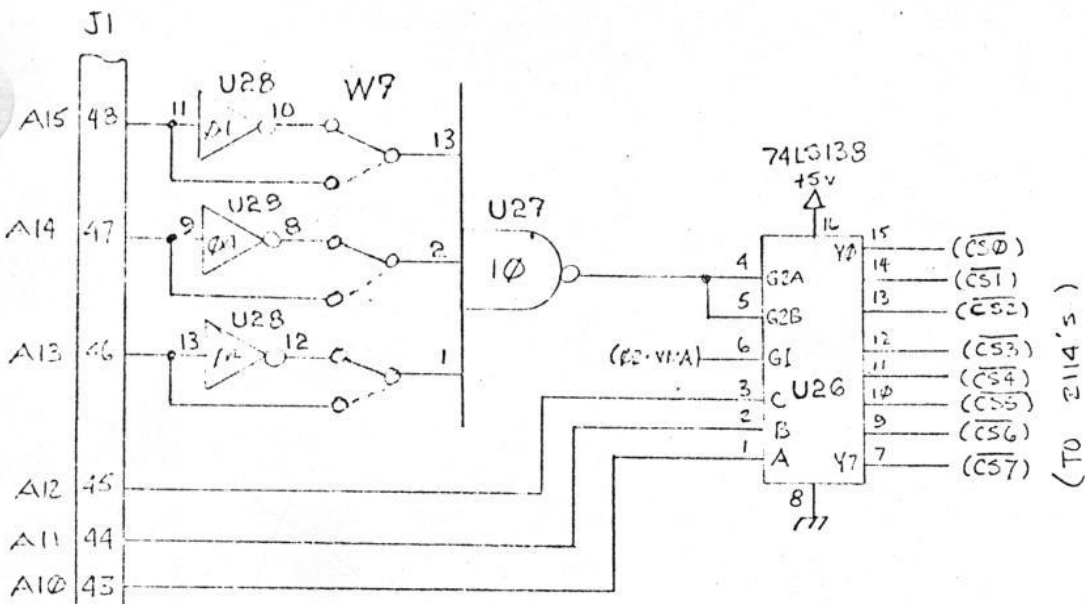


NC. - P 35, 36, 5

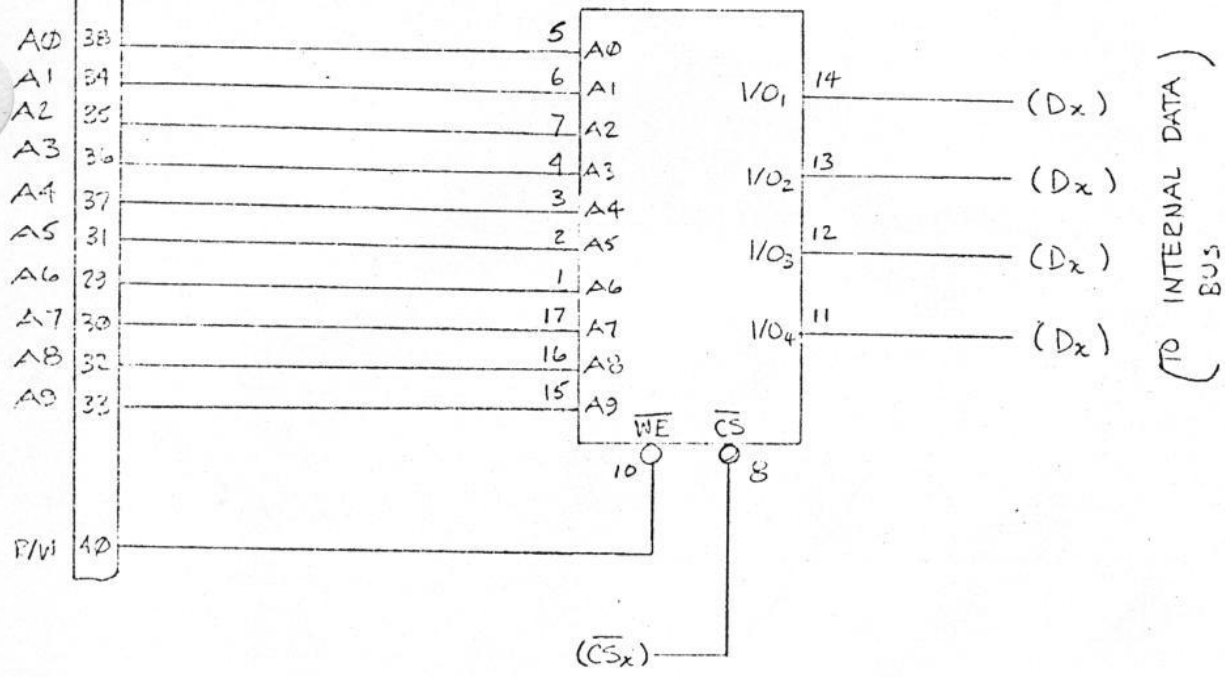
OHIO SCIENTIFIC

product name/number
MODEL 502- μ P AND CLOCK

date	revision	page	status	sheet 1 of 12
------	----------	------	--------	---------------



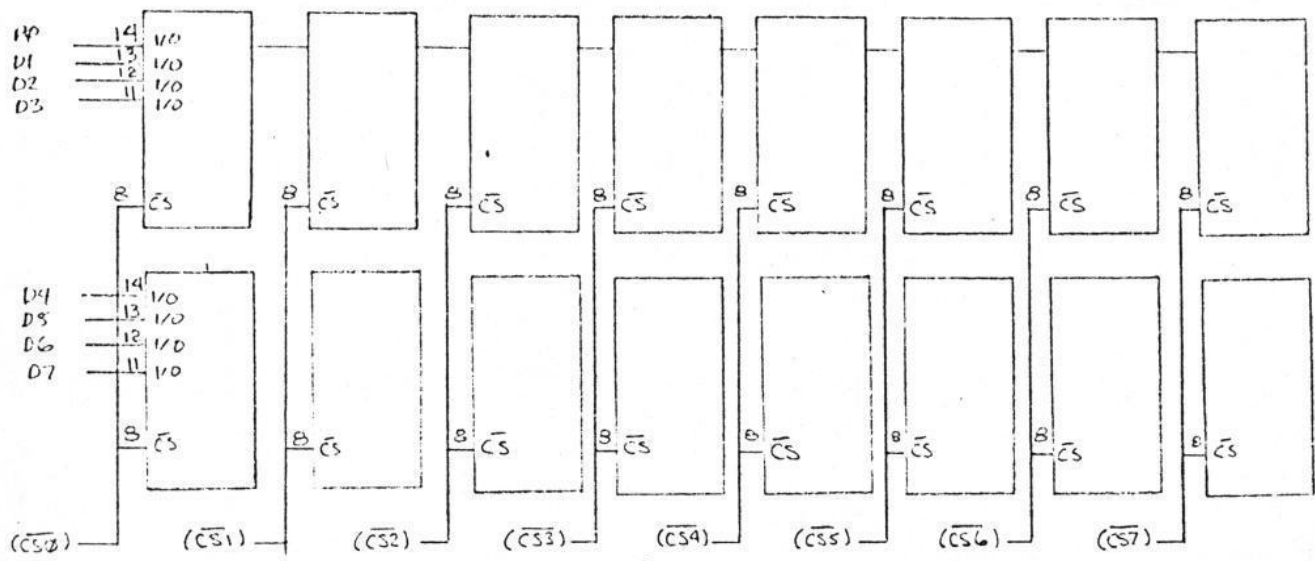
2114 - TYP FOR I6
(SEE SHEET 3110)



(TO INTERNAL DATA BUS)

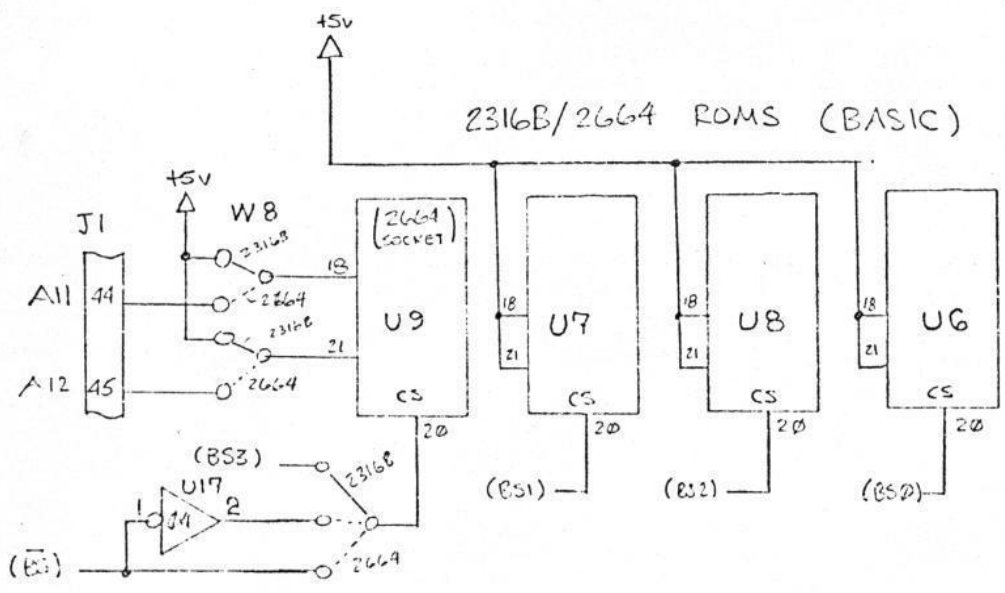
OHIO SCIENTIFIC

product name/number
MODEL 502 - (RAM)



2114 - RAM CHIPS

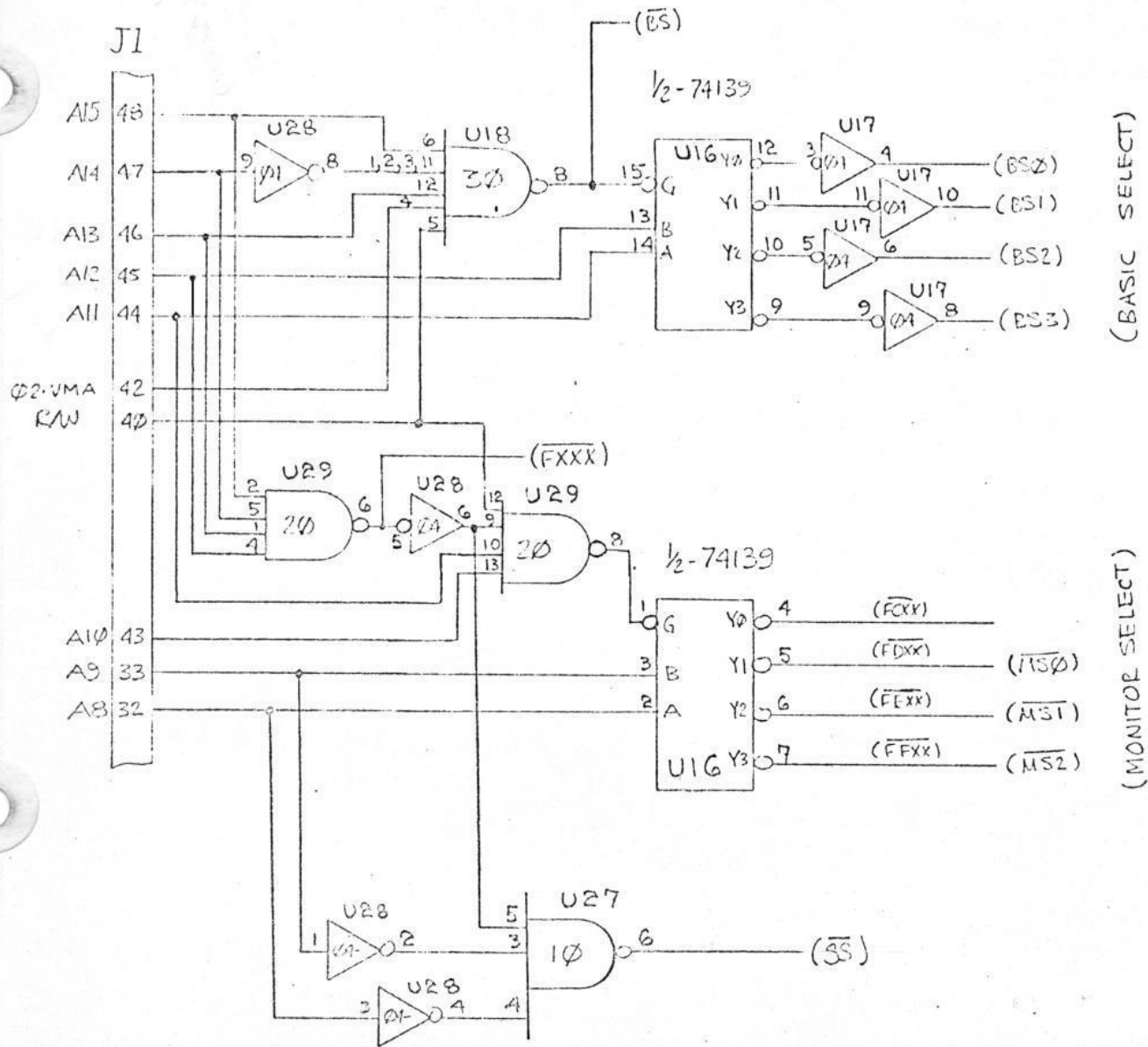
NOTE - A10-A19 & D/W ARE BUSSED TO ALL CHIPS.



NOTE - ALL OTHER LINES AS ON SHEET 6/10

MODEL 502 (RAM & ROM array)

OHIO SCIENTIFIC			product name/number		
			MODEL 502 - (RAM & ROM ARRAY)		
date	revision	page	status	sheet 5 of 12	



(BASIC SELECT)

(MONITOR SELECT)

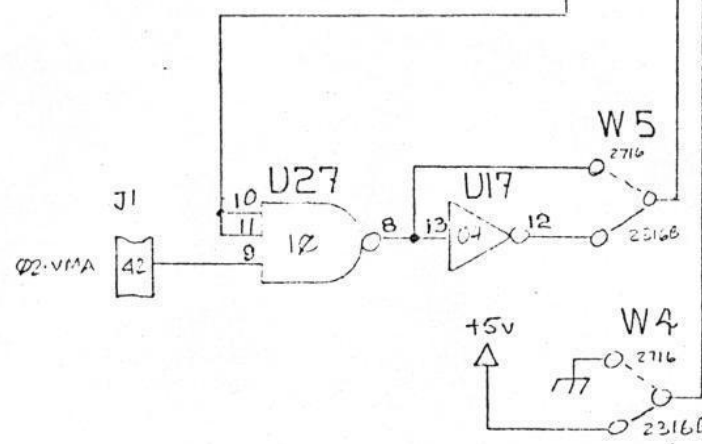
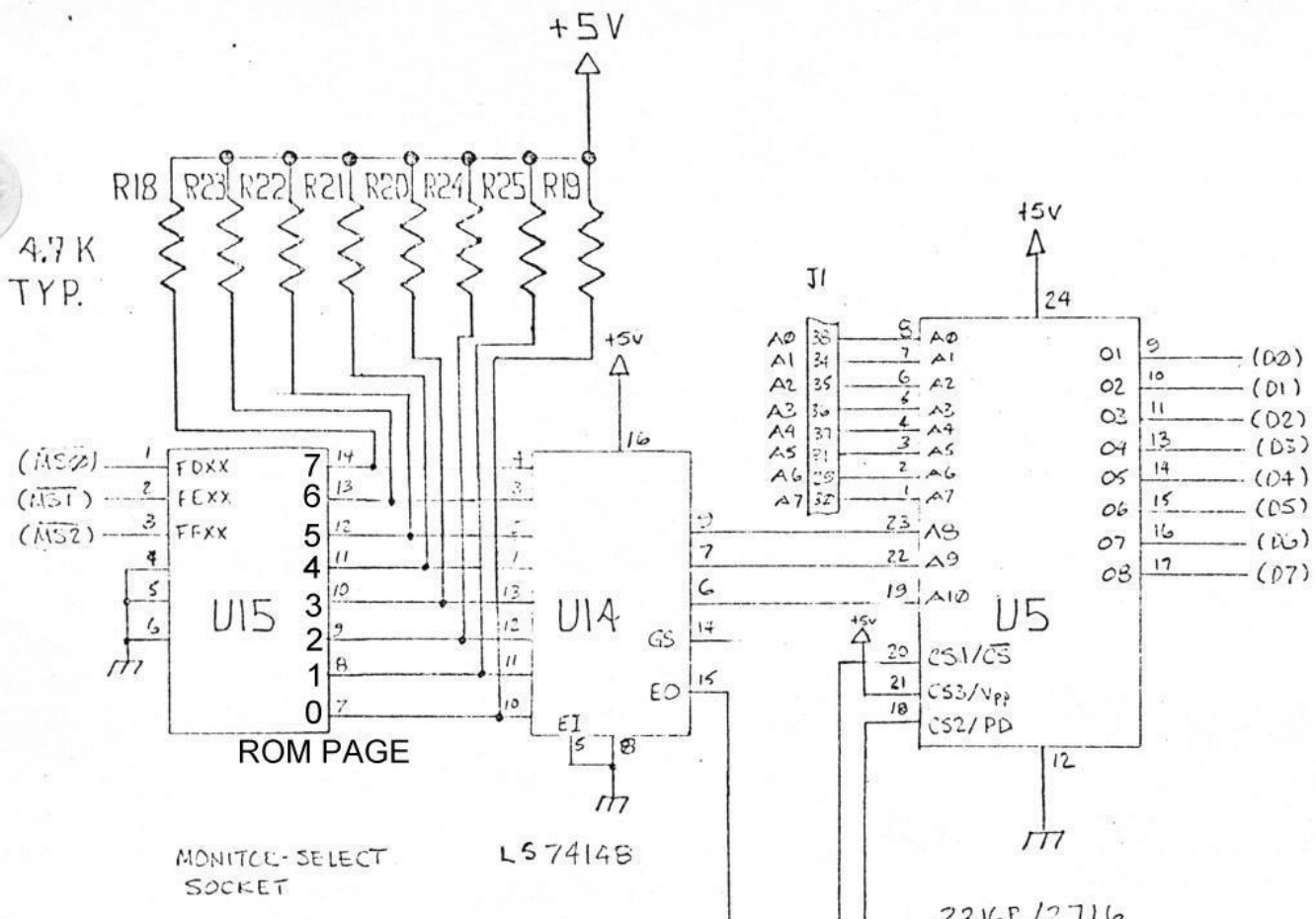
MODEL 502 (ROM Enables)

OHIO SCIENTIFIC

product name/number
MODEL 502 - (ROM ENABLES)

revision	page	status	sheet 4 of 12
----------	------	--------	---------------

4.7K
TYP.



MODEL 502 (Monitor ROM)

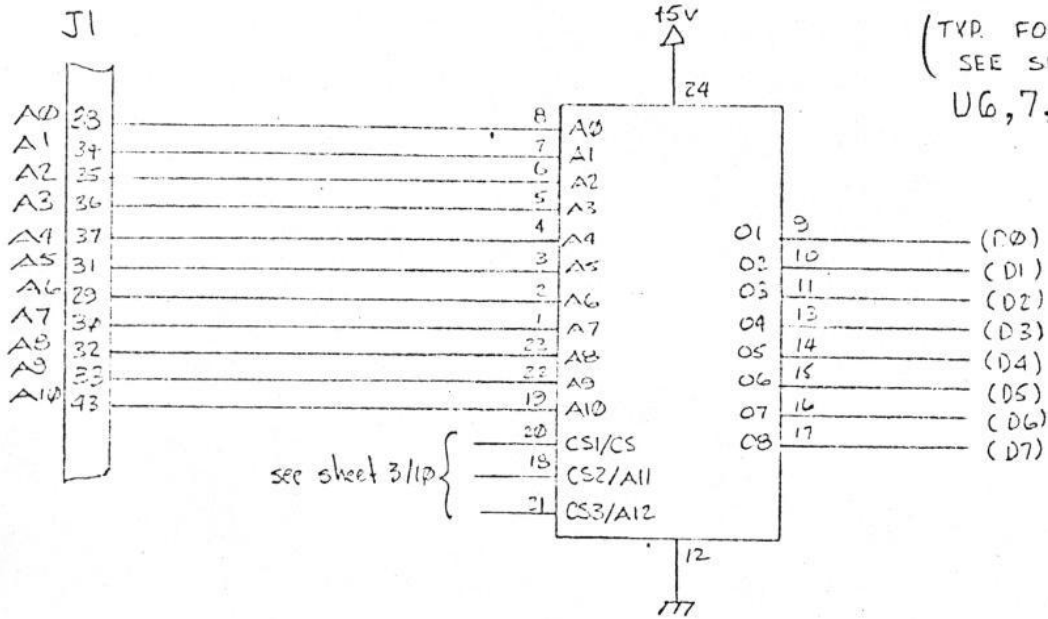
OHIO SCIENTIFIC

product name/number
MODEL 502 (MONITOR ROM)

date	revision	page	status	sheet 5 of 12
------	----------	------	--------	---------------

2316B/2664

(TYP. FOR 4-
SEE SHEET 3/10)
U6,7,8,9



OHIO SCIENTIFIC

product name/number

MODEL 502- (BASIC ROMS)

date

revision

page

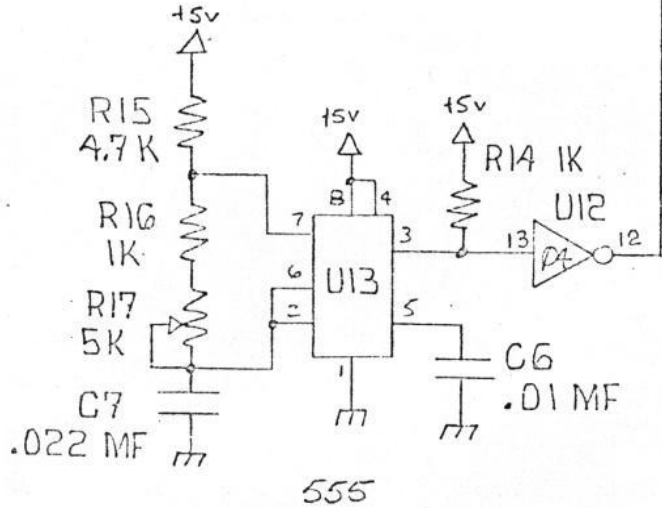
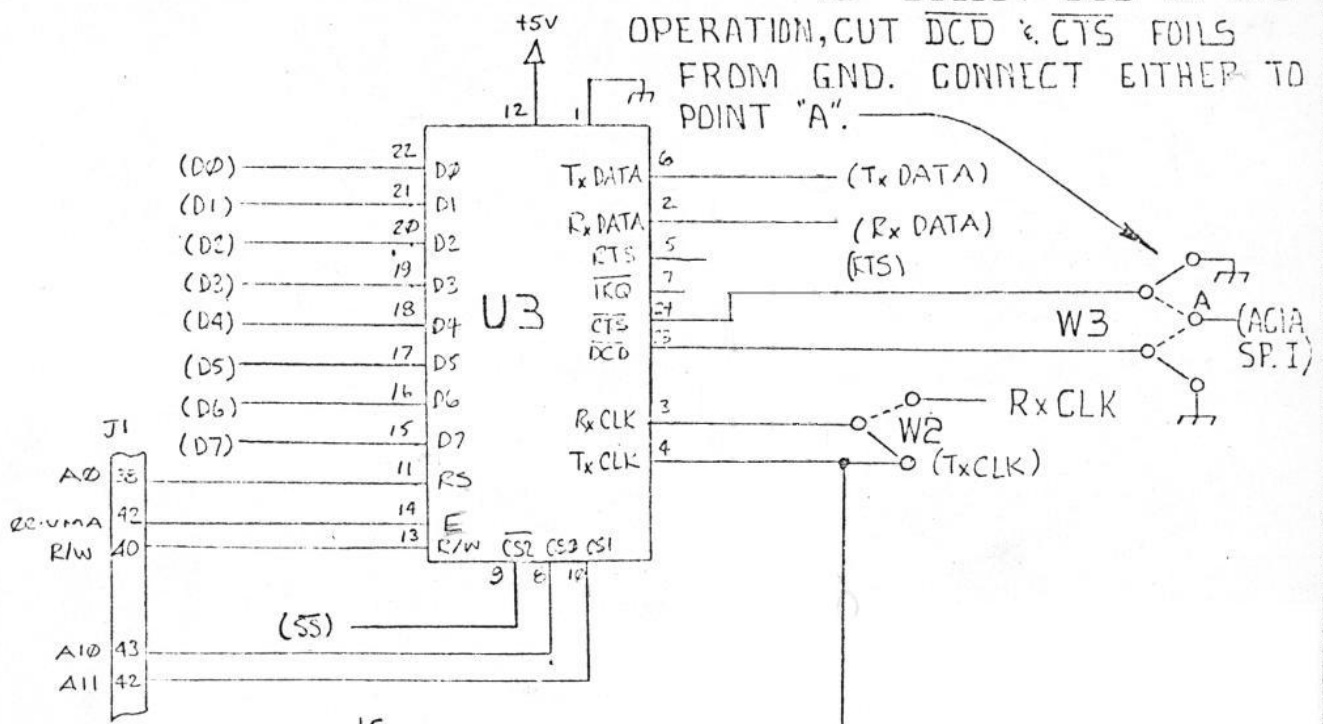
status

sheet 6 of 12

6850
ACIA

NOTE:

TO SELECT DCD OR CTS
OPERATION, CUT DCD & CTS FOILS
FROM GND. CONNECT EITHER TO
POINT "A".

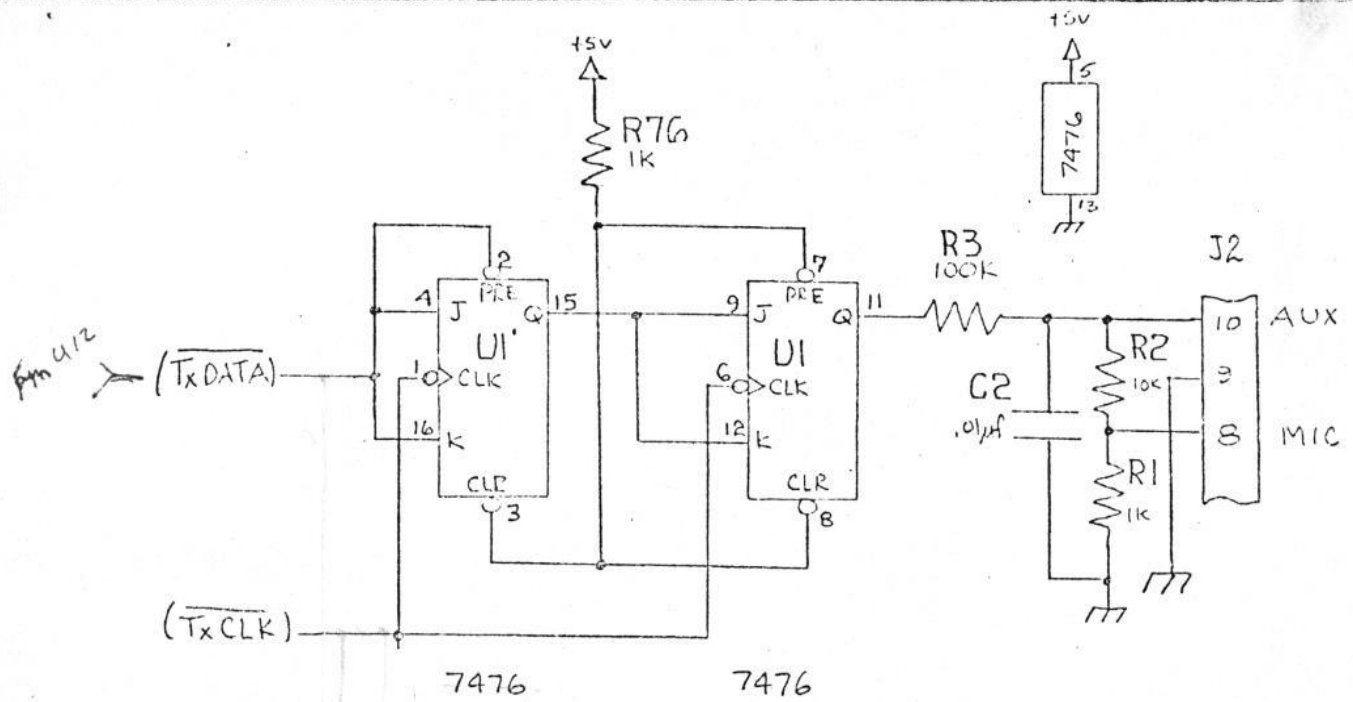


555

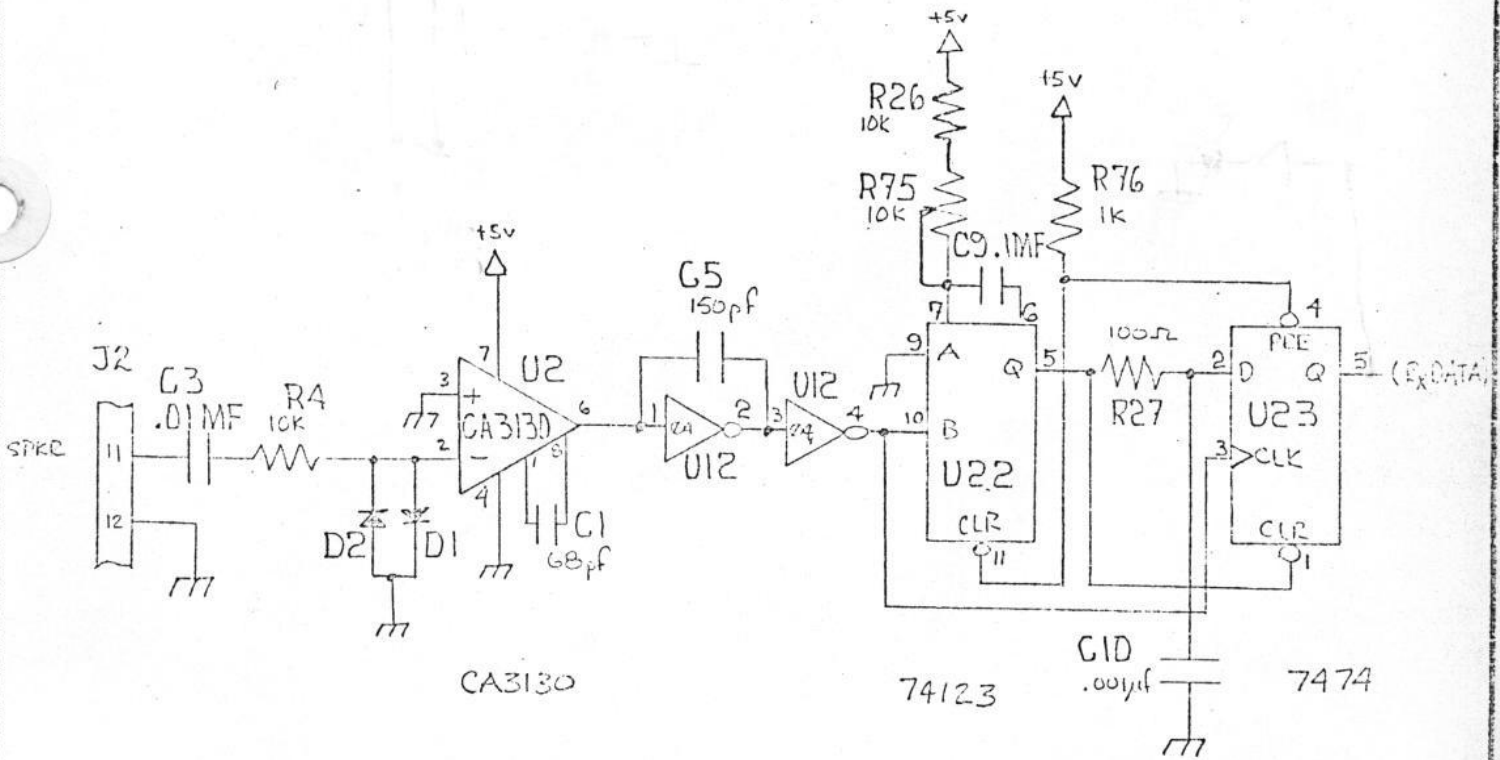
OHIO SCIENTIFIC

product name/number ACIA
MODEL 502- (AUDIO CASSETTE)

date	revision	page	status	sheet 7 of 12
------	----------	------	--------	---------------



TRANSMITTER

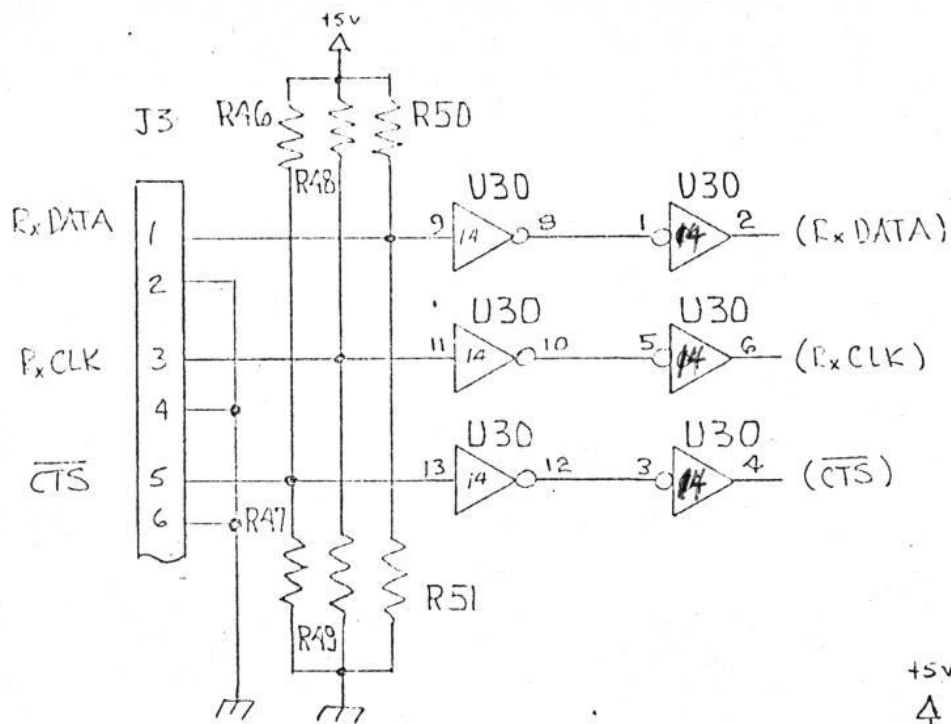


RECEIVER

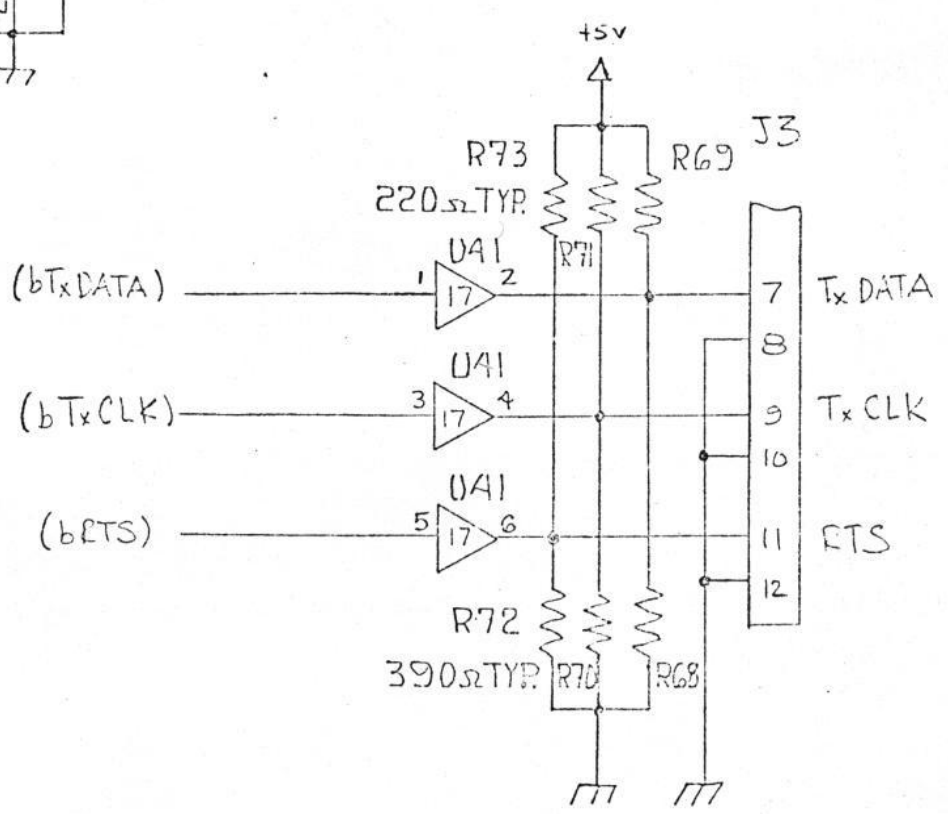
OHIO SCIENTIFIC

product name/number
MODEL 522 - (AUDIO CASSETTE)

date	revision	page	status	sheet 8 of 12
------	----------	------	--------	---------------



U31



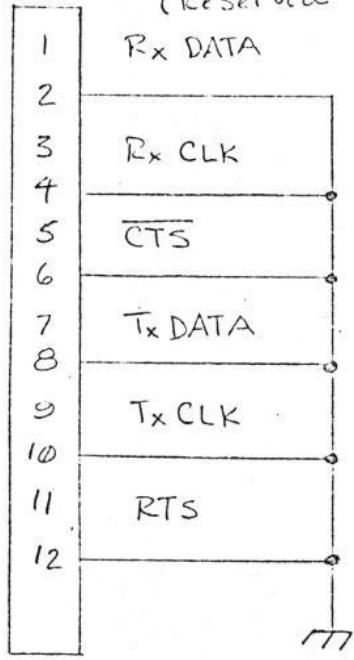
OHIO SCIENTIFIC

product name/number
MODEL 508 - (SYNCHRO. INTERFACE)

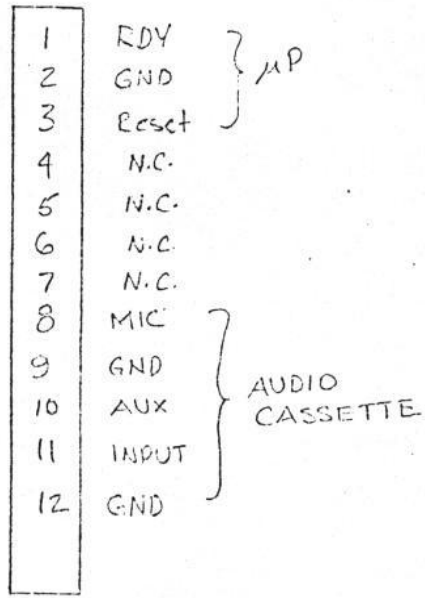
date	revision	page	status	sheet	of
				9	12

J3

(Reserved for synchronous I/O)



J2

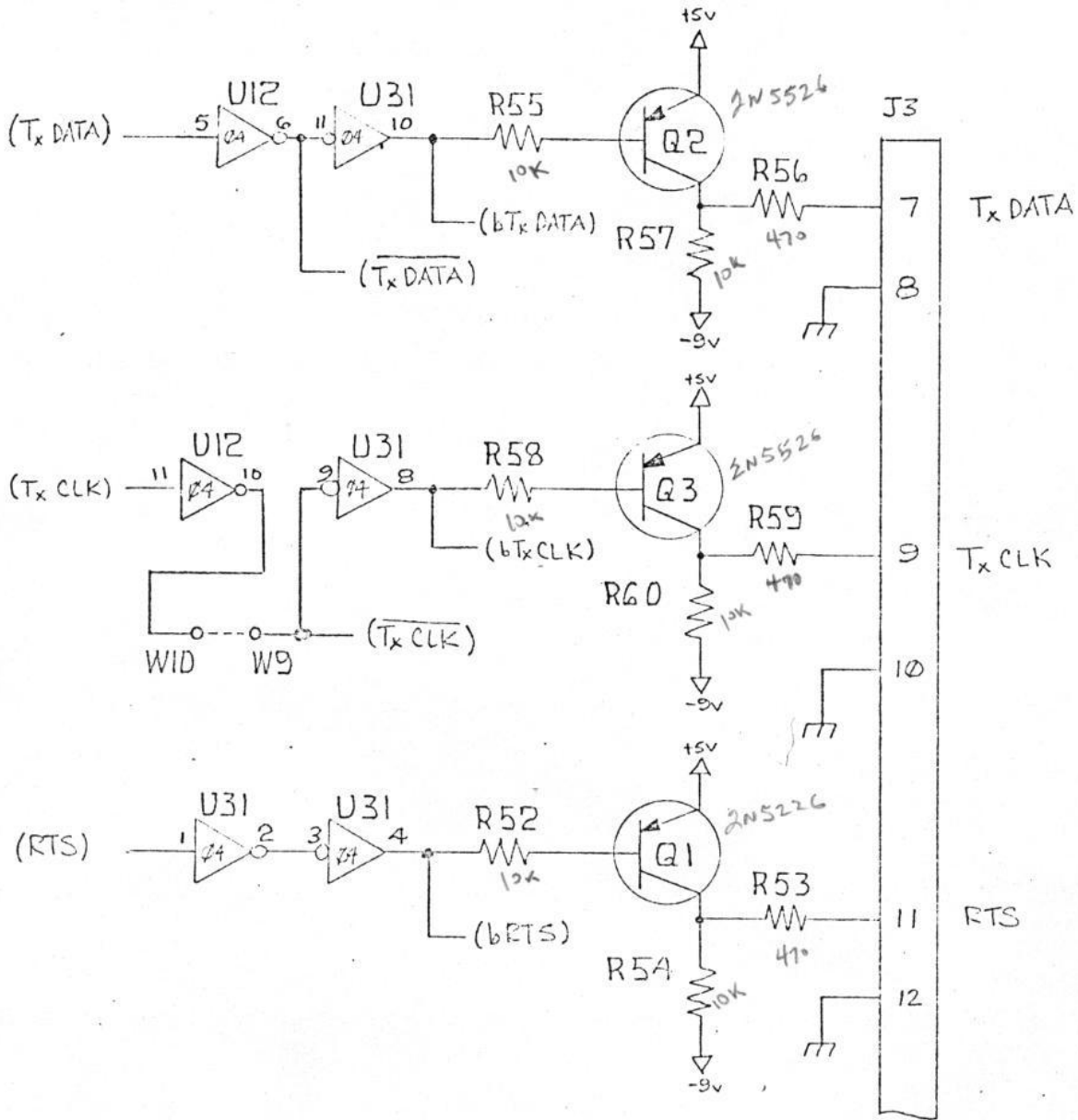


OHIO SCIENTIFIC

product name/number

MODEL 502 - (CONNECTORS)

date	revision	page	status	sheet 10 of 12
------	----------	------	--------	----------------



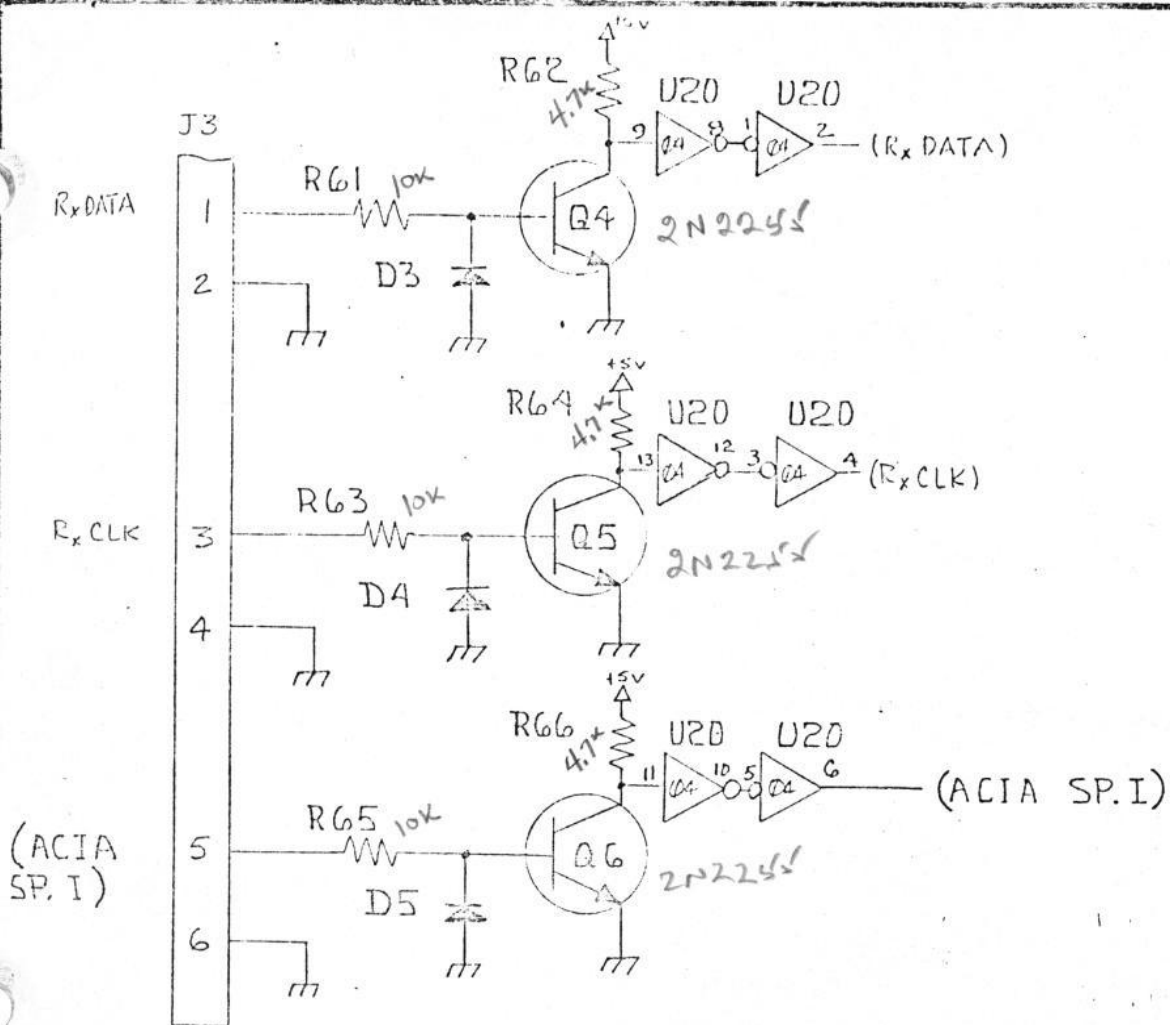
RS232 DRIVERS

MODEL 502 (Synchro. Interface, RS232)

OHIO SCIENTIFIC

product name/number
MODEL 502 - SYNCHRO. INTERFACE, RS232

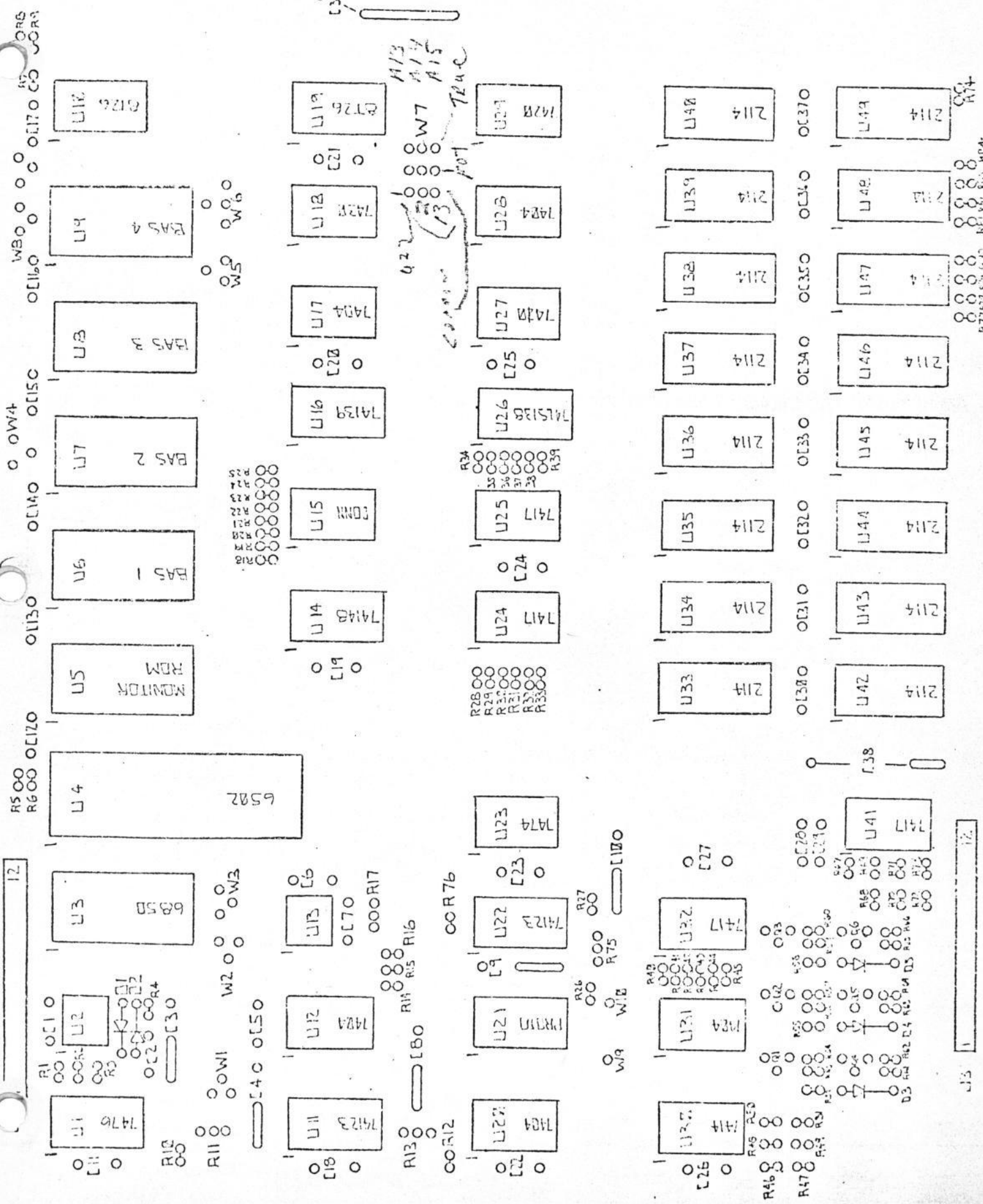
date 26 APR 1978	revision	page	status	sheet 11 of 12
---------------------	----------	------	--------	----------------



RS232 RECEIVERS

MODEL 502 (Synchro. Interface, RS232)

OHIO SCIENTIFIC			product name/number		
			MODEL 502 - (SYNCHRO. INTERFACE, RS232)		
date	revision	page	status	sheet	of
26 APR 1978				12	12



Streamlining the C2-4P

Here are three modifications you can make to your OSI C2-4P to raise its speed, increase the cassette throughput, and add reverse video to the display.

James L. Cass
19559 Tulsa Street
Northridge, CA 91326

I am concerned by the paucity of articles on OSI computers in MICRO and hope that this will reverse the trend. I feel that the Challenger 2-4P running speed and ease of modification more than offset its shortcomings. I will describe three modifications I have made, mainly, raising the CPU clock rate, raising the cassette data rate, and reversing the video presentation.

Raising the CPU Clock Rate

My computer is happily working with a clock frequency a little under 2 MHz (1.9648 actual, 1.96608 nominal) in place of half that, which is the way it was delivered. The CPU clock is taken from the video timing chain, which uses a crystal oscillator near 12 MHz, a divide by three, and then a series of binary dividers to form 15,360 and 60 Hz sync pulses. It was only necessary to move the CPU clock takeoff one stage higher in the timing chain. To do this, move the jumper wire coming from bus pin #18 off IC #E4 pin #13, and onto pin #14. If you intend to make this change, use a small, low power, preferably grounded soldering iron, as recommended for all IC work. Another word of caution: make a long, thorough shakedown run of several operational programs looking for dropped bits from memory. I did this since I have two RAM chips marked "550" (presumably not fast enough to qualify as 450 nsec.), but there was absolutely no hint of dropped bits. Instead, I have very snappy video display operation, slightly fast keyboard repeat, and, best of all, running times cut in half. A machine language LIFE program updates a full screen of 1792 cells 14 times a second!

Doubling the Bit Rate

I successfully doubled the bit rate of my cassette interface from 300 to 600 baud, after speeding up my CPU. I naturally tried 1200 baud; while it seemed to read properly, the load program seemed to choke up on very long (64 to 71 character) lines sometimes and miss the CR and next line. The 555 IC oscillator frequency is doubled from 4800 to 9600 Hz by substituting a 0.01 mfd capacitor for the 0.022 and then adjusting the trimpot.

A frequency counter is a big help, if not essential. Since the tone frequencies should remain at 1200 and 2400 Hz, an extra divider is needed. The unused half of the 7474 already in the interface works nicely, or you can install a 74163 in the convenient prototyping vacant space, and get several baud rates for printers and the like. Rate selection can be conveniently brought to a switch mounted to the left of the keyboard. Figure 1 shows the circuit using the 7474.

I have found "reversed" video to be much easier to view for extended periods. Also, the black "reversed" characters have less apparent intensity variation, that is, they look even. The reversed video connection is indicated in the schematics, but there is no provision made in the printed wiring, so that it is necessary to cut a printed conductor. The junction of R 11 and R 23 is

moved from Pin 8 to Pins 9-10-11 of the IC at D4. I installed a switch near the keyboard with short, direct small wires, but find that I could have left the wiring at "reversed" with no loss.

Conclusions

Doubling the CPU clock rate and hence the speed of the C2-4P is quite easy to do. The main risk is that some 2114 type RAM chips may be too slow. The data rate in the cassette interface can be doubled to 600 baud, but only with some effort and decrease in reliability; 1200 baud does not work. Reversing the video to display black characters on white is relatively simple and the reversed video format is preferred by everyone. Cassette speed selection and normal-reverse video are conveniently brought to switches installed near the keyboard.

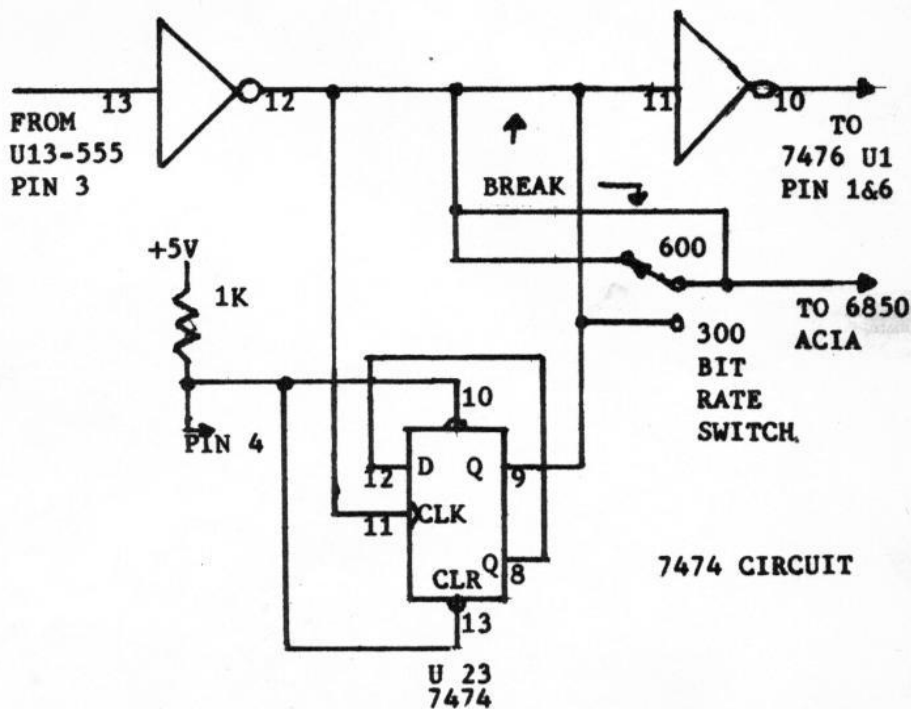


Figure 1

502 ~~notes~~ Specs

4-5-78

6502A

6850 ACIA

Cassette I/O - @ FCXX ?

2316E monitor

4-16K or one 65K BASIC

4 to 8K 2114 memory

7417 drivers

Synchronous port capability? @ FCXX ?

one shot clock or carry over from 540

555 cassette clock

NO 2 speed clock

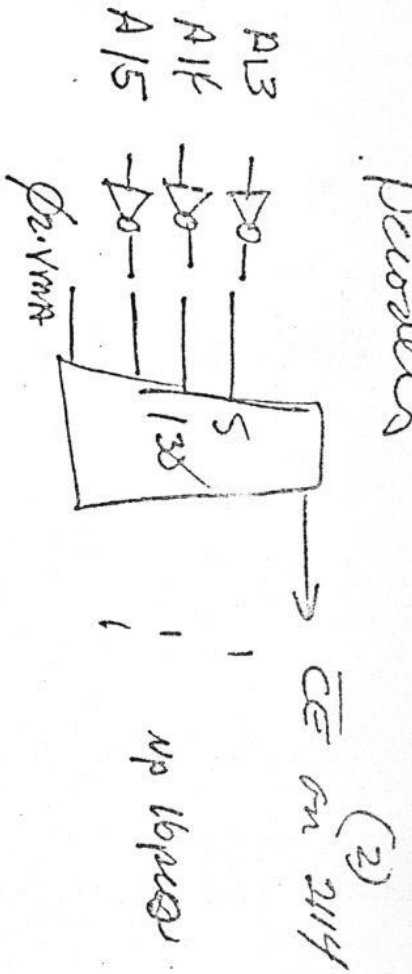
NO eeprom jumpers

NO PIA

NO serial port

1 set 8126s

Problems



Minimized Decoder
As per Info pack 43

for
FEXK
FDK
FEXK
FEXK

φ2.VM/R modified
As per Rev. C 500 board
(no DD over write support)

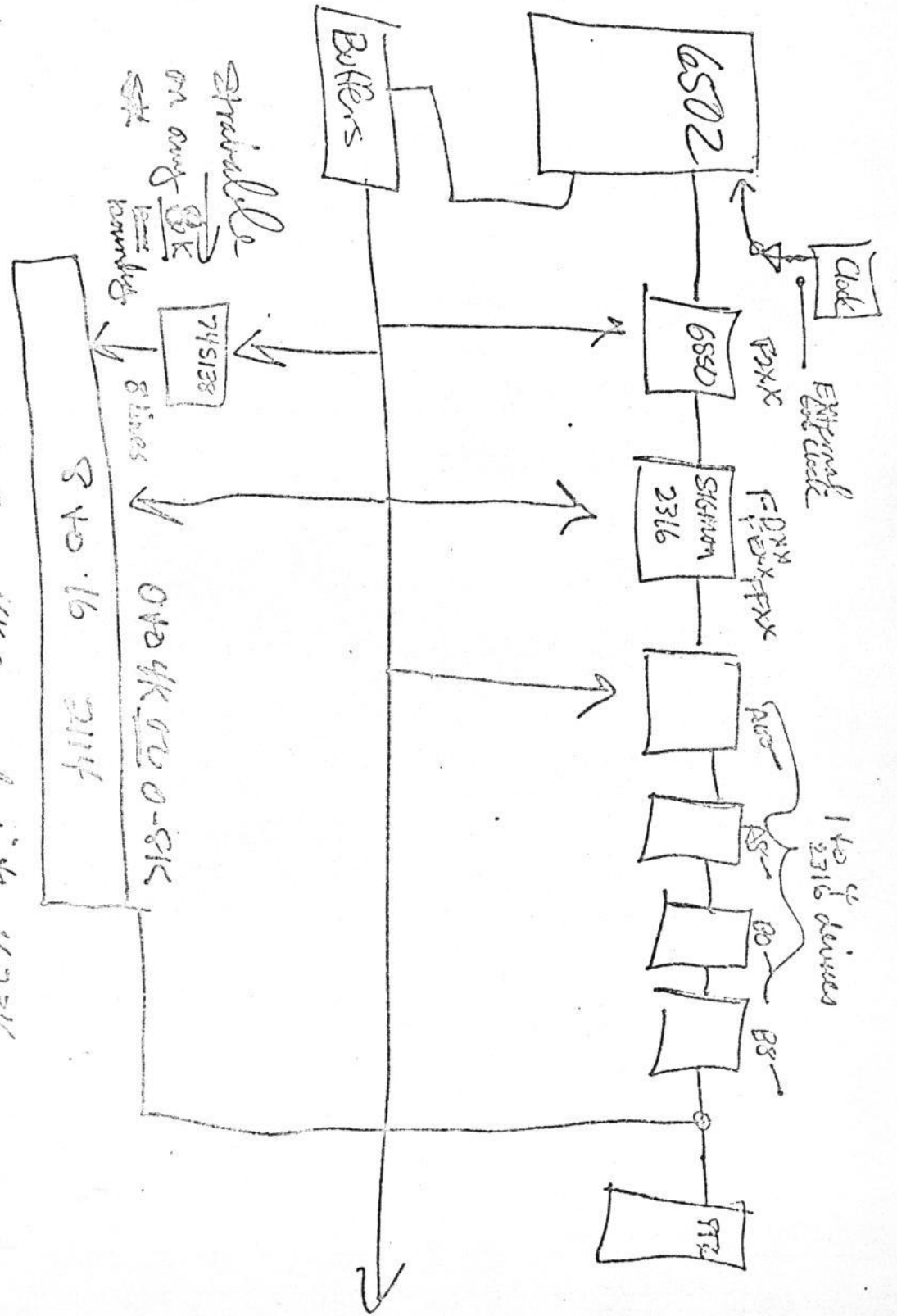
for
A0
A8
A0
B8

Minimized Page 44

NO (DD - write)

Since no internal devices operate DD UN used ports do not affect bleeding!

NOTE: 4K ram only with 4236 SK ram permissible with 2364



Arbitrable on any SK last handles SK