

Read Routine

- M11 interrupt is connected to FD1771 INTREQ.
hence interrupts occur as per ~~not~~ FD1771 specs.
- no interrupts on DRQ therefore all data must be i/o by program.

```

; disc interrupt routine
; disc operation complete
{
  read status reg. 777200
  check for errors etc.
  set up stack return address to kill read routine
; disc read routine
; {
  set up command reg + op.
; wait for data to come ready
; this could take quite a while depending
; on head loading & seeking.
{

```

```

TEST:  BIT    #2, @#777200.    ; check DRQ in status reg.
        BEQ    TEST           ; no DRQ then loop.
LOOP:   MOV    @#data, R0.      ; get the data
        MOVB   R0, (R)+        ; store in buffer.
        BR     delay. ++ TEST LOOP.    ; delay for a bit

```

Timing

TEST BIT	8.5	} 11.9	1.5 - 3xNOPs
BEQ.	2.5		
LOOP MOV.	6.1	} 6.1 (8.5).	20.5 μ s
LOOP MOVB.	6.1		
BR ^{DEC} B15	2.5	3-4	20.5 μ s

will need a delay after movb. to prevent ~~this as a bit tight~~ UNIBUS time out

eg mov (R), (R) 7 μ s.
 mov (R), (R) 7 μ s
 14 μ s ✓.

write
 similar except.

```
TEST:   BIT    #2, @#status
        BEQ    TEST
LOOP:   MOVB   (R)+, R0
        MOV    R0, @#data
        delay
        BR     LOOP.
```


PPR 11 Registers

	read	write	A1	A0
777200	status reg	command reg	0	0
2	track	track	0	1
4	sector	sector	1	0
6	data	data	1	1

Note. bit 3 of address is not decoded. hence from 777200 to 216 cannot be used elsewhere.

read - only responds to word reads but top byte will not contain valid data because these bits are left floating

- not sure of the effect of a DATIP/DATOB sequence on the FD1771 chip - can try but maybe better for timing reasons to stay with word inputs

Must be last service in backplane.

Wired for level 7 priority

Top

Red Tubing

8x
7x
6x
5x
4x
3x
2x
1x

x9
x10
x11
x12
x13
x14
x15
x16

16 pin

7x
6x
5x
4x
3x
2x
1x

x8
x9
x10
x11
x12
x13
x14

14 pin

12x
11x

2x
1x

x13
x14

x22
x23
x24

24 pin

Bottom

Top

20x
19x
18x
17x
16x

3x
2x
1x

40 pin

x21
x22
x23

x39
x40

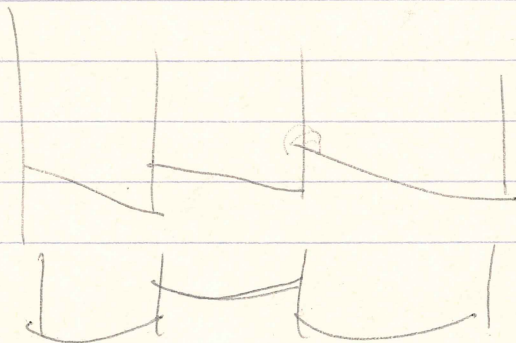
2x x1
4x x3
6x x5

38x x37
40x x39

Bottom

CJ3
only

3/01



<u>Conductor</u>		<u>Cable 1</u>		<u>Cable 2</u>	
<u>NR</u>	<u>Signal</u>	<u>Unibus Pin NR</u>	<u>Signal</u>	<u>Unibus Pin NR</u>	
31	A214 DØ1 L	AD2	A515 NPG H	AU1	
32	-	-	GND	AT1	
33	+5V	BA2	-	-	
34	GND	BB2	A601 INTR L	AB1	
35	A215 DØ3 L	AE2	GND	AS1	
36	-	-	GND	AR1	
37	A301 BR6 L	AU2	-	-	
38	GND	AV2	A602 DØØ L	AC1	
39	-	-	GND	AP1	
40	A302 DØ5 L	AF2	GND	AN1	
41	A303 NPR L	AS2	-	-	
42	A304 BR7 L	AT2	A603 DØ2 L	AD1	
43	A305 DØ7 L	AH2	A604 PA L	AM1	
44	A306 DØ9 L	AJ2	A605 D14 L	AL1	
45	A307 BBSY L	AP2	-	-	
46	A308 SACK L	AR2	A607 DØ4 L	AE1	
47	A310 D11 L	AK2	A609 D12 L	AK1	
48	A311 D13 L	AL2	A610 D1Ø L	AJ1	
49	A312 D15 L	AM2	A611 DØ8 L	AH1	
50	A313 PB L	AN2	A612 DØ6 L	AF1	

PDP11 UNIBUS EXTENDER

Signal List

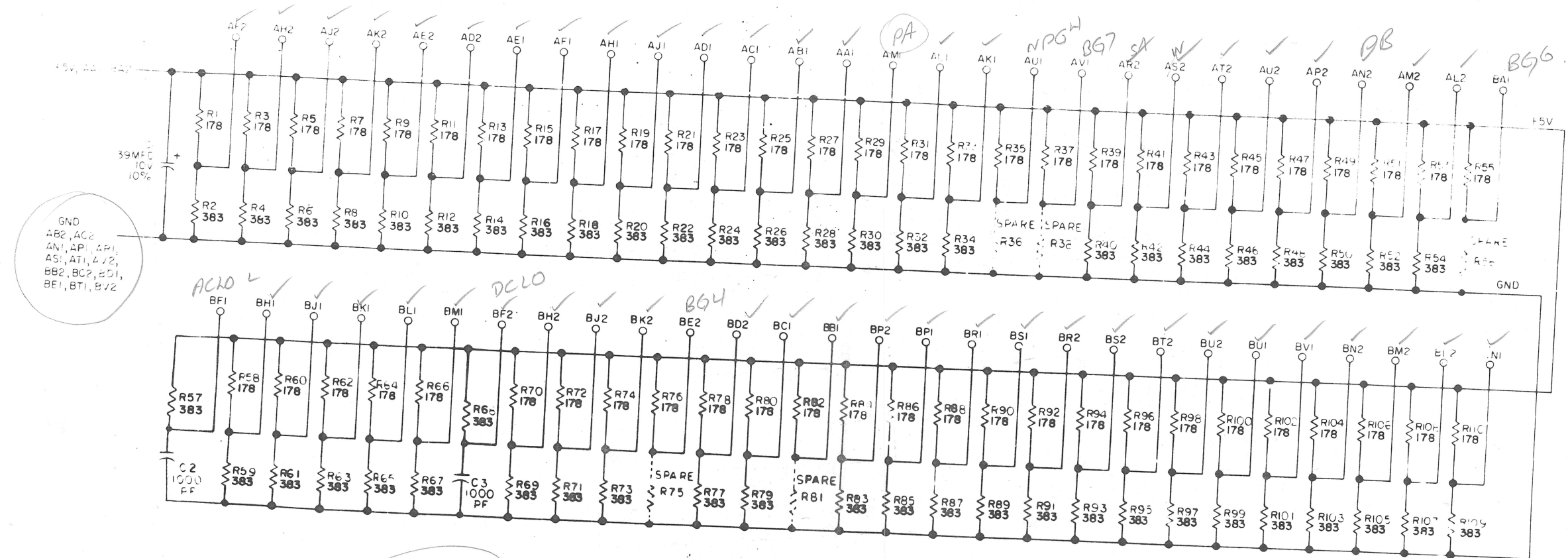
<u>Conductor</u>		<u>Cable 1</u>		<u>Cable 2</u>	
<u>NR</u>		<u>Signal</u>	<u>Unibus Pin NR</u>	<u>Signal</u>	<u>Unibus Pin NR</u>
1		GND	AC2, BC2	GND	AC2, BC2
2		GND	BV2	A501 A03L	BJ1
3	A201	C0L	BU2	A502 A05L	BK1
4	A202	C1L	BT2	A503 A07L	BL1
5		+5V	AA2	A504 A01L	BH1
6		-	-	-	-
7	A203	A16L	BS2	-	-
8	A204	A14L	BR2	A505 A09L	BM1
9		GND	AB2	A506 ACL0L	BF1
10		-	-	-	-
11	A205	A12L	BP2	-	-
12	A206	A10L	BN2	A506 A11L	BN1
13		-	-	GND	BE1
14		-	-	-	-
15	A207	A08L	BM2	A507 A13L	BP1
16	A208	A06L	BL2	A509 A15L	BR1
17		-	-	GND	BD1
18		-	-	-	-
19	A210	A04L	BK2	A510 A17L	BS1
20	A211	A02L	BJ2	A5102 GND	BT1
21		-	-	A5102 BG54M	BB1
22		-	-	A511 BR5L	BC1
23	A212	A00L	BH2	A512 SSYNL	BU1
24		-	-	A513 BG6H	BA1
25		-	-	-	-
26	A407	DCL0L	BF2	-	-
27	A401	BG4 H	BE2	A513 MSYN L	BV1
28		-	-	A404 BG7 4	AV1
29		-	-	-	-
30	A213	BR4 L	BD12	A514 INIT L	AA1

* Terminate 1 R up/down.
 ** " 2 R up
 *** " 3 R up / cap. down.

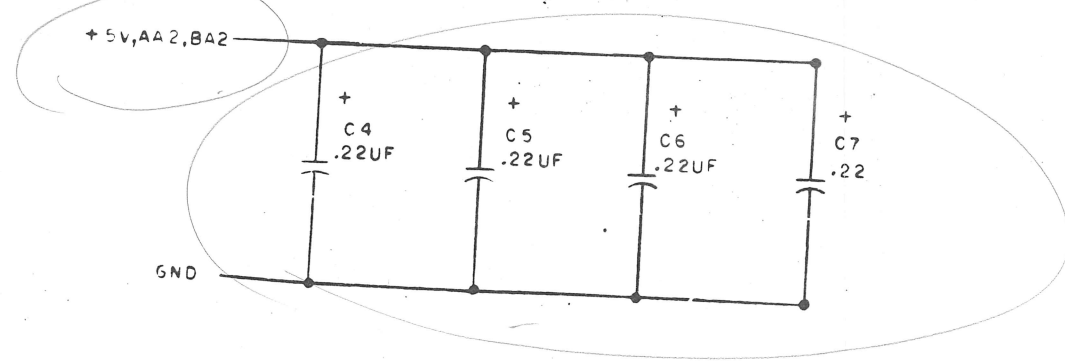
MAINTENANCE INSTRUCTIONS
 1. INSPECT FOR CORROSION AND DAMAGE
 2. REPAIR OR REPLACE AS NECESSARY

AXXL

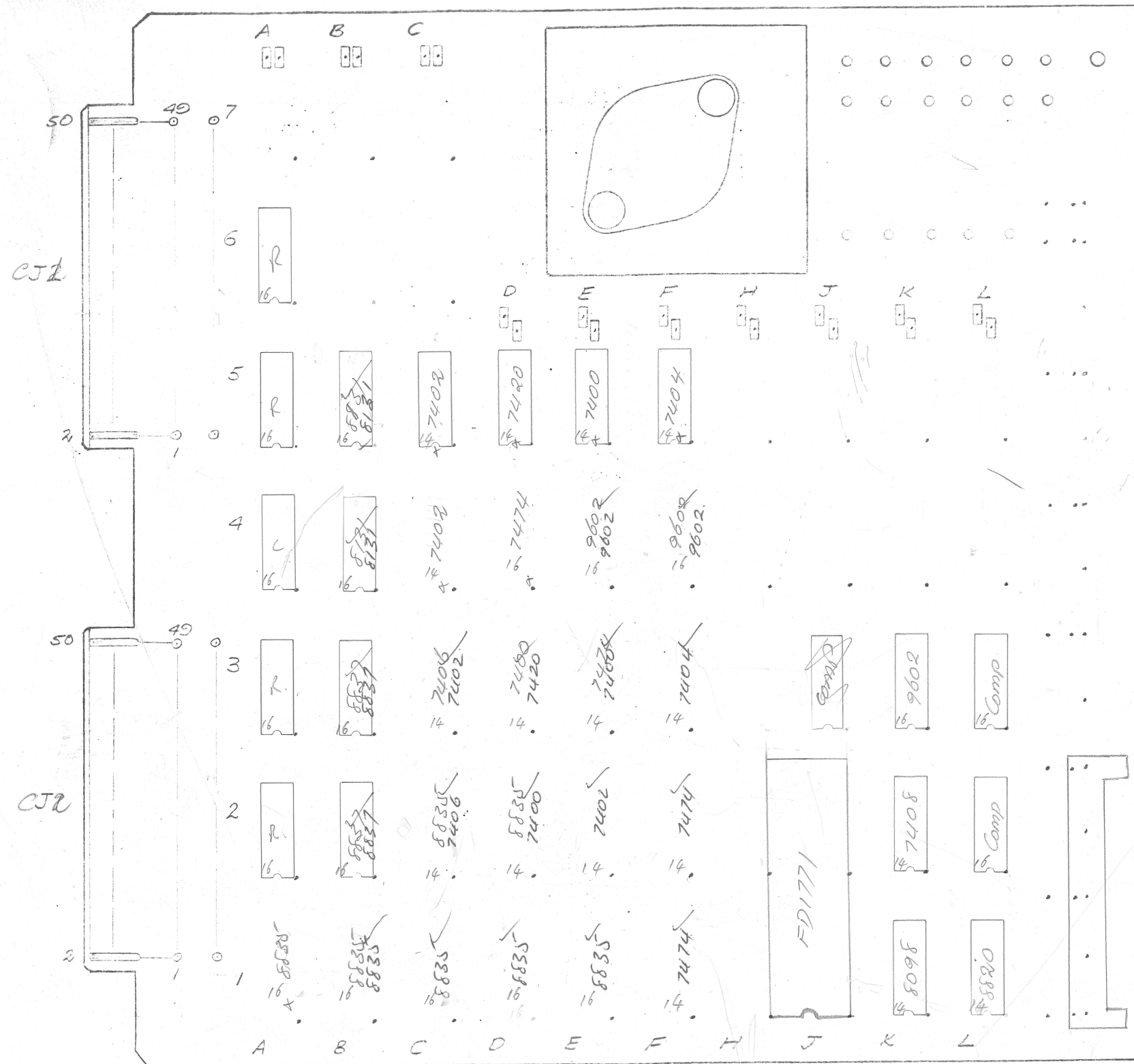
Dxx INTR INIT SACK
 NPR L
 BRx BBSY
 CI CO
 SSYN
 MSYN



UNLESS OTHERWISE INDICATED:
 RESISTORS ARE 1/4W, 1%
 CAPACITORS ARE .001UF, 250V, 20%

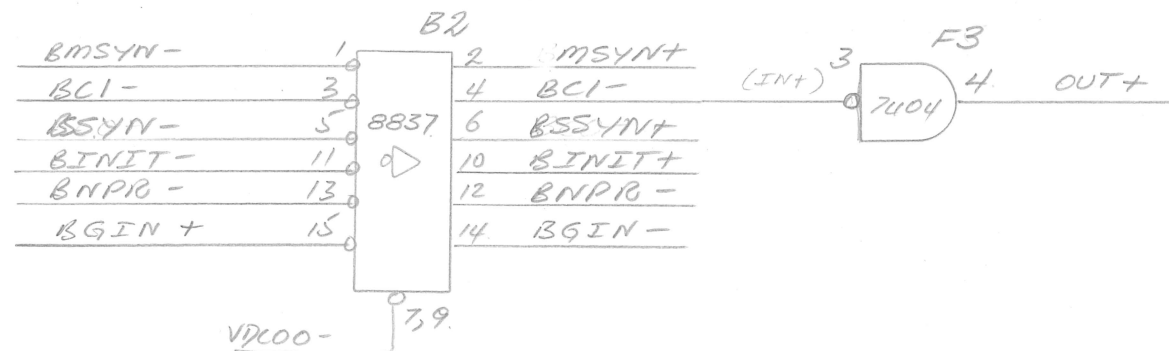
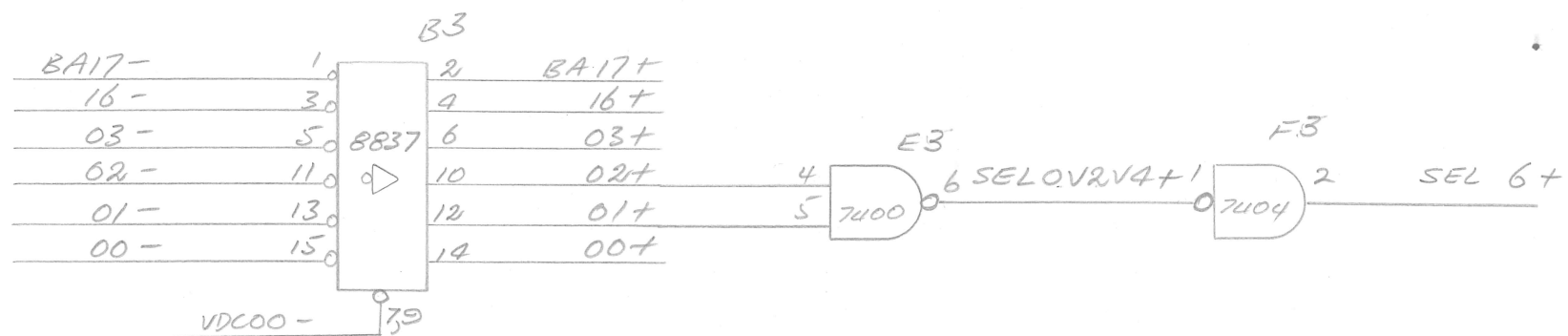
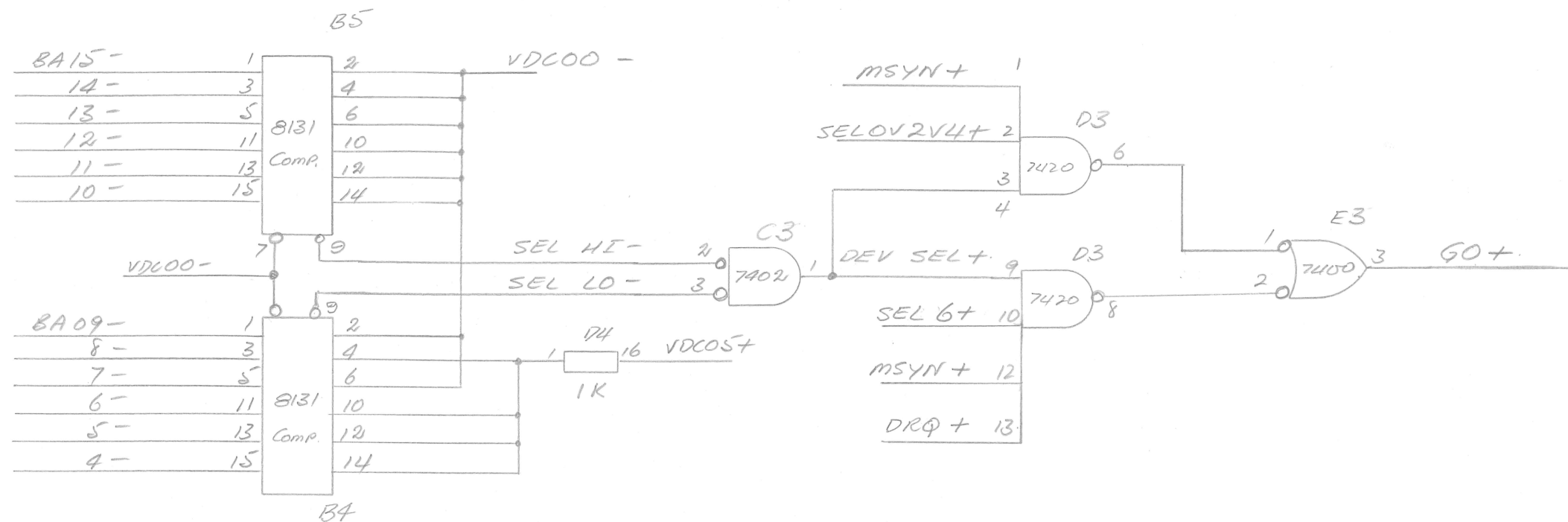


00001	A	1002	B	00003	C
b. j hall 5-29-73					
P. JANSON					
00004 D					
00005 E					
00006 F					
00007 G					
00008 H					
00009 I					
00010 J					
00011 K					
00012 L					
00013 M					
00014 N					
00015 O					
00016 P					
00017 Q					
00018 R					
00019 S					
00020 T					
00021 U					
00022 V					
00023 W					
00024 X					
00025 Y					
00026 Z					
00027 AA					
00028 AB					
00029 AC					
00030 AD					
00031 AE					
00032 AF					
00033 AG					
00034 AH					
00035 AI					
00036 AJ					
00037 AK					
00038 AL					
00039 AM					
00040 AN					
00041 AO					
00042 AP					
00043 AQ					
00044 AR					
00045 AS					
00046 AT					
00047 AU					
00048 AV					
00049 AW					
00050 AX					
00051 AY					
00052 AZ					
00053 BA					
00054 BB					
00055 BC					
00056 BD					
00057 BE					
00058 BF					
00059 BG					
00060 BH					
00061 BI					
00062 BJ					
00063 BK					
00064 BL					
00065 BM					
00066 BN					
00067 BO					
00068 BP					
00069 BQ					
00070 BR					
00071 BS					
00072 BT					
00073 BU					
00074 BV					
00075 BW					
00076 BX					
00077 BY					
00078 BZ					
00079 CA					
00080 CB					
00081 CC					
00082 CD					
00083 CE					
00084 CF					
00085 CG					
00086 CH					
00087 CI					
00088 CL					
00089 CM					
00090 CN					
00091 CO					
00092 CP					
00093 CQ					
00094 CR					
00095 CS					
00096 CT					
00097 CU					
00098 CV					
00099 CW					
00100 CX					
00101 CY					
00102 CZ					
00103 DA					
00104 DB					
00105 DC					
00106 DD					
00107 DE					
00108 DF					
00109 DG					
00110 DH					
00111 DI					
00112 DJ					
00113 DK					
00114 DL					
00115 DM					
00116 DN					
00117 DO					
00118 DP					
00119 DQ					
00120 DR					
00121 DS					
00122 DT					
00123 DU					
00124 DV					
00125 DW					
00126 DX					
00127 DY					
00128 DA					
00129 DB					
00130 DC					
00131 DD					
00132 DE					
00133 DF					
00134 DG					
00135 DH					
00136 DI					
00137 DJ					
00138 DK					
00139 DL					
00140 DM					
00141 DN					
00142 DO					
00143 DP					
00144 DQ					
00145 DR					
00146 DS					
00147 DT					
00148 DU					
00149 DV					
00150 DW					
00151 DX					
00152 DY					
00153 DA					
00154 DB					
00155 DC					
00156 DD					
00157 DE					
00158 DF					
00159 DG					
00160 DH					
00161 DI					
00162 DJ					
00163 DK					
00164 DL					
00165 DM					
00166 DN					
00167 DO					
00168 DP					
00169 DQ					
00170 DR					
00171 DS					
00172 DT					
00173 DU					
00174 DV					
00175 DW					
00176 DX					
00177 DY					
00178 DA					
00179 DB					
00180 DC					
00181 DD					
00182 DE					
00183 DF					
00184 DG					
00185 DH					
00186 DI					
00187 DJ					
00188 DK					
00189 DL					
00190 DM					
00191 DN					
00192 DO					
00193 DP					
00194 DQ					
00195 DR					
00196 DS					
00197 DT					
00198 DU					
00199 DV					
00200 DW					
00201 DX					
00202 DY					
00203 DA					
00204 DB					
00205 DC					
00206 DD					
00207 DE					
00208 DF					
00209 DG					
00210 DH					
00211 DI					
00212 DJ					
00213 DK					
00214 DL					
00215 DM					
00216 DN					
00217 DO					
00218 DP					
00219 DQ					
00220 DR					
00221 DS					
00222 DT					
00223 DU					
00224 DV					
00225 DW					
00226 DX					
00227 DY					
00228 DA					
00229 DB					
00230 DC					
00231 DD					
00232 DE					
00233 DF					
00234 DG					
00235 DH					
00236 DI					
00237 DJ					
00238 DK					
00239 DL					
00240 DM					
00241 DN					
00242 DO					
00243 DP					
00244 DQ					
00245 DR					
00246 DS					
00247 DT					
00248 DU					
00249 DV					
00250 DW					
00251 DX					
00252 DY					
00253 DA					
00254 DB					
00255 DC					
00256 DD					
00257 DE					
00258 DF					
00259 DG					
00260 DH					
00261 DI					
00262 DJ					
00263 DK					
00264 DL					
00265 DM					
00266 DN					
00267 DO					
00268 DP					
00269 DQ					
00270 DR					
00271 DS					
00272 DT					
00273 DU					
00274 DV					
00275 DW					
00276 DX					
00277 DY					
00278 DA					
00279 DB					
00280 DC					
00281 DD					
00282 DE					
00283 DF					
00284 DG					
00285 DH					
00286 DI					
00287 DJ					
00288 DK					
00289 DL					
00290 DM					
00291 DN					
00292 DO					
00293 DP					
00294 DQ					
00295 DR					
00296 DS					
00297 DT					
00298 DU					
00299 DV					
00300 DW					
00301 DX					
00302 DY					
00303 DA					
00304 DB					
00305 DC					
00306 DD					
00307 DE					
00308 DF					
00309 DG					
00310 DH					
00311 DI					
00312 DJ					
00313 DK					
00314 DL					
00315 DM					
00316 DN					
00317 DO					
00318 DP					
00319 DQ					
00320 DR					
00321 DS					
00322 DT					
00323 DU					
00324 DV					
00325 DW					
00326 DX					
00327 DY					
00328 DA					
00329 DB					
00330 DC					
00331 DD					
00332 DE					
00333 DF					
00334 DG					
00335 DH					
00336 DI					
00337 DJ					
00338 DK					
00339 DL					
00340 DM					
00341 DN					
00342 DO					
00343 DP					
00344 DQ					
00345 DR					
00346 DS					
00347 DT					
00348 DU					
00349 DV					
00350 DW					
00351 DX					
00352 DY					
00353 DA					
00354 DB					
00355 DC					
00356 DD					
00357 DE					
00358 DF					
00359 DG					
00360 DH					
00361 DI					
00362 DJ					
00363 DK					
00364 DL					
00365 DM					
00366 DN					
00367 DO					
00368 DP					
00369 DQ					
00370 DR					
00371 DS					
00372 DT					
00373 DU					
00374 DV					
00375 DW					
00376 DX					
00377 DY					
00378 DA					
00379 DB					
00380 DC					
00381 DD					
00382 DE					
00383 DF					
00384 DG					
00385 DH					
00386 DI					
00387 DJ					
00388 DK					
00389 DL					
00390 DM					
00391 DN					
00392 DO					
00393 DP					
00394 DQ					
00395 DR					
00396 DS					
00397 DT					
00398 DU					
00399 DV					
00400 DW					
00401 DX					
00402 DY					
00403 DA					
00404 DB					
00405 DC					
00406 DD					
00407 DE					
00408 DF					
00409 DG					
00410 DH					
00411 DI					
00412 DJ					
00413 DK					
00414 DL					
00415 DM					
00416 DN					
00417 DO					
00418 DP					
00419 DQ					
00420 DR					
00421 DS					
00422 DT					
00423 DU					
00424 DV					
00425 DW					
00426 DX					
00427 DY					
00428 DA					
00429 DB					
00430 DC					
00431 DD					
00432 DE					
00433 DF					
00434 DG					
00435 DH					
00436 DI					
00437 DJ					
00438 DK					
00439 DL					
00440 DM					
00441 DN					
00442 DO					
00443 DP					
00444 DQ					
00445 DR					
00446 DS					
00447 DT					
00448 DU					
00449 DV					
00450 DW					
00451 DX					
00452 DY					
00453 DA					
00454 DB					
00455 DC					
00456 DD					
00457 DE					
00458 DF					
00459 DG					
00460 DH					
00461 DI					
00462 DJ					
00463 DK					
00464 DL					
00465 DM					
00466 DN					
00467 DO					
00468 DP					
00469 DQ					
00470 DR					
00471 DS					
00472 DT					
00473 DU					
00474 DV					
00475 DW					
00476 DX					
00477 DY					
00478 DA					
00479 DB					
00480 DC					
00481 DD					
00482 DE					
00483 DF					
00484 DG					
00485 DH					
00486 DI					
00487 DJ					
00488 DK					
00489 DL					
00490 DM					
00491 DN					
00492 DO					
00493 DP					
00494 DQ					
00495 DR					
00496 DS					
00497 DT					
00498 DU					
00499 DV					
00500 DW					
00501 DX					
00502 DY					
00503 DA					
00504 DB					
00505 DC					
00506 DD					
00507 DE					
00508 DF					
00509 DG					
00510 DH					
00511 DI					
00512 DJ					
00513 DK					
00514 DL					
00515 DM					
00516 DN					
00517 DO					
00518 DP					
00519 DQ					
00520 DR					
00521 DS					
00522 DT					
00523 DU					
00524 DV					
00525 DW					
00526 DX					
00527 DY					
00528 DA					
00529 DB					
00530 DC					
00531 DD					
00532 DE					
00533 DF					
00534 DG					
00535 DH					
00536 DI					
00537 DJ					
00538 DK					
00539 DL					
00540 DM					
00541 DN					
00542 DO					
00543 DP					
00544 DQ					
00545 DR					
00546 DS					
00547 DT					
00548 DU					
00549 DV					
00550 DW					
00551 DX					
00552 DY					
00553 DA					
00554 DB					
00555 DC					
00556 DD					
00557 DE					
00558 DF					
00559 DG					
00560 DH					
00561 DI					
00562 DJ					
00563 DK					
00564 DL					
00565 DM					
00566 DN					
00567 DO					
00568 DP					
00569 DQ					
00570 DR					
00571 DS					
00572 DT					
00573 DU					
00574 DV					
00575 DW					
00576 DX					
00577 DY					
00578 DA					
00579 DB					
00580 DC					
00581 DD					
00582 DE					
00583 DF					
00584 DG					
00585 DH					
00586 DI					
00587 DJ					
00588 DK					
00589 DL					
00590 DM					
00591 DN					
00592 DO					
00593 DP					
00594 DQ					
00595 DR					
00596 DS					
00597 DT					
00598 DU					
00599 DV					
00600 DW					
00601 DX					
00602 DY					
00603 DA					
00604 DB					
00605 DC					
00606 DD					
00607 DE					
00608 DF					
00609 DG					
00610 DH					
00611 DI					
00612 DJ					
00613 DK					
00614 DL					
00615 DM					
00616 DN					
00617 DO					
00618 DP					
00619 DQ					
00620 DR					
00621 DS					
00622 DT					
00623 DU					
00624 DV					
00625 DW					
00626 DX					
00627 DY					
00628 DA					
00629 DB					
00630 DC					
00631 DD					
00632 DE					
00633 DF					
00634 DG					
00635 DH					
00636 DI					
00637 DJ					
00638 DK					
00639 DL					
00640 DM					
00641 DN					
00642 DO					
00643 DP					
00644 DQ					
00645 DR					
00646 DS					
00647 DT					
00648 DU					
00649 DV					
00650 DW					
00651 DX					
00652 DY					
00653 DA					
00654 DB					
00655 DC					
00656 DD					
00657 DE					
00658 DF					
00659 DG					
00660 DH					
00661 DI					
00662 DJ					
00663 DK					
00664 DL					
00665 DM					
00666 DN					
00667 DO					
00668 DP					
00669 DQ					
00670 DR					
00671 DS					
00672 DT					
00673 DU					
00674 DV					
00675 DW					
00676 DX					
00677 DY					
00678 DA					
00679 DB					
00680 DC					
00681 DD					
00682 DE					
00683 DF					
00684 DG					
006					

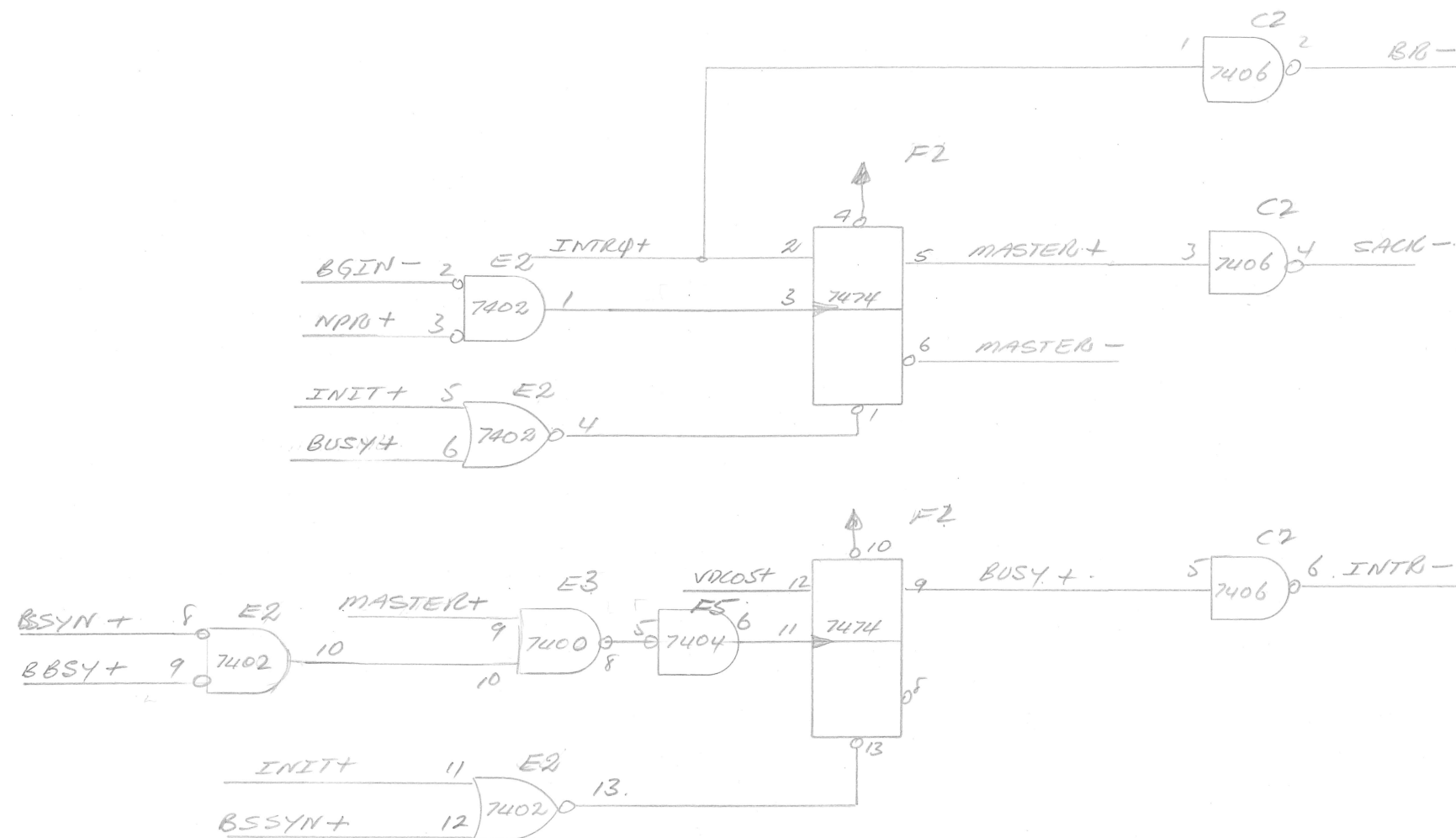


1. • denotes pin 1 of 0.3 in IC's, alignment is
2. □ denotes spare power buses

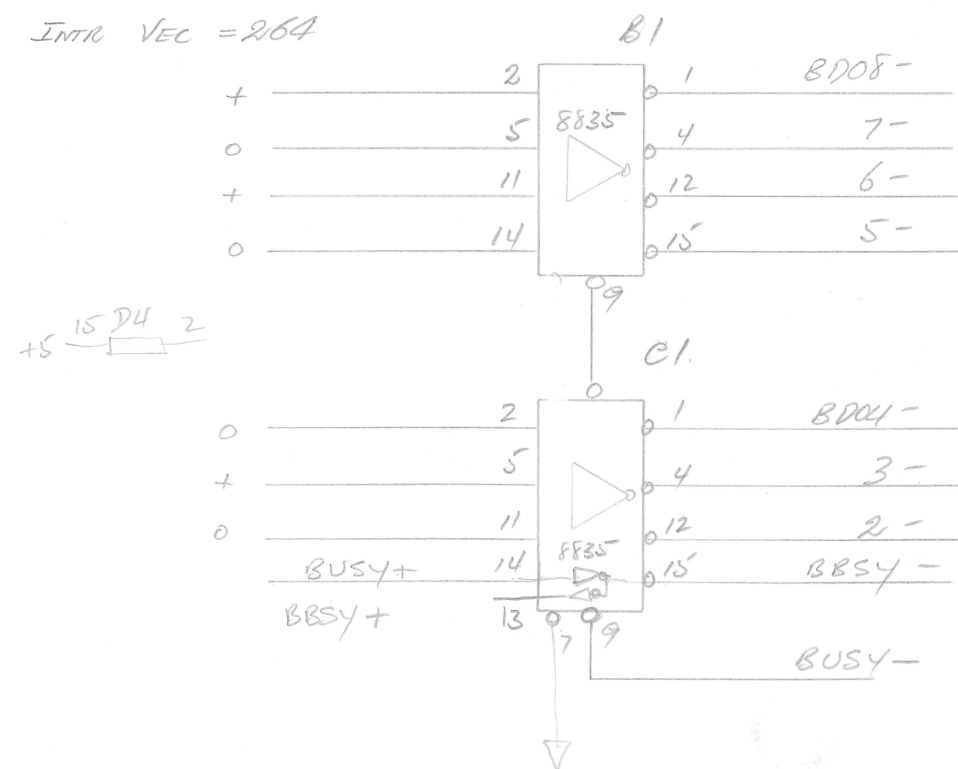
UNIVERSITY OF QUEENSLAND



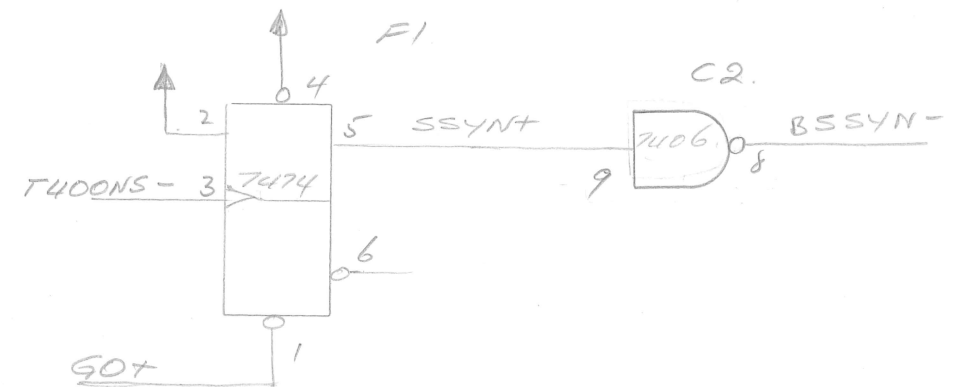
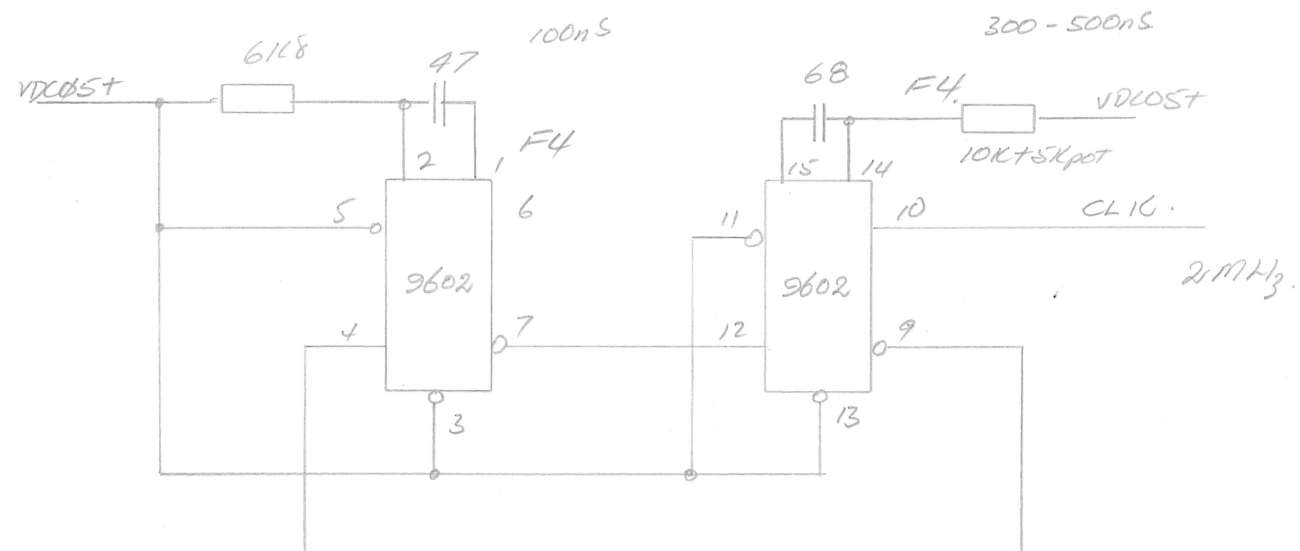
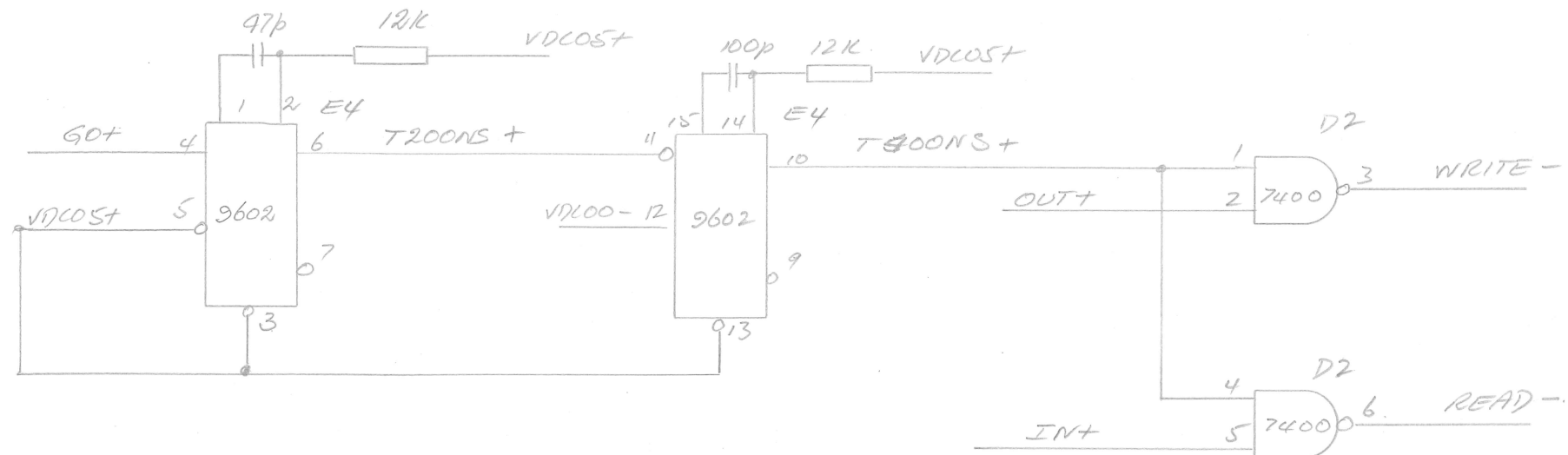
UNIVERSITY OF QUEENSLAND	
PRENTICE COMPUTER CENTRE	
Dwn.	
Date	
520.10	



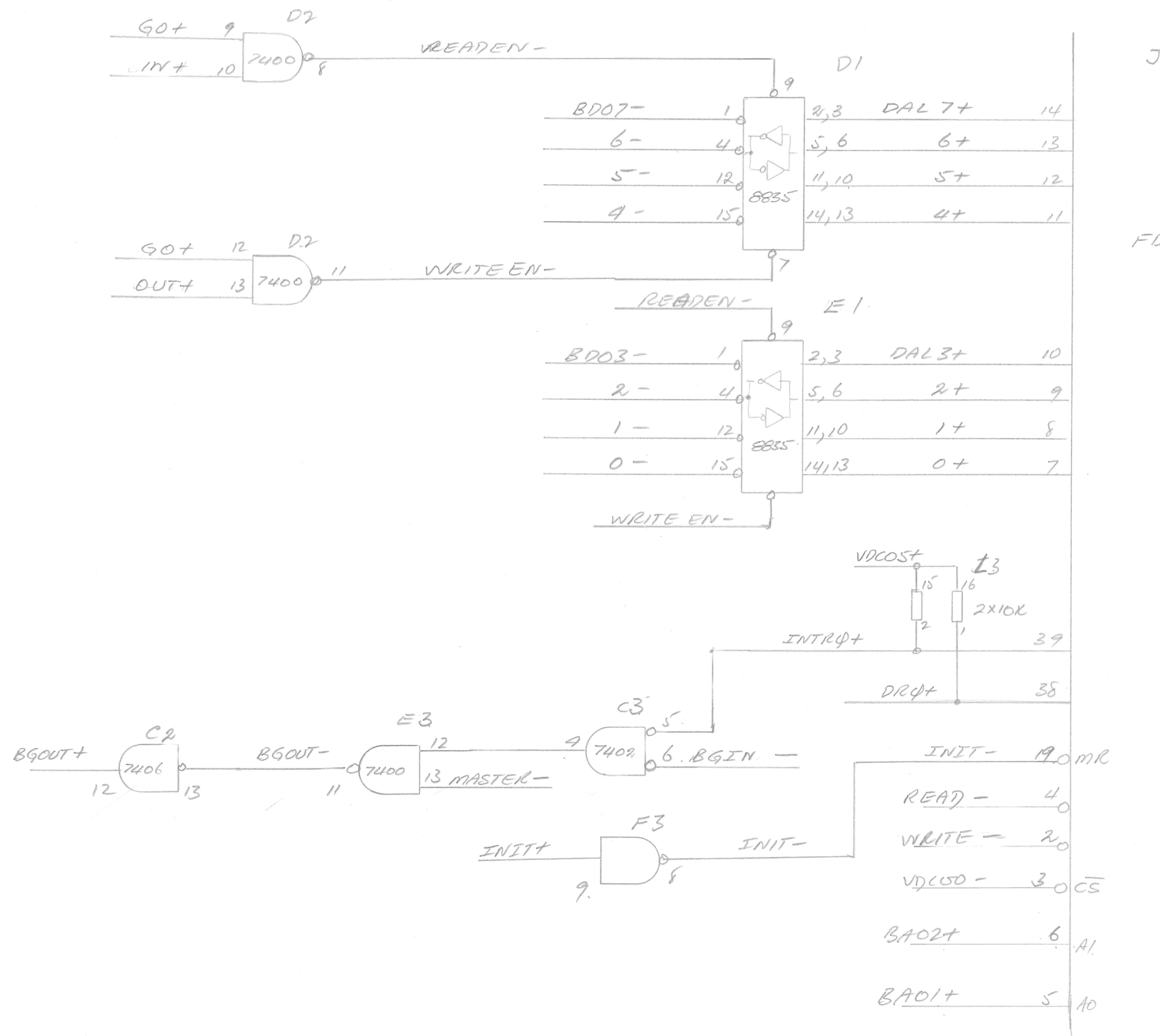
INTR VEC = 264



UNIVERSITY OF QUEENSLAND PRENTICE COMPUTER CENTRE	
Dwn.	
Date	
520.11	



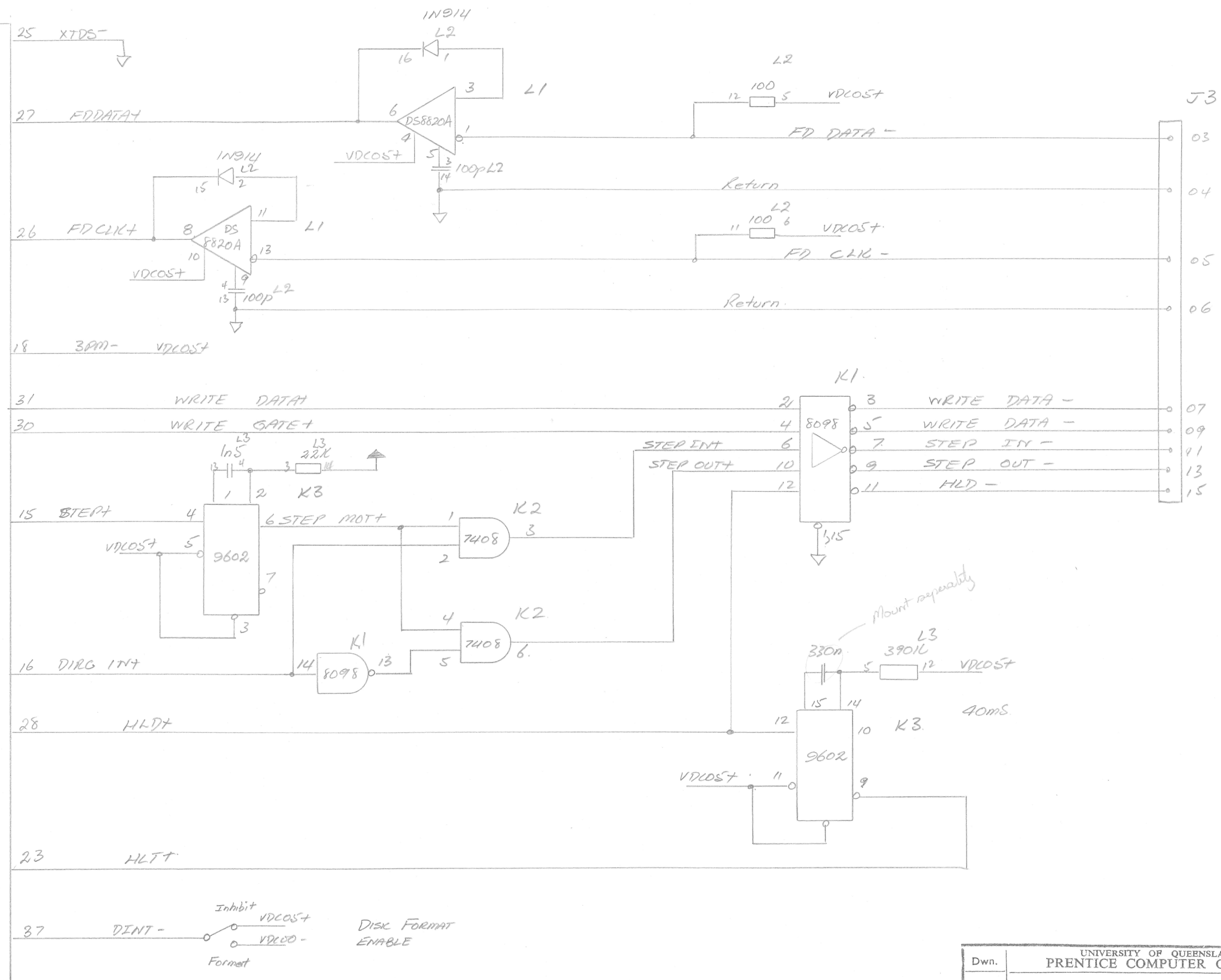
Dwn.	UNIVERSITY OF GUTENSLAND PRESENCE COMPUTATION CENTRE	
Date		
	520.12	



Dwn.	UNIVERSITY OF QUEENSLAND	
	PREPARED BY COMPUTER CENTRE	
Date		
	520.13	

J1.

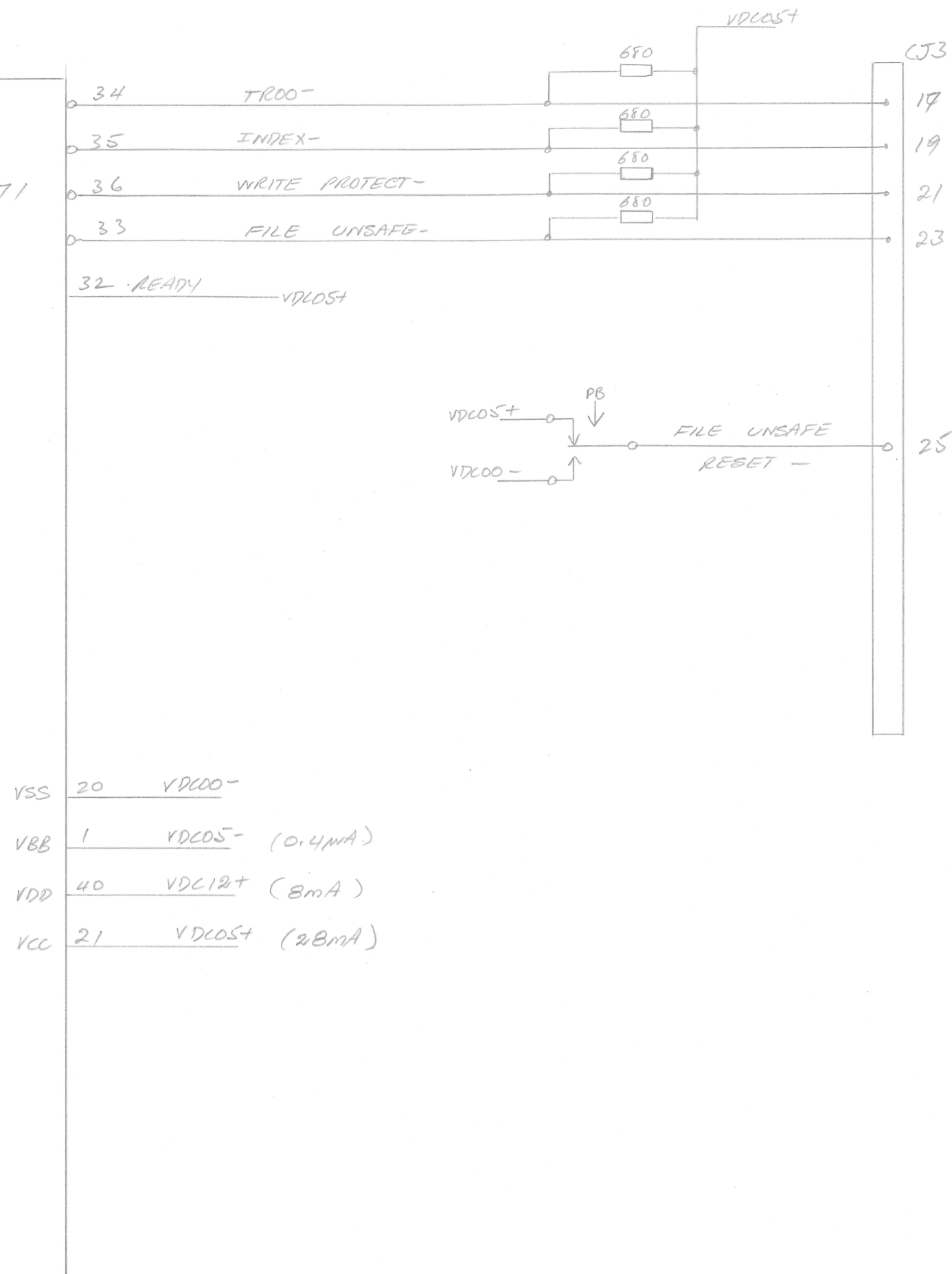
FD1771



01, 02
08 -- 40.

UNIVERSITY OF QUEENSLAND PRENTICE COMPUTER CENTRE	
Dwn.	
Date	
520.14	

FD 1771



UNIVERSITY OF QUEENSLAND PRENTICE COMPUTER CENTRE	
Dwn.	
Date	
520.15	

					VPLOST	VPLOO	VPDS-	VPCHT
8131	B5	B5	⊗	16	16			
8131	B4	B4	⊗	16				
8837	B3	B3	⊗	16				
8837	B2	B2	⊗	16				
7402	C5	C3	⊗ ⊗ / /	14				
7420	D5	D3	⊗ ⊗	14				
7400	E5	E3	⊗ ⊗ ⊗ ⊗	14				
7404	F5	F3	⊗ ⊗ ⊗ X / /	14				
8835	A1	B1	⊗	16				
8835	B1	C1	⊗	16				
7406	C3	C2	⊗ ⊗ ⊗ ⊗ ⊗ ^{for} ⊗	14				
7400	D3	D2	⊗ ⊗ ⊗ ⊗	14				
7474	D4	F2	X X	14				
7402	C4	E2	⊗ ⊗ ⊗ ⊗	14				
8835		D1	X	16				
8835		E1	X	16				
9602	E4	E4	⊗ ⊗	16				
9602	F4	F4	⊗ ⊗	16				
7474	E3	F1	⊗ X /	14				
8820		L1		14				
8098		K1		16				
7408		K2		14				
9602		K3		16				
FD1771		J1		40	21	20	1	40

Resistor
Networks

Device Addressed.

if conditions OK. * if SEL6 then DRQ+ must be up.
then GO

start timer

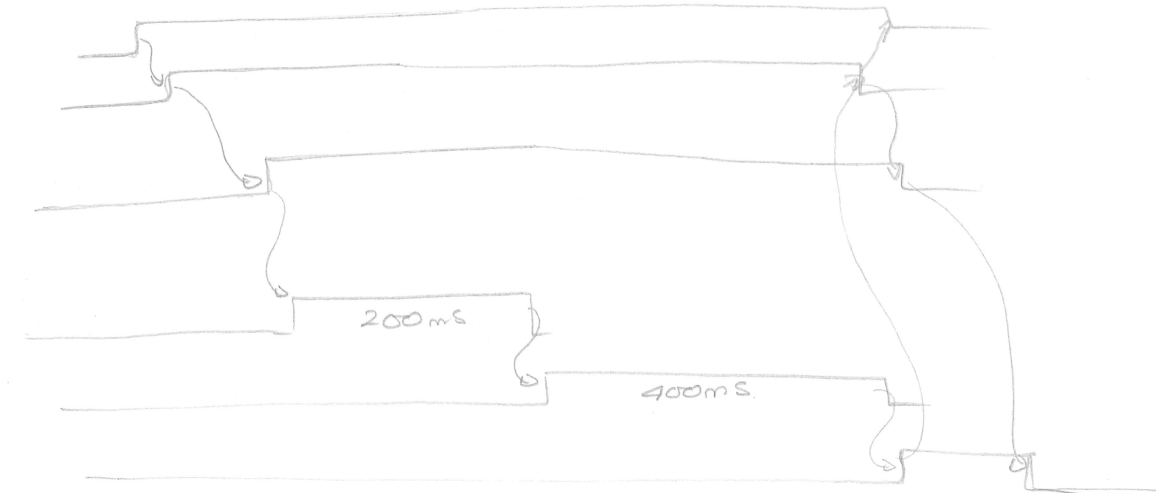
set SSYN+.

BAXX +
MSYN -

GO +

T200NS

T400NS



INTRQ.

INTRQ

BR-

BG+

MASTER+ (SACLT).

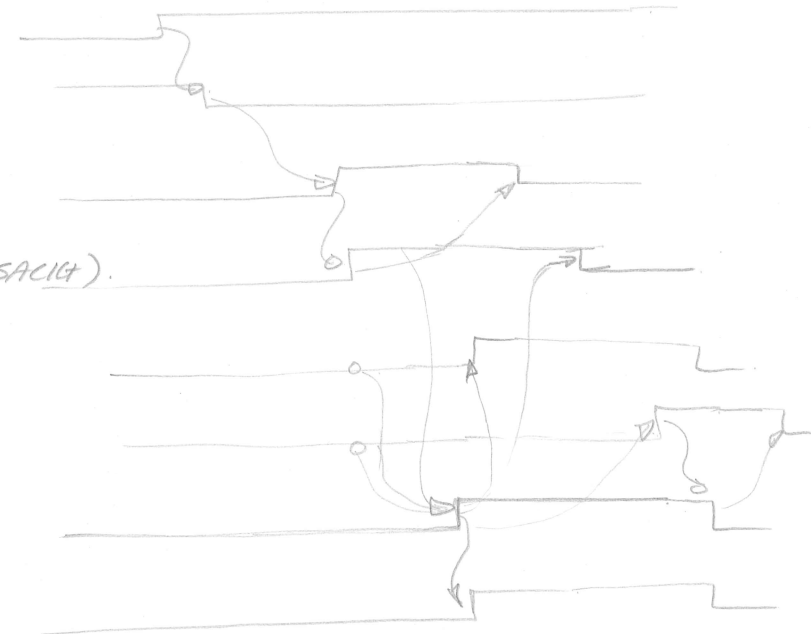
BBSY+

BSYN+

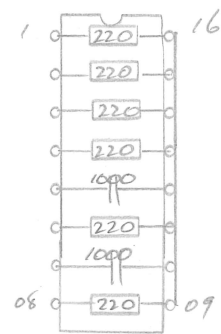
BUSY+

INTR+ }

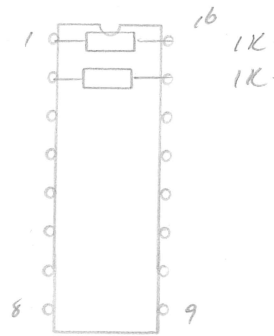
DATA



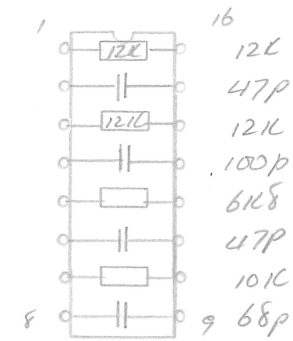
A4



D4



F5



A2, A3, A5, A6

Resistor Networks

