

8/18/74.

Call to Seco. Webb. 323-7311
Info on Bubble group in S.J.

OPD Adv. Tech group. - San Jose

Charlie Chou 18K12 x 1477-1080 (028-2)

GPD - Materials & Dev. ^{Science} ~~February~~.

George Cheroff K15 4452-7993 (028-2)

OPD group working with GPD -

(GPD) Dennis Mees 2039-2226 (F93) 015

(20-25 man effort)
adv. Technology
Kane Asrar 6705-2523- (F96) 015

(1880 time frame)
Exploratory Storage Dev.
Bertram Calhoun - 2523-7228 - F94 (015)
Bubble Devices -

① Carl Shelton 6525-1564 - K45 28-1

~~applied physics~~ Adv. Storage Tech-

② Top guy - Larry Rossin 4676-2609 K45 - 28-2

Austin is working on near term bubble memory -

low density is $1/2$ m bits / $sq\text{ in}$ -
product late 77 early 78.

10/29/74

Austin - George Webb 323 - 7311

Low cost I/o writer

Lexington -

Pensonic - new typewriter 1976
Plaudit I/o - writer. 1976 =
lower cost than present products.

(Plaudit)

Mgr. Don Greer Lexington.

Inter

Mag card I/o - \approx 400 mfg cost
Incl KBD - \approx 1000 cost.

SDD using this in some of their products.

For

Product. also High Performance Printer in works in Lexington.
Typewriter

Mag card I/o Austin -

phase in Plaudit later.

Mag card.

B.M. Bingham, Product Eng - 6100
Doug Brown, Controller, (pricing) 6228

Else Mag Card I/o w/o KBD.

Then phase PLAUDIT

Meeting in BOCA by OPD - ??

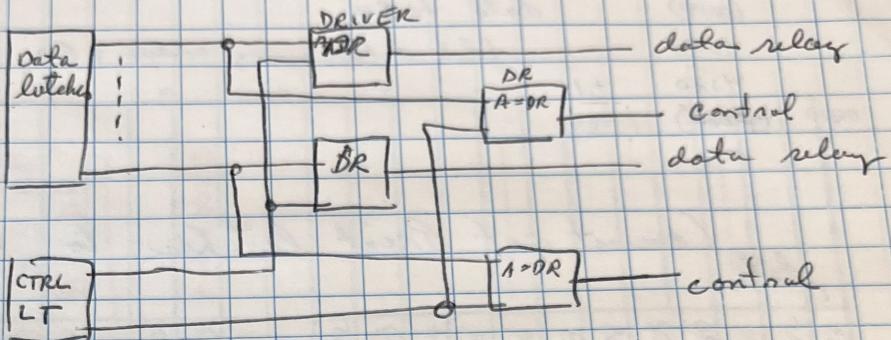
Call Don Rep Thurs or Friday..

11/23/14.

Consider using dutch printer module designed for Bahia that has data latches.

Use data latches plus one additional latch to direct output from three latches.
i.e.: data cycle and control cycle.

Exps



Control cycle for such things as tab, backspace, carriage return, etc.

Alternative to above suggestion is to use Bahia attachment with minor modification.
i.e. add required drivers to attachment card and fix code exceptions.

Reviewing Bahia attachment card.

11/25/14.

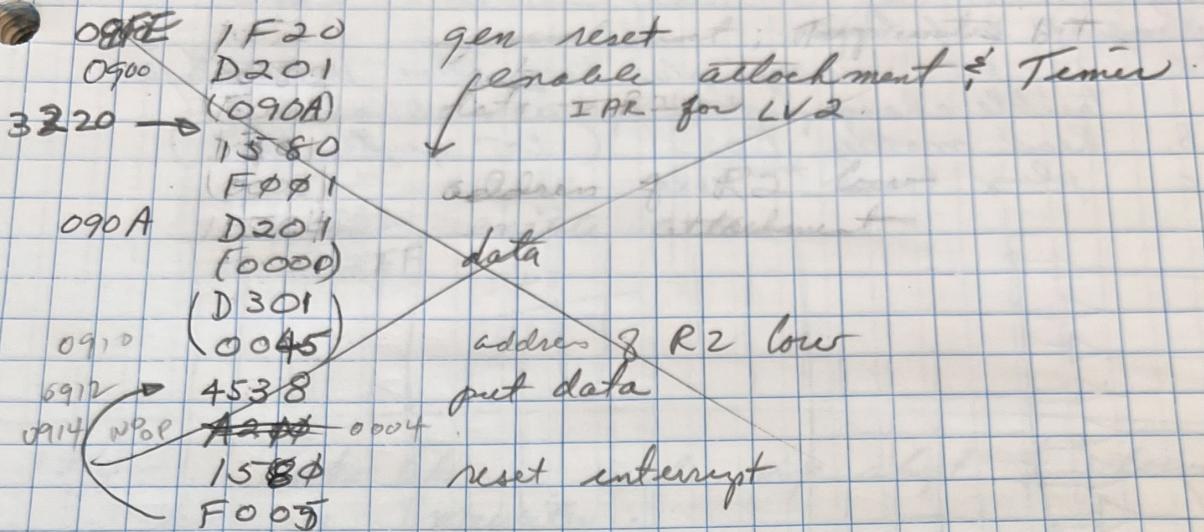
Will try to use Bahia Print emitter scheme for print character timing.

- a. Replace sampling frequency with Vertical Sync line as is
 - b. Invert ^{Vertical} Horizontal sync + tie to Print emitter 1 input
 - c. Tie non invert vertical sync + print emitter 3 input.
- Hopefully this will cause the sampling ring to print. Should give us a 15.5 CPS rate.

N/G - Cannot use as above - Must regroup.

1/16/74.

Preliminary debug of Tippewriter attachment card.



Assembly code (L2) at address 3720:

```
L2 →
    0900 1F20
    2 D701
    4 090E
    6 3720      STOR L2 addr.
    8 1580      enable TWR attach.
    A F001      WAIT
    C F001      Trap.
    E D201
    10 0000     ) data → R2
    2 D301
    4 0045     ) addr → R3
    6 4538      - Put data - NO INC.
    8 A200 (0004) INC data
    A 1580      Reset intpt
    C F007 OK   Return for next interrupt
    E F001      Trap
```

11/26/74

Recap of Turk attachment.

Need character generator for Tilt/rotate / shift
& velocity control.

8 bit address. Perhaps 7 only

$$\begin{array}{r} 8 \times 8 \times 256 \\ \hline 64 \\ 16 \\ 4 \\ 1 \\ \hline 16,384 \end{array}$$

$$\begin{array}{r} 8 \times 8 \times 8 \\ \hline 64 \\ 32 \\ 16 \\ 8 \\ 4 \\ 2 \\ \hline 5622 \end{array}$$

~~778X~~

12/4 - looks like we need up shift & down shift
lines to Typewriter.

Present wiring for experimental tests

R1

R2

R2A

R5

T1

A (1)

T2 B (2) low byte Hi (Sep.)

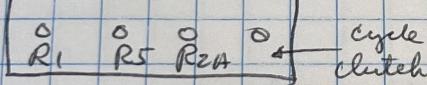
low byte

Hi (Sep.)

Tab
Contact

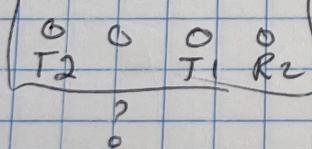
Tab
Solenoid
Requires much
drive.

TOP conn.



Upshift/Down shift
Contacts -

Bottom



KBD
LOCK

2/5/74

Changes to Supervisor

081C = 1F20 reset TWR attachment

083A 110E

0844 1F20

0848 F001

1st attachment
second TWR attach.
reset trap.

Translate Table - Scopy interval \rightarrow TWR

CHAR	TWR	ATTACH	
A	1C		I 3F
B	2Φ		2 3G
C	2C		3 3E
D	2D		4 39
E	25		5 35
F	0E		6 34
G	0F		7 3D
H	21		8 3C
I	14		9 30
J	07		Φ 31
K	24		- 00
L	29		= 06
M	1F		! 17
N	26		; 0D
O	19		” 15
P	05		- 0C
Q	04		· 16
R	1D		/ 09
S	11		
T	27		
U	2E		
V	1E		
W	10		
X	2F		
Y	01		
Z	37		

Table for
Copy port since
Type ball

12/11/74.

Consider requesting system power for Tippencaster attachment.

- a. +5V = Use low power hardware.
- b. +12V
- c. -12V.

Average # of magnets picked for alpha chars = 3.47
Average # " " " numeric chars = $\frac{4.03}{5.3}$

So; Using $4^{.385}$ as an average.

Coil resistance $\approx 124\Omega$

$$I = \frac{V}{R} = \frac{26.4 \text{ (+10%)}}{124} \approx 213 \text{ mA.}$$

~~$\frac{4.4}{2} \times 4.4$~~ 469 mA.

$213 \times 4 \div 2 \text{ (50% duty cycle)} = 426 \text{ mA.}$

Assuming we use + and - 12V from System.

This appears to be a small enough drain to warrant further investigation of system power for Tippencaster attachment.

$$\text{Max I} = 213 \times 7 \div 2 = 745.5 \text{ mA.}$$

1.5Amps Peak for 50%

Jerry Vette: 2367.

-5	.1	.4
+5	7	-15 AMP
+8.5	0.65	-2.5
+12	0.6	1.5
-12	0	.3

display is very jumpy.

Power supply is 90% used.

12/13/74. TAB IMAGE BUFFER (TIB)

1. DEDICATE 16 BYTES FOR BUFFER = 128 BITS -
EACH BIT FROM 1-128 CORRESPONDS TO TYPEWRITER
PRINT POSITIONS FROM 1-128 -
2. TAB IMAGE ADDR (T^A) = $XXXn.$ = 1 REGISTER
3. BIT MASK = XXn_1n_2 = LO BYTE SHIFTED LEFT
PER EACH POSITION 1-8.
AFTER HI ORDER BIT TEST
INCREMENT TIA AND
SET LO ORDER MASK BIT.

NOTE: CYCLE SHIFT DOES NOT TURN FOR SPACE BAR OR BACKSPACE.

FOR TAB IMAGE SETTING BACKSPACE & SPACEBAR
CANNOT BE USED UNLESS SENSING HARDWARE
INSTALLED.

PREFER TO ^{RESTRICT} TAB IMAGE SETTING AS FOLLOWS:

1. BACKSPACE CANNOT BE USED - MUST RESTART
PROCEDURE IF TAB SET POSITION IS BYPASSED.
2. USE AN ALPHAMERIC KEY TO SPACE TO
TAB POSITION'S AND THEN USE SCAMP
KEYBOARD TO RECORD TAB SET ADDRESS.
2A - Also consider direct keying of Tab
addresses into scamp - APL or BASIC routine
would then set image over buffer.

12/28 TWR MICRO CODE

sg L2.

11AC

A025

skip to tab or print test

D701

0045

} address of R2 low

8A2C

last lower case char (internal code)

D501

1414

} hi byte = address of translate table

DC01

07BF

} address of 1st buffer char,

DE01

07FF

" " last " "

8300

clr R3 low

64E4

fetch char from data buffer

C432

skip if blank

A007

CEC2

skip if entire line blank

F009

test next character for blank

D008

1246

90 to INDEX

11D8

AEO1

adj last print char count

A00B

Go TO PRINT

21BA

get PET STATUS

8404

TAB mask

C145

skip if TAB

F02D

I008

90 to TAB

16BA

10/14 M

PRE PRINT
PRINT

PRINT+8

11E0

11F0

200

DN SHIFT

1216

121E

(A)

8901 Set lower case status bit
1580
CCE2
A003
D008
122A 3
A063
C2A0
A01D
8301 yes
C935 are we in lower case?
A011
025D yes - L → H

6228 fetch to R2 with R2 address
B280 set cycle drive bit
4578
0444 Put data & Reset interrupt.

NO op

CCE2
F019
D008
122A lost char printed?
B901
1580
F017 no, repeat

Set istatus

DN shift + Rent interrupt
return

8300 mark of blank char
C232
A007
025D Blank?

No

yes

6228 fetch code
B2C0 set cycle clutch

this code
not entirely
used.

F01F
8301 mark of Downshift.

C935 is it down?

F028

9901 yes

1581 Upshift & reset interrupt
F031

12/24/98

Lost char Printed

122A

B901

set down shift bit
shift

Carrier return

1230

1580

830C (05) length count for CR delay

1582

CR

C30B

skip some delay

A005

F300

decrement delay count
reset interrupt

1587

F009

D101

1622

3100

Lφ IAR

1507

disable TWR attachment.

FF001

1583

INDEX

1587

delay

E00F

1F20

F008

0802

62Cφ

C203

skip no bits

F069

Print + 9 (not zero)

B200

F059

→ A

PATCH

read char

Patch)

Blayne M.

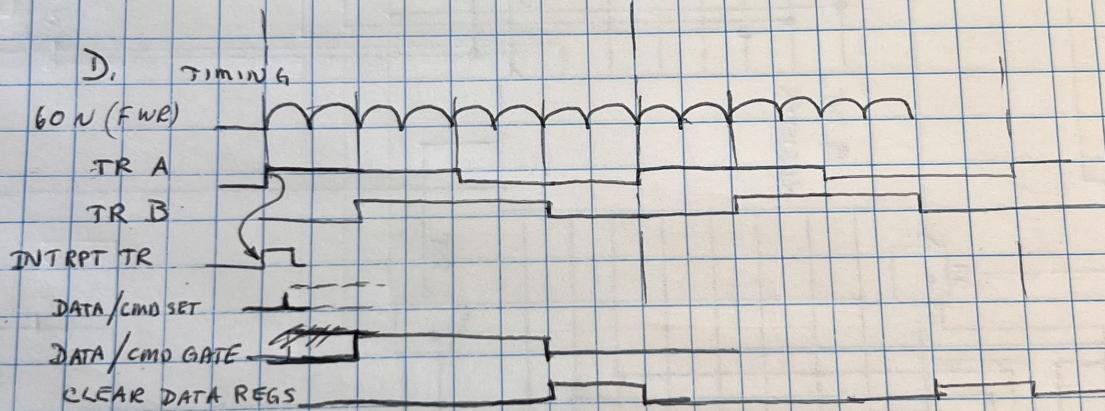
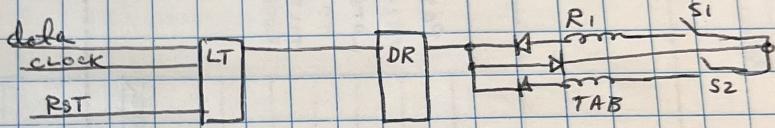
456 - 6738

1/6/75

Gas funds & head cover for TWR

Assumptions for AC driven TWR attachment:

- a. use single driver for shift magnet.
no mechanical latch - Driver not energized
equals lower shift.
- b. all other magnets drivers are timed.
b2 Data register is always cleared at character end period.
- c. Data and function magnets are mutually exclusive.

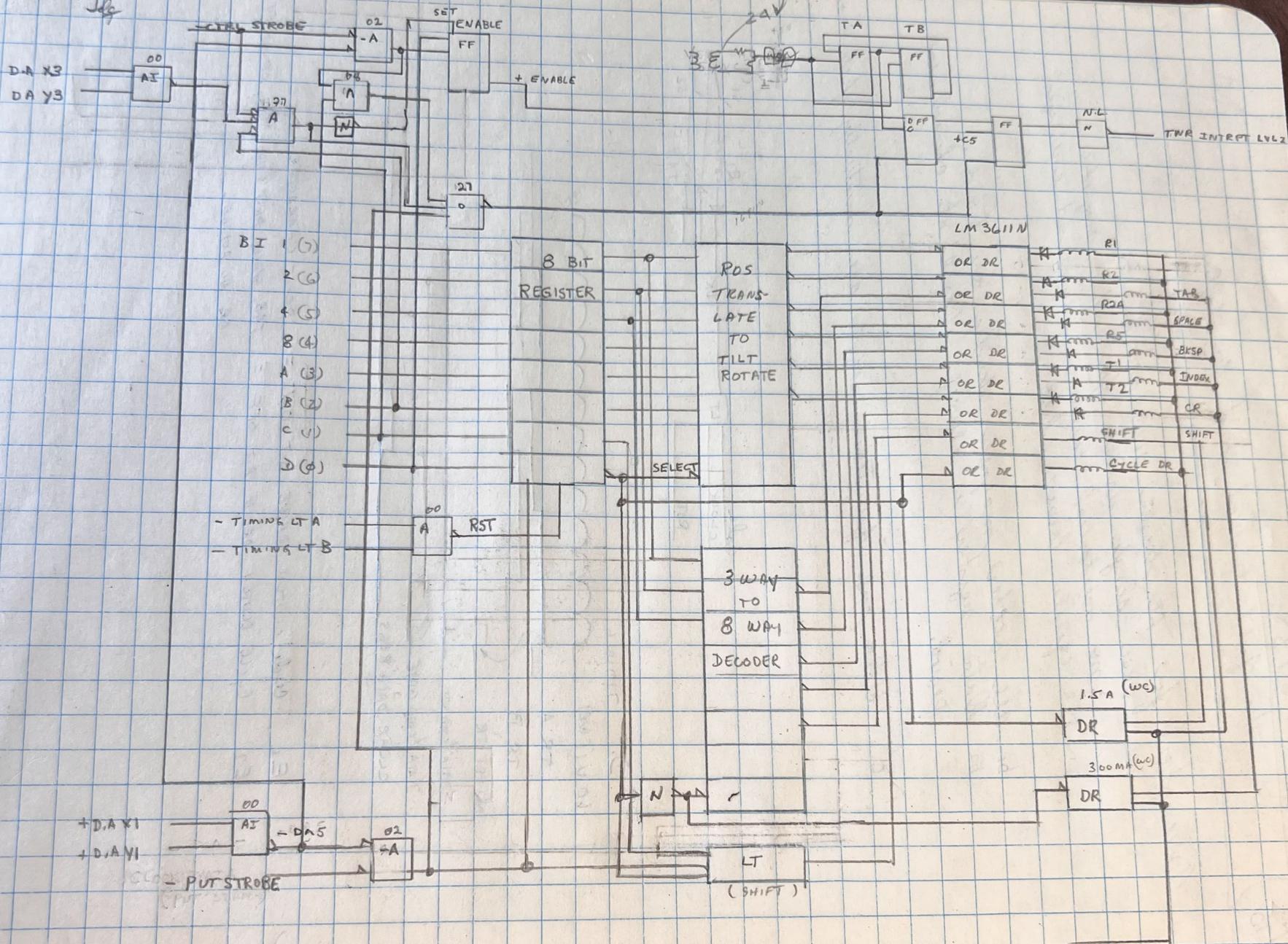


E1. Cycle CLUTCH DRIVE B.T ON = PRINT CHARACTER.

E2. Cycle CLUTCH DRIVE B.T OFF = TAB, SPACE, BS, INDEX, CR, OR SHIFT
OR NO ACTION.

1/7/25

JLg



SET TABS - Preliminary code -

L0	16B4	2110	{	
2		3132	}	SAVE OLD L1 address.
4		D101	{	
6		16C4	}	L1 POINTER
8		3110		
A		1401		ENABLE KBD
C		D008	}	
E		1380	}	GO TO PRINT MSG 1
L1	16C0	D901	{	permanent tab list address
		1680	}	
		DA01	{	Temporary tab list address.
		1690	}	
		860F		table list length
		8700		CHAR counter. φ = no entry or ready for next entry.
		DB01	{	address of R2 low
		0025	}	
		16D4	{	clear last key stroke save area
		3437	}	
		0444		no op
CLEAR TABLE	16D6	C608		
		A005		
		77Aφ		CLR byte +
		F600		sub 1 from table length
		F009		
		16E4		
		860F		restore table length
		3733	{	
		3734	}	clear input ^{area} registers
		3735		
		8A90		restore table address
		A003		go to Keystroke routine

KEY STROKED

16F0

043E

get R 3 Keyed data

84FF

}

FUP BITS

0347

ENTER key mask

84BD

Jump not enter

C34A

90 to "ENTER"

A059

8404

mask of ATTN key

C34A

Jump not ATTN

A061

90 to ATTN

841B

mask of BKSP

C34A

JUMP NOT BKSP

A075

GO TO BKSP

0444

NO OP

8440

mask of space

C34A

JUMP NOT SPACE

A009

90 to SPACE

1710

84F0

mask bits for numeric character.

C34D

Jump not numeric

A00F

90 to NUMERIC

D008

90 to INVALID KEYSTROKE

177E

JUMP NO BITS

SPARE

171A

C703

Jump NO BITS

A003

char has already been updated.

D008

go to WAIT.

163C

90 to CONVERSION Routine.

1720

D008

90 to CONVERSION Routine.

1470

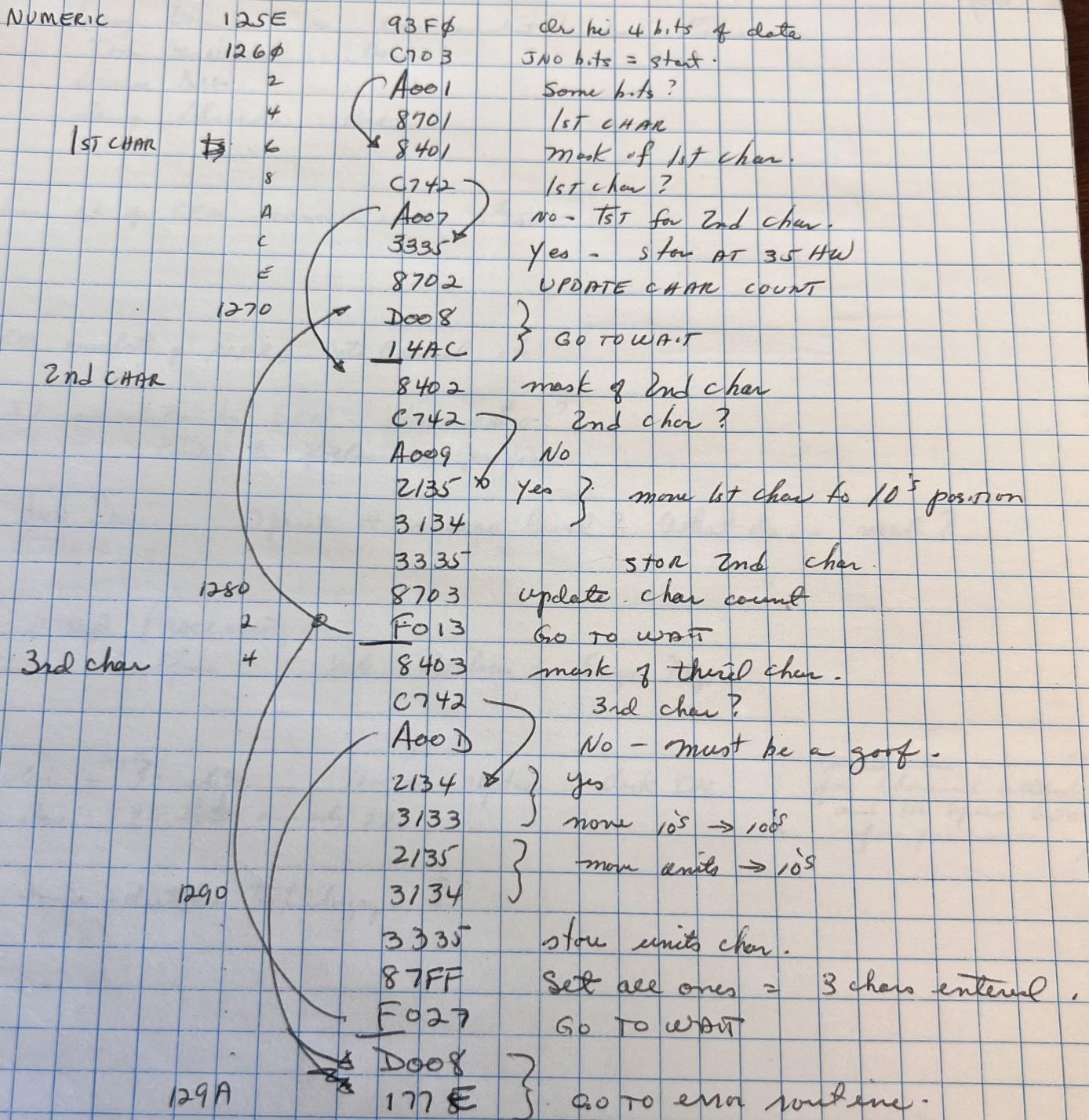
D008

90 to CONVERSION Routine.

125E

90 to NUMERIC routine.

Numeric Routine



1/125 John Rood

Jack Sens

Gerry Gorsuch → 3 mo assistant to Chuck Branscomb.

Tom McDevonott Boca

Dennis Gibbs

Larry Shreder Rich

Johns est of GEM processor card ≈ \$256,-

GEM emulate of PDP8; Data General, etc.

S7 emulation by GEM - How slow?

Could be follow on program.

Jack Sens - Operate at macro level? What do we need?

Word Processing.

Wolfson - Glen Neubauer - Engs. Mgrs.

Magnolia - early 77 ship 1200 ms-system - disk IPL.

Cornucopia 76 late or early 77.

Could reuse slow GEM
for channel attach
and the speed GEM
for processor.

Simple - Detacher technology - ?