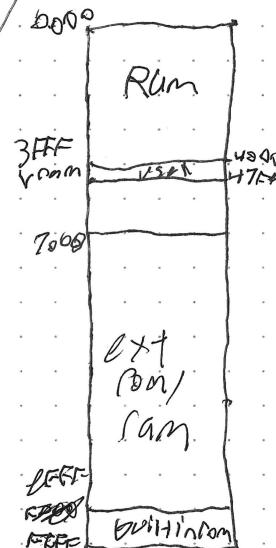
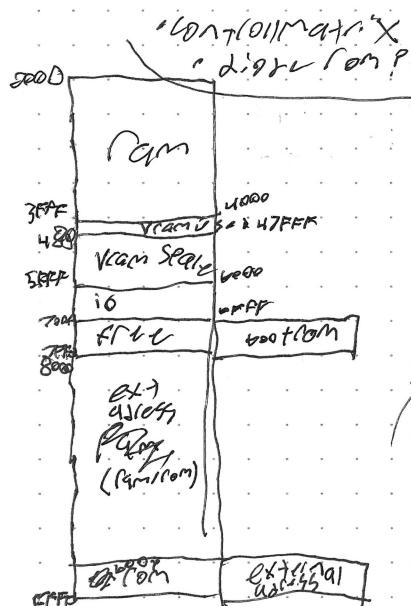


Basic TTL / Discrete Computer

8bit

- Program Counter
- Registers
 - Accumulator
 - B
 - C
- ALU
 - 8bit
 - Discrete Gates or TTL
- MAR (Memory Address register)
- Program Memory
- Instruction Register
- Output Register
- CLOCK
 - 555 timer



final

Basic Computer - Memory Map / Components Specs

CPU
6502 or Z80

Video
MC6847 or TMS9918

RAM
16K or 32K

I/O

Sound
AY-3-8910 or 76489

KB Controller or ROM soft

Game Pad

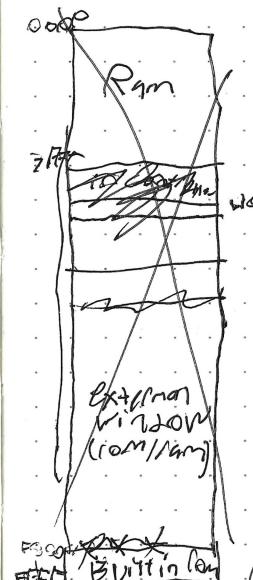
Cassette

SP10

Built-in dotmatrix screen

VGA?

Joystick



Shift + 29
- K8
- SP10
- SP10

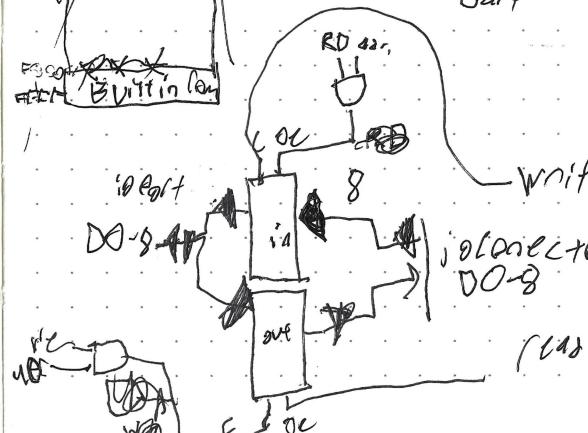
4x11FB

82C54

timer

16C550
uart

644802 YAC



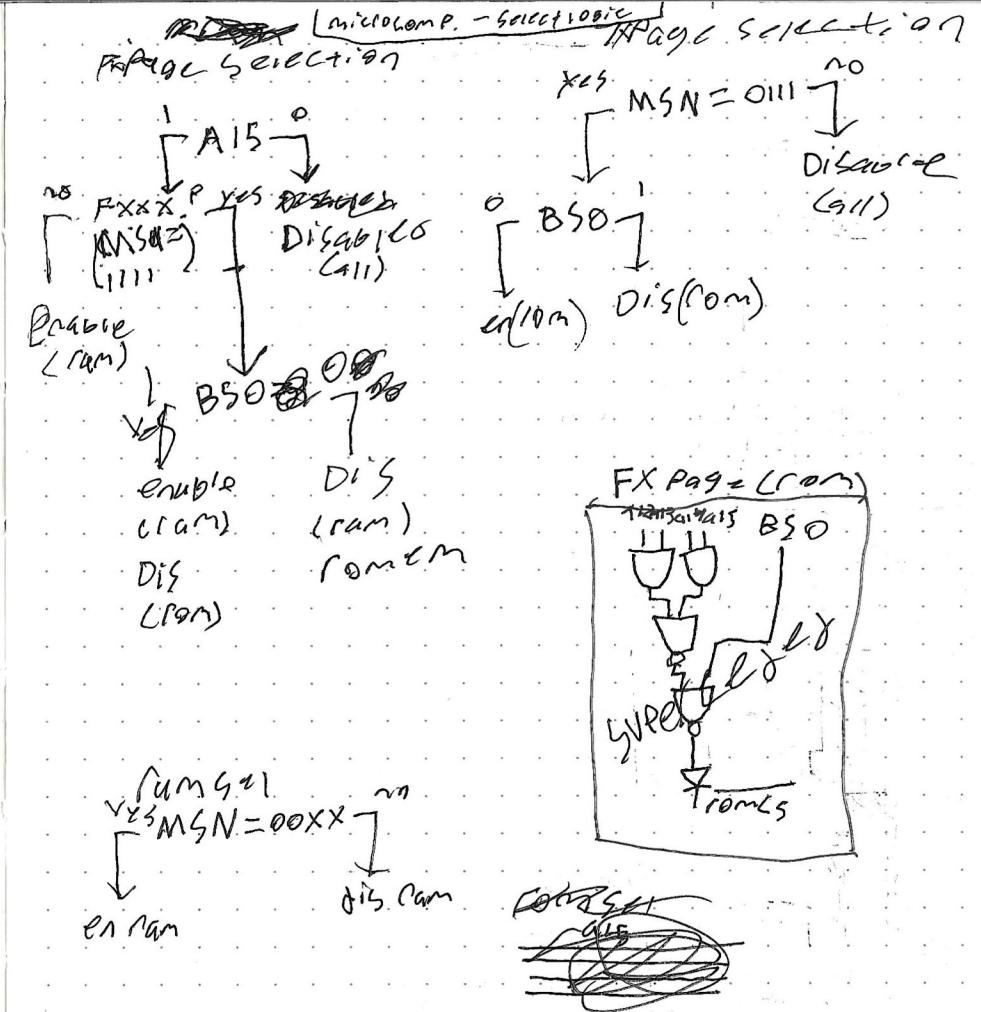
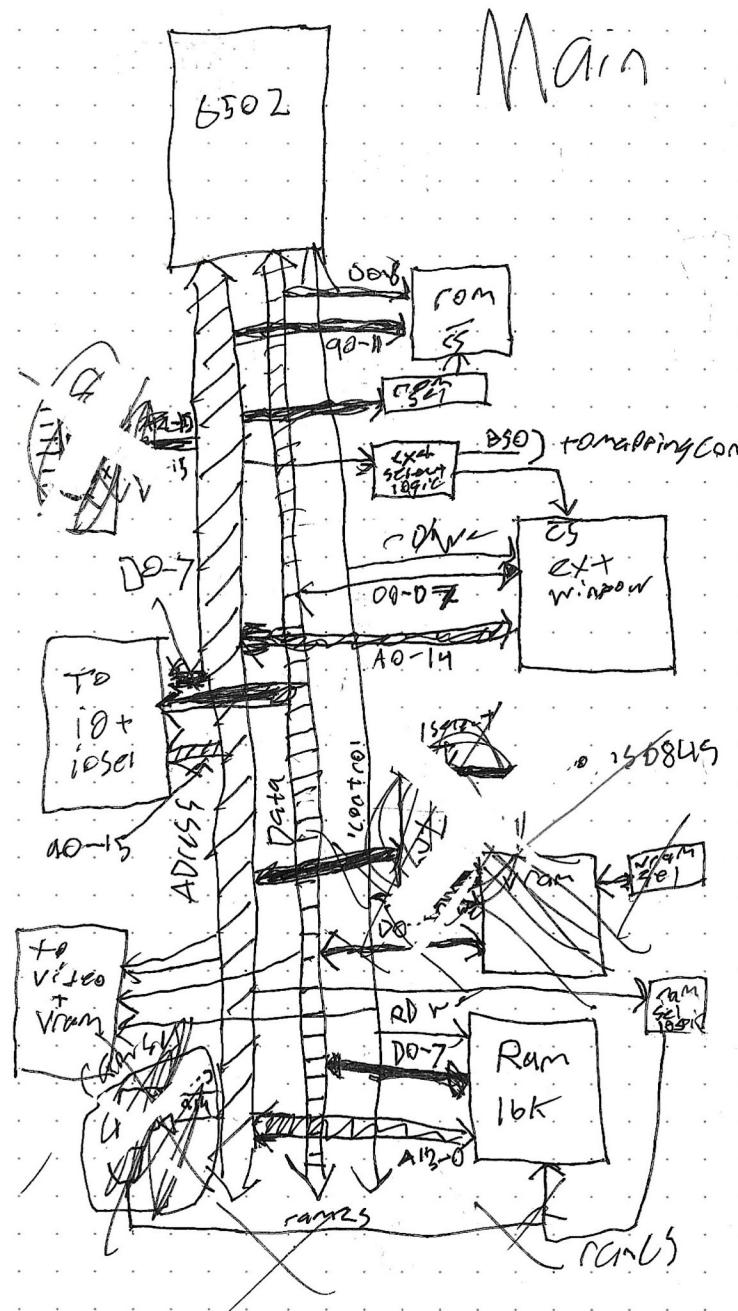
write

connector

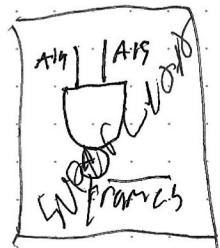
DO-8

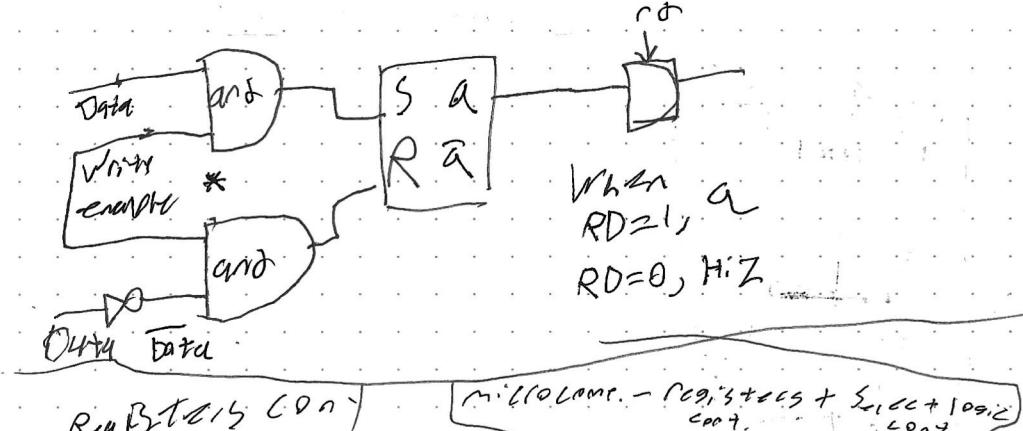
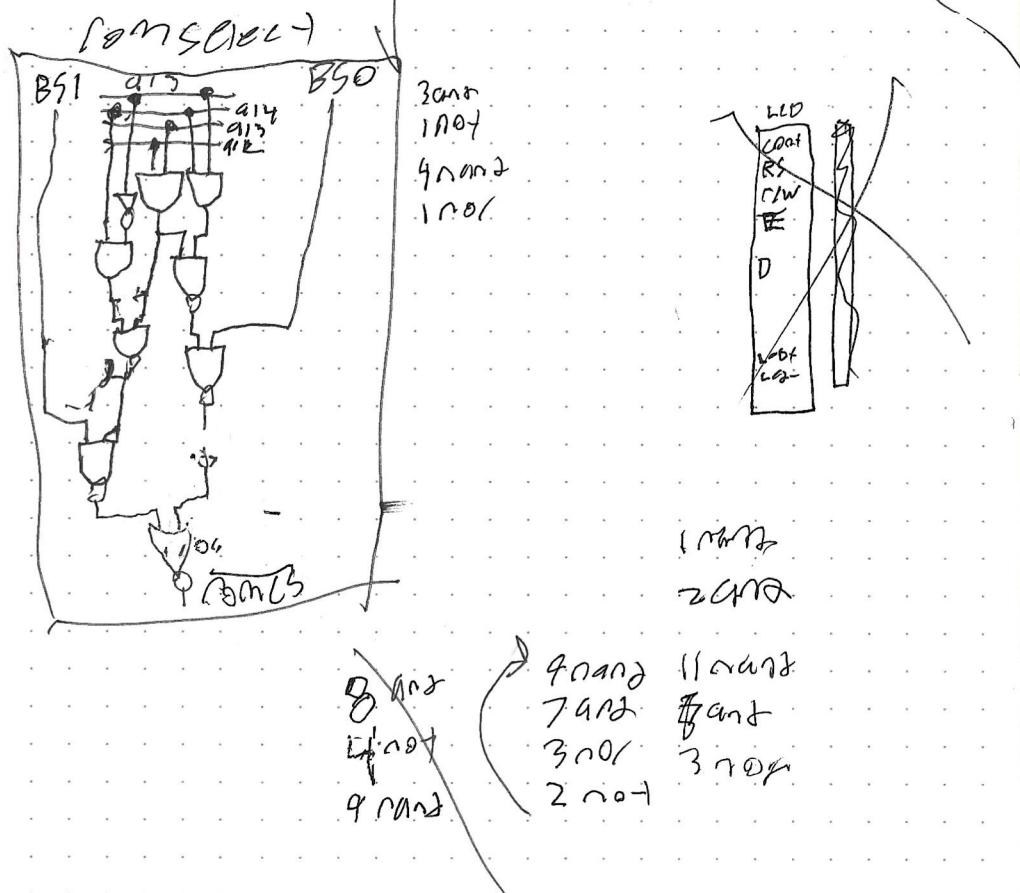
read

M6800 Computer - Block Diagram



RAM CS1 logic





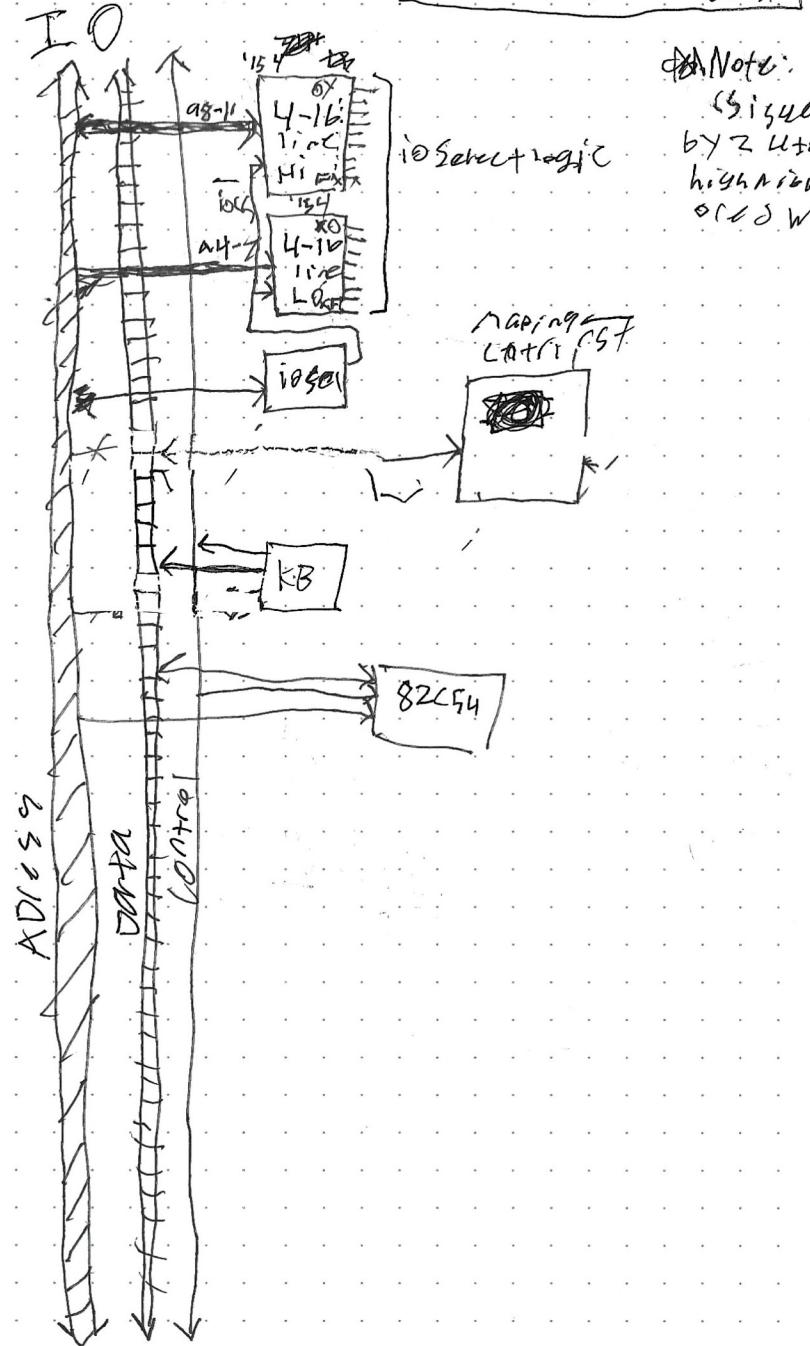
Reg BYTES CON *(microcomp. - registers + select + logic cont.)*

DB BYT C

0 - 5 sec	U - Hours	8 - Day of week	C - Calendar
1 - Sec alarm	54 Hours alarm	9 - Month	D - Days
2 - min	b - Day alarm	A - Year	E - Control
3 - min alarm	7 Day alarm	B - Month	F - Century



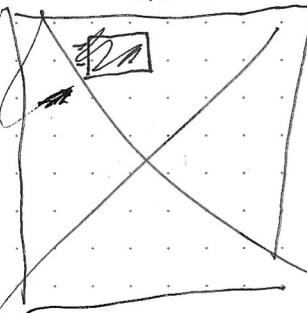
Gb	Y
00	0
10	0
01	0
11	0



Mapping G+T/F

IO Select logic

Mapping G+T/F

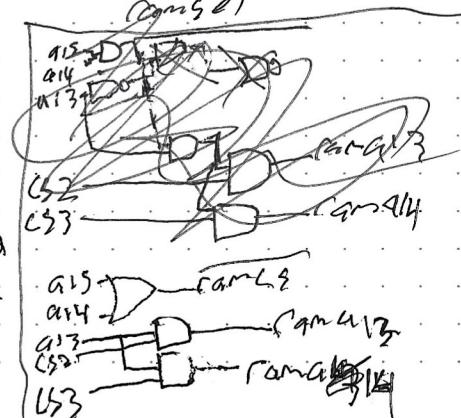
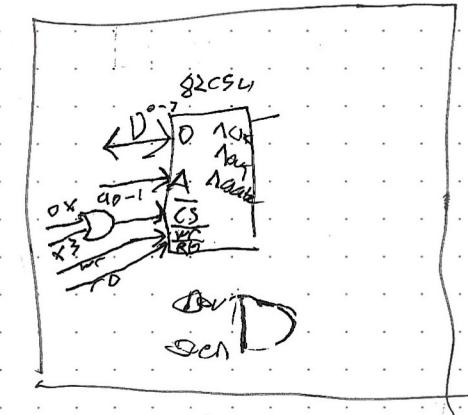


Mapping G+T/F microcore
72 + D3

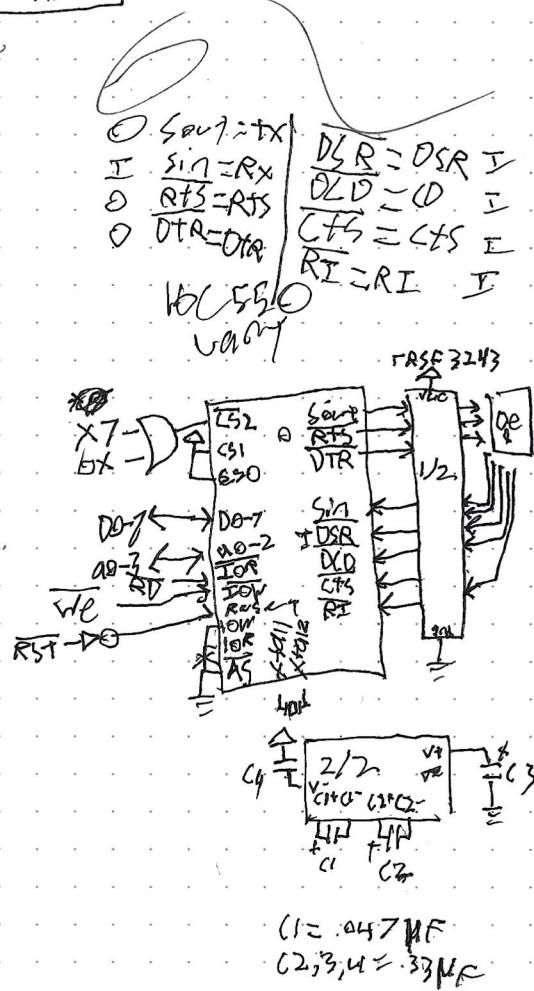
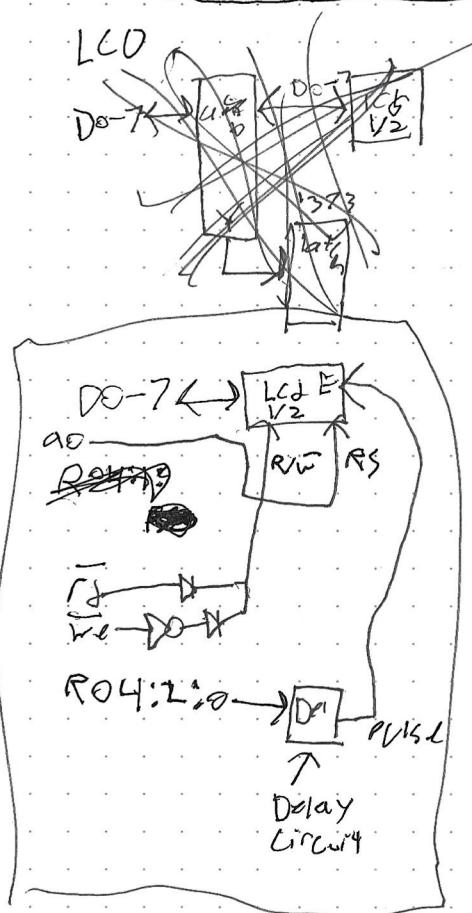
Schematic
brain storm
+ SCI logic



Low 16K fixed bank 0
User: 8K changeable 1-3



microcomp - Schematic Brainstorm



internal

CD a pink
b pink

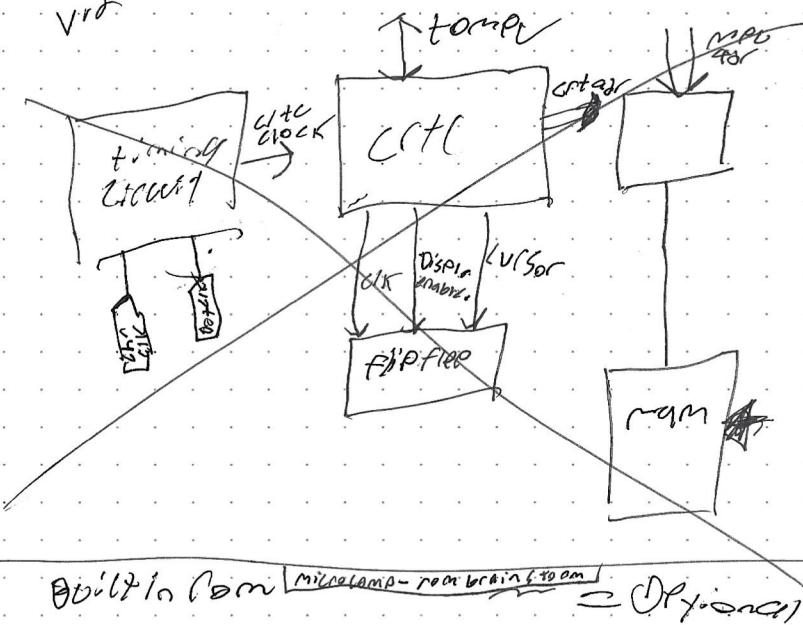
$(D\sigma) \xrightarrow{\text{ext}} (D\pi_0)$

(internal) O DSR (pink)

When C_1 CO internal (connected to C_D ext) only

When B₁ connects to DSR AND C₀(out) to D₁

Vide



Büttin Nam | Microlamp - rear brain to am

~~get~~ • WOLMAN GAVE ME
A LITTLE

- LCD Driver ✓
 - I²C Reader ✓
 - BUTTON Driver ✓
 - I²C B Driver
 - 6545 Driver ✓
 - 16C550 Driver ✓
 - RS232 Ram Update Pro

* First instruction is to disable interrupt

micro - to do

✓ Video

- ✓ RAM config
- ✓ Timing
- ✓ video bus

Opio port

• CPU STUFF

- interleaved RAM and ROM together
- timing

JOY: SBIT

• I/O

• LCD Screen

- JOY
- Nav buttons] uses 65C20

- 65C20 - VS03 65C21

- finish timer 1 - close: need to implement speaker and

- RTC

PIC865620

FIFO

- via for JOY/buttons/ ~~RAM~~ GATE

- via for KB, ? ASCII right back to memory source

micro-IR check

- 82CS4 (RAM must be erased before write)

1. write 1 to memory CNT bit 7(5) 03:3:3-1

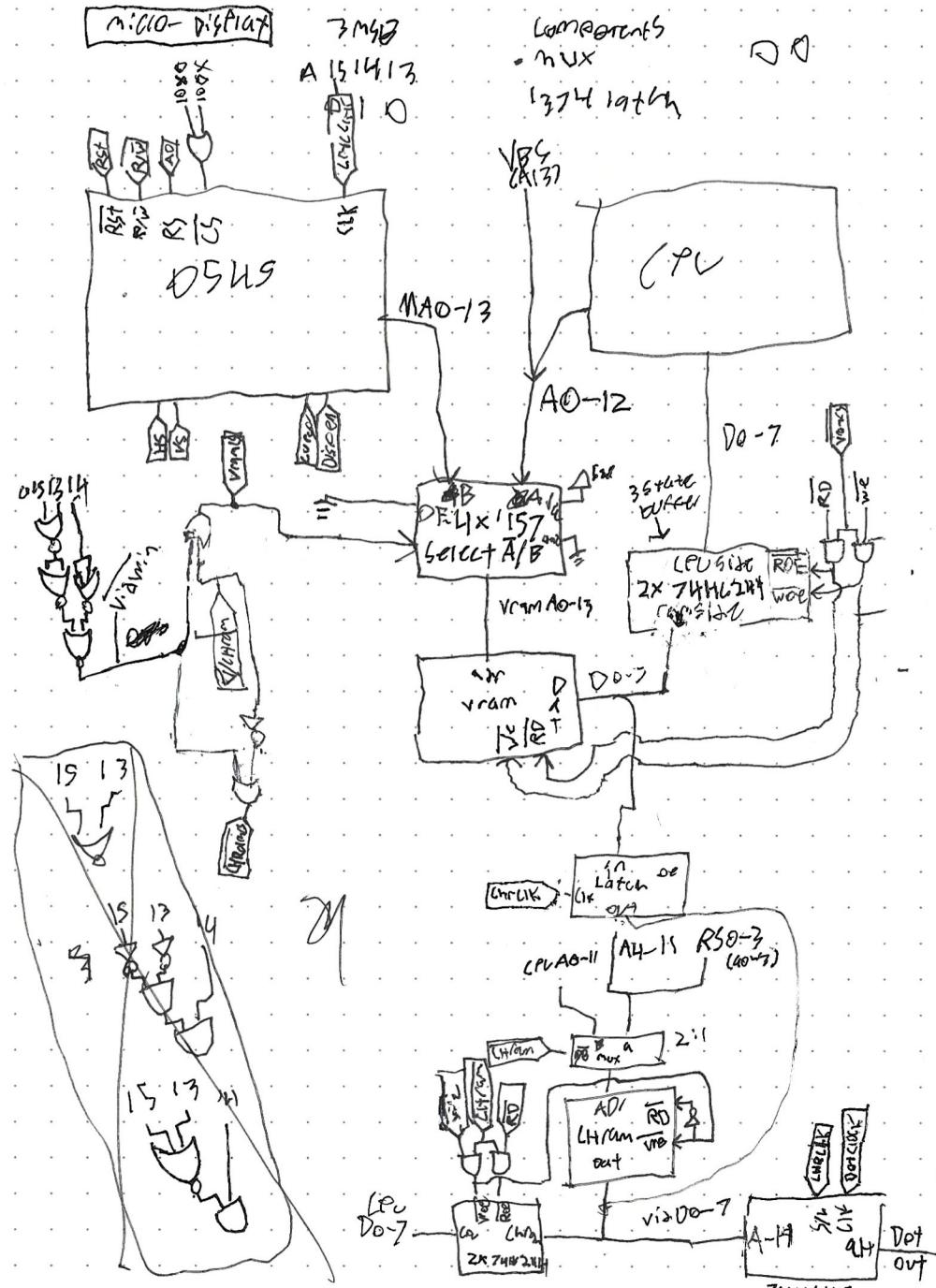
2. write 0 to STATUS bit 3:3:4

- KB check (register 65C21)

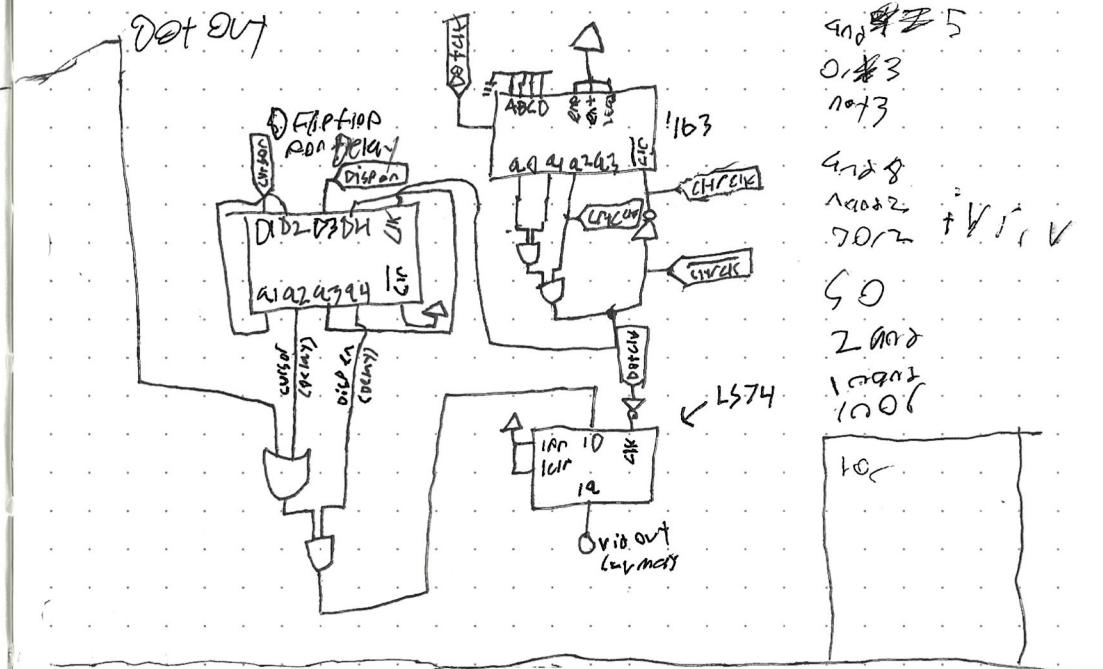
- 16CS40

RAM must be inverted and ordered

ALWAYS BCKP



Note: As stated earlier, it's a privilege to serve in any church. You can pair up adjacent rows and invite two neighboring families!



PCB Layout notes

VLPU

2 CPU

3 CPU

4 Sel logic

5 Sel logic

6 Sel logic + Reset inverting

7 Sel logic

8 Sel logic

9 Sel logic

10 IO Sel logic

11 IO Sel logic

12 register (CLOCKED)

Reg

14 timer

15 KB

16 KB + Serial + DA, DT, Timer (CLOCKED)

17 Service

18 Service

19 V12

20 GPIO

21 IO Sel logic

22 register

23 register

24 V12

25 V12 ~~CHram~~

26 V12

27 V12 VRam

28 V12

29 V12 V12 (Timing) + V12 Combi + Timer

30 V12 V12 (Sel logic) + IO Sel

31 V12 (Sel logic)

32 V12 (Sel logic) + V12 (CHram)

33 V12 (VRam) + V12 (CHram)

34 V12 (CHram)

35 V12 (CHram)

36 V12 (VRam)

37 V12 (VRam) + V12 (CHram)

38 V12 (VRam) + V12 (CHram)

39 V12 (CHram)

40 V12 (CHram)

41 V12

42 V12 CHram

43 V12

44 V12 (Timing)

45 V12 (Delay)

46 V12

47 GPIO

48 GPIO

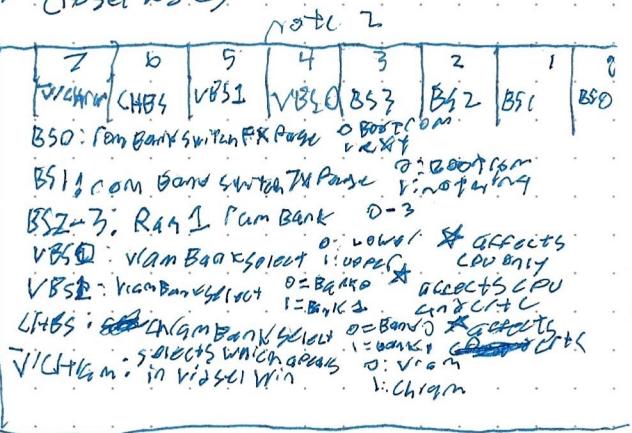
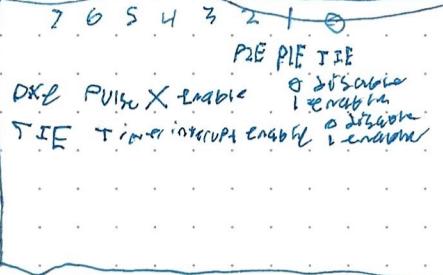
49

FixChram

Buffel RAM DS

RAM

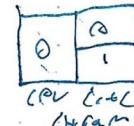
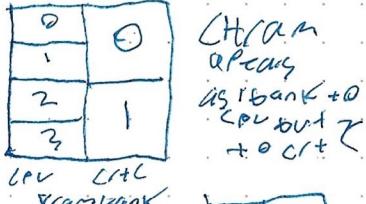
NOTE



IO map

VRam 32K
VRam 32K
CHram 8K

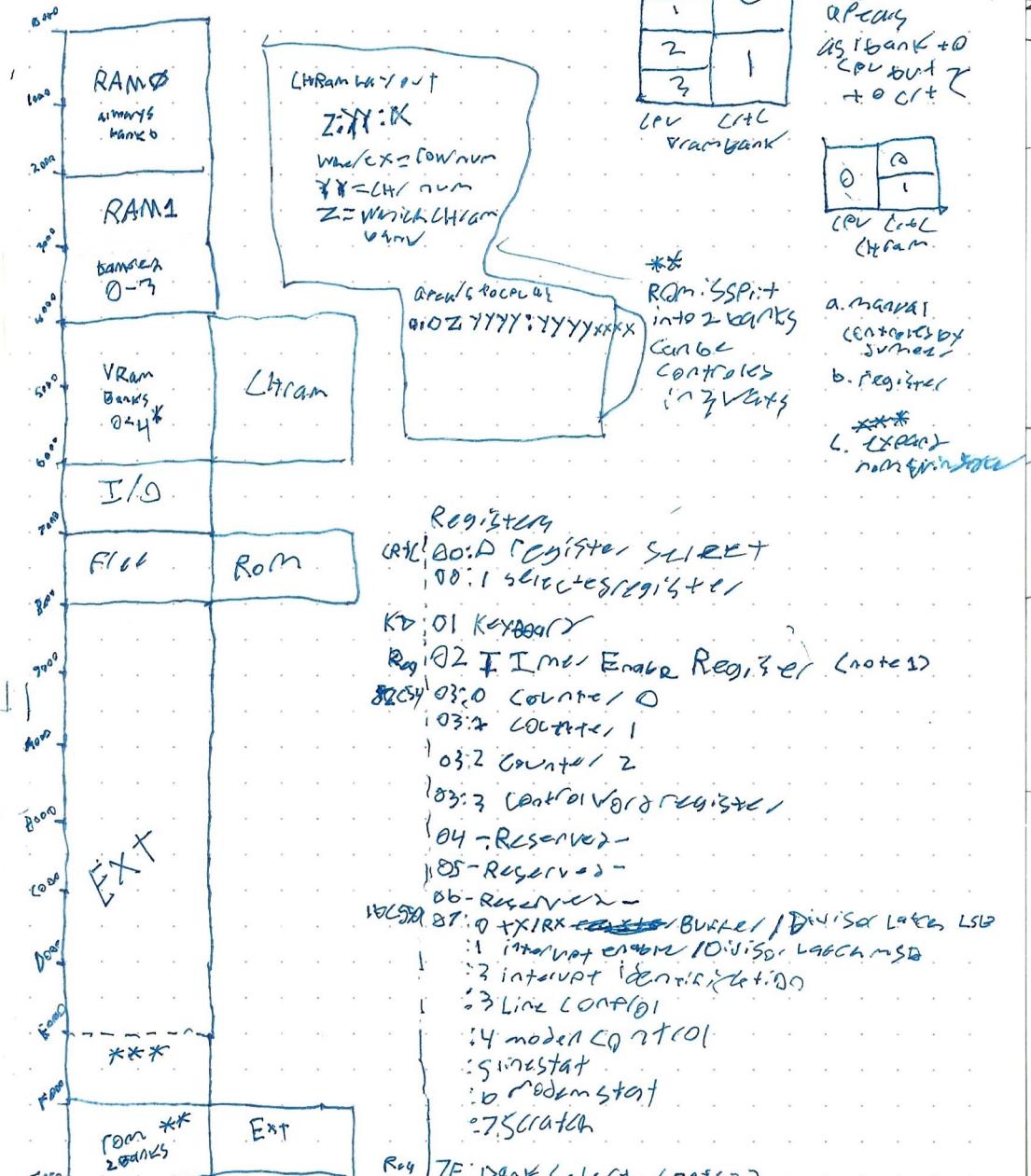
* VRam appears to the CPU as 4 banks
but appears to the V12 as 2



a. manual
controlled by jumper

b. register

c. exec
non-volatile



Registers

CR1: 00:D Register Select
00:1 selects register 0/1

KD: 01 Keyboard

Reg 02 I Timer Enable Register (note 12)
8000:03:0 Counter 0

03:1 Counter 1

03:2 Counter 2

03:3 Control Word register

04-Reserve-

05-Reserve-

06-Reserve-
87:0 TX/RX Buffer / Divisor later LSD

1: invert enable 10 divisor least MSB

2: interrupt identifier (let. 0)

3: Link Control 01

4: mode CQ 2+01

5: sinestat

6: random stat

7: scratch

Reg 7F: Bank Select 04 - Cntr 027

Video Calculations

B1 Hor. freq. B6 # disp char row

B2 Vert freq B7 dots in char dot matrix.

B3 min. hor.

B8 retrace time B9 # scanning in char 249 mtr row $R_n = \text{register}$

B4 min. vert B10 # dots between adj char

B5 # disp. char per row B10 # scan lines 16

Vid modes

00: 8x8 40x24 10: 8x16 40x24

01: 8x8 80x24 11: 8x16 80x24

$$F' = \frac{\text{dot freq.}}{(\text{1st + gap freq.})} = \frac{B_5 \cdot (B_7 + B_9)}{\left(\frac{1}{B_1}\right) - B_7}$$

t_c char time

$$x + 401400 \approx 6.174$$

$$VAC \approx 60142!$$

too little time, mode

$$(R_0 + 1) \cdot B_1$$

$$R_7 = 32 - \frac{16 - 6}{8} \geq R_7 \geq R_6$$

~~$F = 40 - 1 \text{ freq. only } B_7 + B_9$~~

~~$30.75 \geq x \geq 6$~~

~~$SOR_7 = 7$~~

$$\begin{aligned} t_{char} &= \frac{(48 + 1 - 40) - 8}{6.174 \times 10^0} \\ t_{char} &> B_7? x \in S! \end{aligned}$$

\wedge total # scan lines

$$\text{marg 00} \quad F' = \frac{40 \cdot (8+0)}{\left(\frac{1}{15750}\right) - 1 \times 10^{-5}} \approx 5982 \text{ MHz} \quad R_0 = \frac{5982 \times 10^6}{15750 - 8} = 48$$

$$B1 = 15750$$

$$B2: 60$$

$$B3: 1 \times 10^{-5}$$

$$B4: 9.5 \times 10^{-4}$$

$$B5: 40$$

$$B6: 8$$

$$B7: 8$$

$$B8: 8$$

$$B9: 0$$

$$B10: 0$$

$$F = \frac{8}{\frac{1}{48 - 15750}} = 1.2457 \times 10^6$$

(MHz)

$$R_1 = 40$$

~~$R_2 = 40 + \frac{3}{2} = 42$~~

$$R_3 = \frac{48 - 40}{3} = 3$$

$$R_4 = 31$$

$$R_5 = 6$$

$$R_6 = 6$$

$$R_7 = 7 \quad (\geq -30) \quad \text{OK}$$

$$R_8 = 7$$

$$\frac{(15750 - 8(8)) \cdot 6.3492 \times 10^{-5}}{60} = 1.26312 \times 10^{-2}$$

$$\frac{262}{8} = N + \frac{R}{8} \quad 32 + \frac{6}{8} \quad N = 32 \quad R = 6$$

$$R_1: 8 - 1 = 7$$

$$8 \cdot 6 \cdot 3492 \times 10^{-5} = 5.0784 \times 10^{-5}$$

50.645

+ v.c. $\geq B_4$? Yes!

29

mode 01

D1: 15850

B2 100

B3 1×10^{-5}

B4 9.5×10^{-4}

B5 40

B6 24

B7 8

B8 ~~100~~

B9 0

B10 0

~~66 DIP RES~~

66 DIP RES

R9 0

R9: 48

R1: 140

R2: 42

R3: 3

R4: 31

R5: 6

res

CLOCK XTA/130K

R6: 24

R7: 28

R4: 7

$$3e \geq 28 \geq 3.24$$

RECALL

T_{re}

R6

R7

$$f' = 5.482 \text{ MHz}$$

$$t_c = 1.2457 \cdot 10^{-6} \text{ s}$$

$$R = 6.17 \mu\text{Hz}$$