

# **CGP-100 Graphics Processor**

## Logic Diagrams

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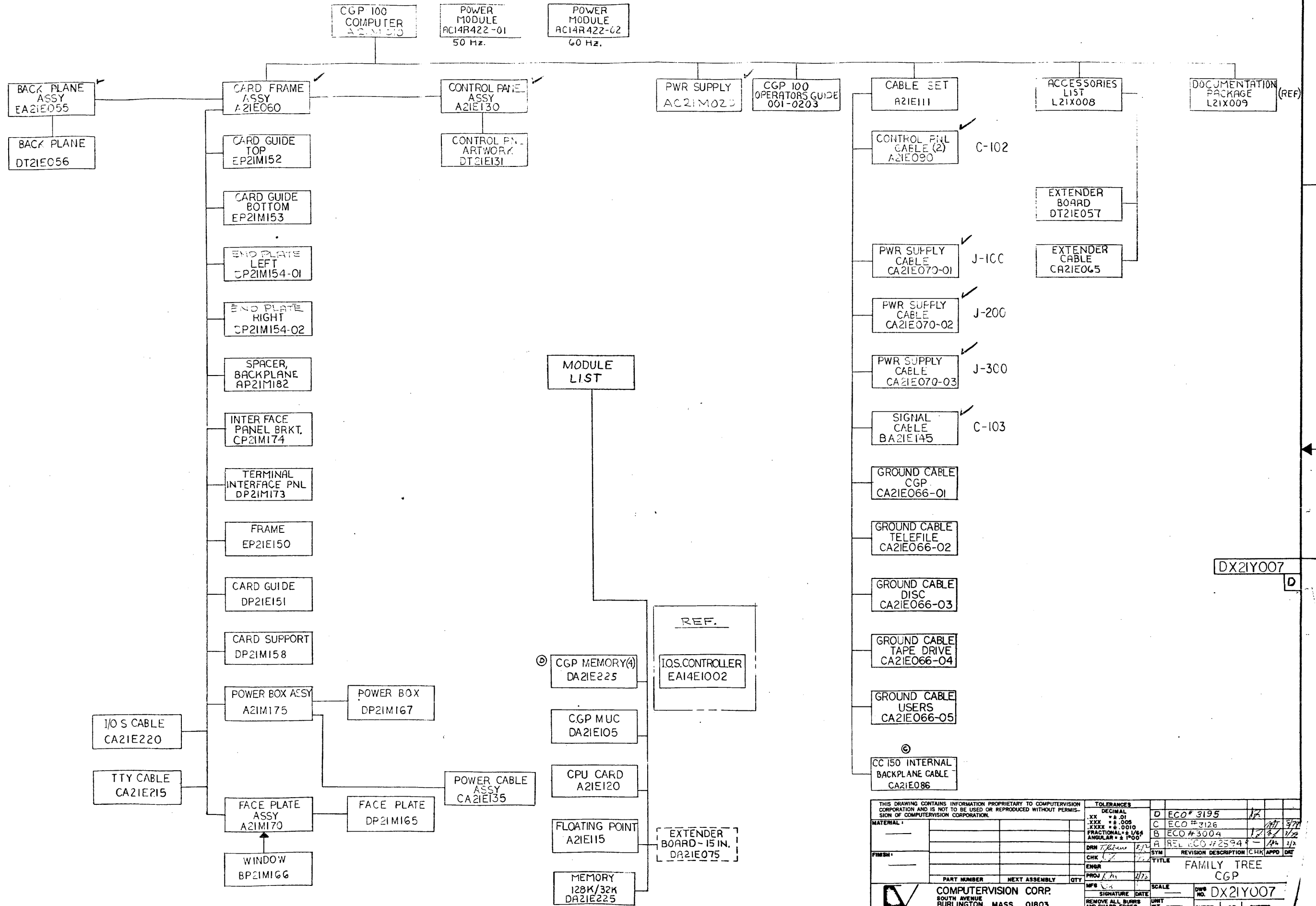
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**CGP Family Tree**



DX21Y007

D

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		XX	DECIMAL	D	ECO # 3195
		.XXX	± .01	C	ECO # 3126
		.XXXX	± .005	B	ECO # 3004
			± .0010	A	REL. ECO # 2594
			FRACTIONAL ± 1/64		
			ANGULAR ± 1°00'		
MATERIAL		DRN	DATE	SYM	REVISION DESCRIPTION
FINISH		CHK	DATE	ENGR	CHK
PART NUMBER		ENGR	DATE	PROJ	DATE
NEXT ASSEMBLY					
QTY					
MFG					
SIGNATURE					
DATE					
REMOVE ALL BURRS AND SHARP EDGES					
UNIT					
WT.					
SHEET					
OF					
SHEETS					
TITLE		FAMILY TREE CGP			
SCALE		DWG NO. DX21Y007			
REV A = REV 4					

**Backplane**

Connector List  
Artwork Silkscreen

POWER SUPPLY CONNECTORS

16	14	12	10	8	6	4	2
-5V	RES	REV	REV	REV	REV	REV	REV
15	13	11	9	7	5	3	1
J100	J200	J300					

TTY CONNECTOR

5	4	3	2	1
-5V	DATA IN	DATA IN	DATA IN	+5V
GND	GND	GND	GND	GND
9	8	7	6	

PUNCH

20	GND	GND
19	PUN 4	PUN 1
18	PUN 4	PUN 1
17	PUN 3	PUN 2
16	PUN 3	PUN 2
15	PUN 2	PUN 3
14	PUN 2	PUN 3
13	PUN 1	PUN 4
12	PUN 1	PUN 4
11	GND	GND

HI SPEED READER

20	GND	GND
19	RD	RD
18	RD	RD
17	RD	RD
16	CH2	CH1
15	CH3	CH2
14	CH4	CH3
13	CH5	CH4
12	CH6	CH5
11	GND	GND

TYPE	SLT	NOS.	CONN.
TTY	1	J1	
	5	J2	
TTY (AS)	13	J4	
	17	J5	
	21	J6	
	4	J9	
IBS	9	J10	
	12	J11	
	16	J12	
	20	J13	
RTP	5	J7	
PTR	5	J8	
MUC	2		
MUC	10		
MUC	19		
FPU	3		
FPU	11		
FPU	18		

IBS

J9 - J14	CONN.
1	A61 14
2	A63 15
3	A65 A67 16
4	A69 17
5	A71 A57 18
6	A73 A75 19
7	A59 A77 20
8	A79 21
9	A81 A83 22
10	GND 23
11	A85 A87 24
12	GND A89 25
13	A91 GND 26

1	GND	1	GND
2	+5V	2	+5V
3	DATA 6	3	DATA 6
4	WRITE PROT	4	WRITE PROT
5	GND	5	GND
6	MEM RST	6	MEM RST
7	M WRIT	7	M WRIT
8	LD MAR	8	LD MAR
9	-5V	9	-5V
10	MRUS 0	10	DATA 2
11	MRUS 1	11	MRUS 1
12	DATA 10	12	DATA 10
13	DATA 3	13	MBSY
14	-12V	14	-12V
15	DATA 1	15	DATA 15
16	DATA 9	16	DATA 13
17	DATA 4	17	DATA 8
18	DATA 12	18	DATA 2
19	DATA 5	19	DATA 11
20	DATA 7	20	DATA 14
21	PUN 0	21	GND
22	ACCESS PROT	22	PUN 4
23	MREAD	23	-12V
24	MRUS 3	24	MRUS 2
25	ROENR	25	MRUS 4
26	OVVELO	26	MRUS 4
27	DCHI	27	PUN 6
28	DCHR	28	OUT OF TAPE
29	DCHO	29	PUN 2
30	TNTR	30	MRUS 5
31	FEED HOLE	31	
32	PUN 7	32	
33	DCHM1	33	
34	DCHM2	34	
35	PICK UP	35	MRUS 6
36	PICK UP	36	MRUS 7
37	PAR ON	37	MRUS 8
38	MRUS 9	38	MRUS 9
39	MRUS 10	39	MRUS 10
40	MRUS 11	40	MRUS 11
41	+5V	41	+5V
42	GND	42	GND
43	GND	43	GND
44	+5V	44	+5V
45	INTP OUT	45	INTP IN
46	DCHP OUT	46	DCHP IN
47	SELB	47	SELB
48	SELD	48	SELD
49	SPKT	49	
50	TOPLS	50	TOPLS
51	DS 0	51	DS 0
52	CH1	52	TORST
53	CH2	53	DS 1
54	CH3	54	DS 2
55	CH4	55	DS 3
56	CH5	56	DS 4
57	CH6	57	DS 5
58	CH7	58	DATA
59	DATOR	59	DATOR
60	DATIC	60	DATIC
61	STRT	61	STRT
62	CLR	62	CLR
63	DATOC	63	DATOC
64	DS 1	64	DS 1
65	MRUS 14	65	DATTA
66	MRUS 15	66	DATIR
67	MRUS 12	67	INTA
68	MRUS 13	68	MSKO
69	GND	69	GND
70	MC 3	70	MC 3
71	MC 2	71	MC 2
72	MC 1	72	MC 1
73	MC 0	73	MC 0
74	MUCAD 04	74	MUCAD 04
75	MUCAD 03	75	MUCAD 03
76	MUCAD 02	76	MUCAD 02
77	MUCAD 01	77	MUCAD 01
78	ACPWREAI	78	ACPWREAI
79		79	
80	-12V	80	-12V
81	-5V	81	-5V
82	+5V	82	+5V
83	GND	83	GND

1	GND	1	GND
2	+5V	2	+5V
3	DATA 6	3	DATA 6
4	WRITE PROT	4	WRITE PROT
5	GND	5	GND
6	MEM RST	6	MEM RST
7	M WRIT	7	M WRIT
8	LD MAR	8	LD MAR
9	-5V	9	-5V
10	MRUS 0	10	DATA 2
11	MRUS 1	11	MRUS 1
12	DATA 10	12	DATA 10
13	DATA 3	13	MBSY
14	-12V	14	-12V
15	DATA 1	15	DATA 15
16	DATA 9	16	DATA 13
17	DATA 4	17	DATA 8
18	DATA 12	18	DATA 2
19	DATA 5	19	DATA 11
20	DATA 7	20	DATA 14
21	PUN 0	21	GND
22	ACCESS PROT	22	PUN 4
23	MREAD	23	-12V
24	MRUS 3	24	MRUS 2
25	ROENR	25	MRUS 4
26	OVVELO	26	MRUS 4
27	DCHI	27	PUN 6
28	DCHR	28	OUT OF TAPE
29	DCHO	29	PUN 2
30	TNTR	30	MRUS 5
31	FEED HOLE	31	
32	PUN 7	32	
33	DCHM1	33	
34	DCHM2	34	
35	PICK UP	35	MRUS 6
36	PICK UP	36	MRUS 7
37	PAR ON	37	MRUS 8
38	MRUS 9	38	MRUS 9
39	MRUS 10	39	MRUS 10
40	MRUS 11	40	MRUS 11
41	+5V	41	+5V
42	GND	42	GND
43	GND	43	GND
44	+5V	44	+5V
45	INTP OUT	45	INTP IN
46	DCHP OUT	46	DCHP IN
47	SELB	47	SELB
48	SELD	48	SELD
49	SPKT	49	
50	TOPLS	50	TOPLS
51	DS 0	51	DS 0
52	CH1	52	TORST
53	CH2	53	DS 1
54	CH3	54	DS 2
55	CH4	55	DS 3
56	CH5	56	DS 4
57	CH6	57	DS 5
58	CH7	58	DATA
59	DATOR	59	DATOR
60	DATIC	60	DATIC
61	STRT	61	STRT
62	CLR	62	CLR
63	DATOC	63	DATOC
64	DS 1	64	DS 1
65	MRUS 14	65	DATTA
66	MRUS 15	66	DATIR
67	MRUS 12	67	INTA
68	MRUS 13	68	MSKO
69	GND	69	GND
70	MC 3	70	MC 3
71	MC 2	71	MC 2
72	MC 1	72	MC 1
73	MC 0	73	MC 0
74	MUCAD 04	74	MUCAD 04
75	MUCAD 03	75	MUCAD 03
76	MUCAD 02	76	MUCAD 02
77	MUCAD 01	77	MUCAD 01
78	ACPWREAI	78	ACPWREAI
79		79	
80	-12V	80	-12V
81	-5V	81	-5V
82	+5V	82	+5V
83	GND	83	GND

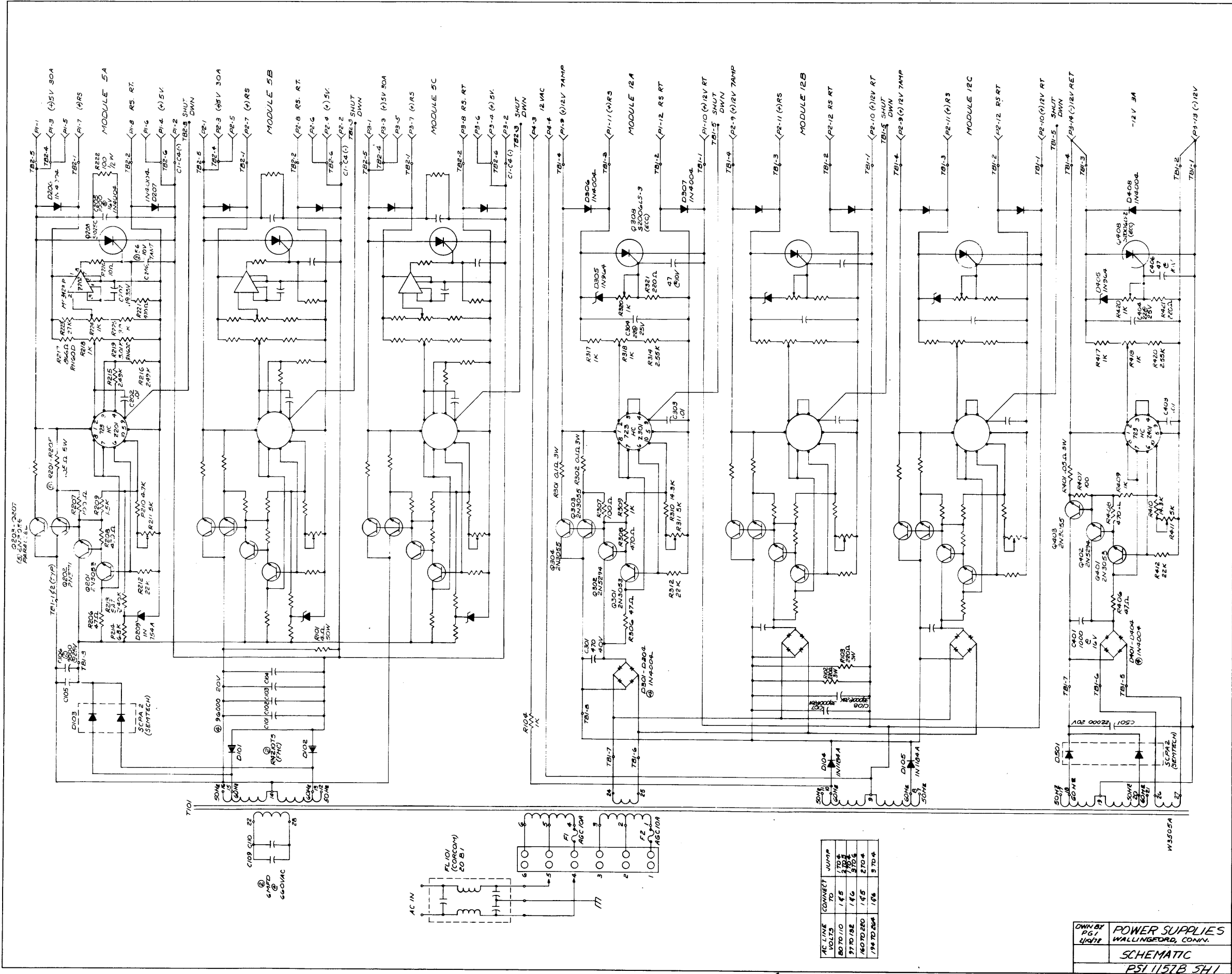
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2	+5V	2	+5V
3	DATA 6	3	DATA 6
4	WRITE PROT	4	WRITE PROT
5	GND	5	GND
6	MEM RST	6	MEM RST
7	M WRIT	7	M WRIT
8	LD MAR	8	LD MAR
9	-5V	9	-5V
10	MRUS 0	10	DATA 2
11	MRUS 1	11	MRUS 1
12	DATA 10	12	DATA 10
13	DATA 3	13	MBSY
14	-12V	14	-12V
15	DATA 1	15	DATA 15
16	DATA 9	16	DATA 13
17	DATA 4	17	DATA 8
18	DATA 12	18	DATA 2
19	DATA 5	19	DATA 11
20	DATA 7	20	DATA 14
21	PUN 0	21	GND
22	ACCESS PROT	22	PUN 4
23	MREAD	23	-12V
24	MRUS 3	24	MRUS 2
25	ROENR	25	MRUS 4
26	OVVELO	26	MRUS 4
27	DCHI	27	PUN 6
28	DCHR	28	OUT OF TAPE
29	DCHO	29	PUN 2
30	TNTR	30	MRUS 5
31	FEED HOLE	31	
32	PUN 7	32	
33	DCHM1	33	
34	DCHM2	34	
35	PICK UP	35	MRUS 6
36	PICK UP	36	MRUS 7
37	PAR ON	37	MRUS 8
38	MRUS 9	38	MRUS 9
39	MRUS 10	39	MRUS 10
40	MRUS 11	40	MRUS 11
41	+5V	41	+5V
42	GND	42	GND
43	GND	43	GND
44	+5V	44	+5V
45	INTP OUT	45	INTP IN
46	DCHP OUT	46	DCHP IN
47	SELB	47	SELB
48	SELD	48	SELD
49	SPKT	49	
50	TOPLS	50	TOPLS
51	DS 0	51	DS 0
52	CH1	52	TORST
53	CH2	53	DS 1
54	CH3	54	DS 2
55	CH4	55	DS 3
56	CH5	56	DS 4
57	CH6	57	DS 5
58	CH7	58	DATA
59	DATOR	59	DATOR
60	DATIC	60	DATIC
61	STRT	61	STRT
62	CLR	62	CLR
63	DATOC	63	DATOC
64	DS 1	64	DS 1
65	MRUS 14	65	DATTA
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69	GND	69	GND
70	MC 3	70	MC 3
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72	MC 1	72	MC 1
73	MC 0	73	MC 0
74	MUCAD 04	74	MUCAD 04
75	MUCAD 03	75	MUCAD 03
76	MUCAD 02	76	MUCAD 02
77	MUCAD 01	77	MUCAD 01
78	ACPWREAI	78	ACPWREAI
79		79	
80	-12V	80	-12V
81	-5V	81	-5V
82	+5V	82	+5V
83	GND	83	GND

1	GND	1	GND
2	+5V	2	+5V
3	DATA 6	3	DATA 6
4	WRITE PROT	4	WRITE PROT
5	GND	5	GND
6	MEM RST	6	MEM RST
7	M WRIT	7	M WRIT
8	LD MAR	8	LD MAR
9	-5V	9	-5V
10	MRUS 0	10	DATA 2
11	MRUS 1	11	MRUS 1
12	DATA 10	12	DATA 10
13	DATA 3	13	MBSY
14	-12V	14	-12V
15	DATA 1	15	DATA 15
16	DATA 9	16	DATA 13
17	DATA 4	17	



### Power Supply

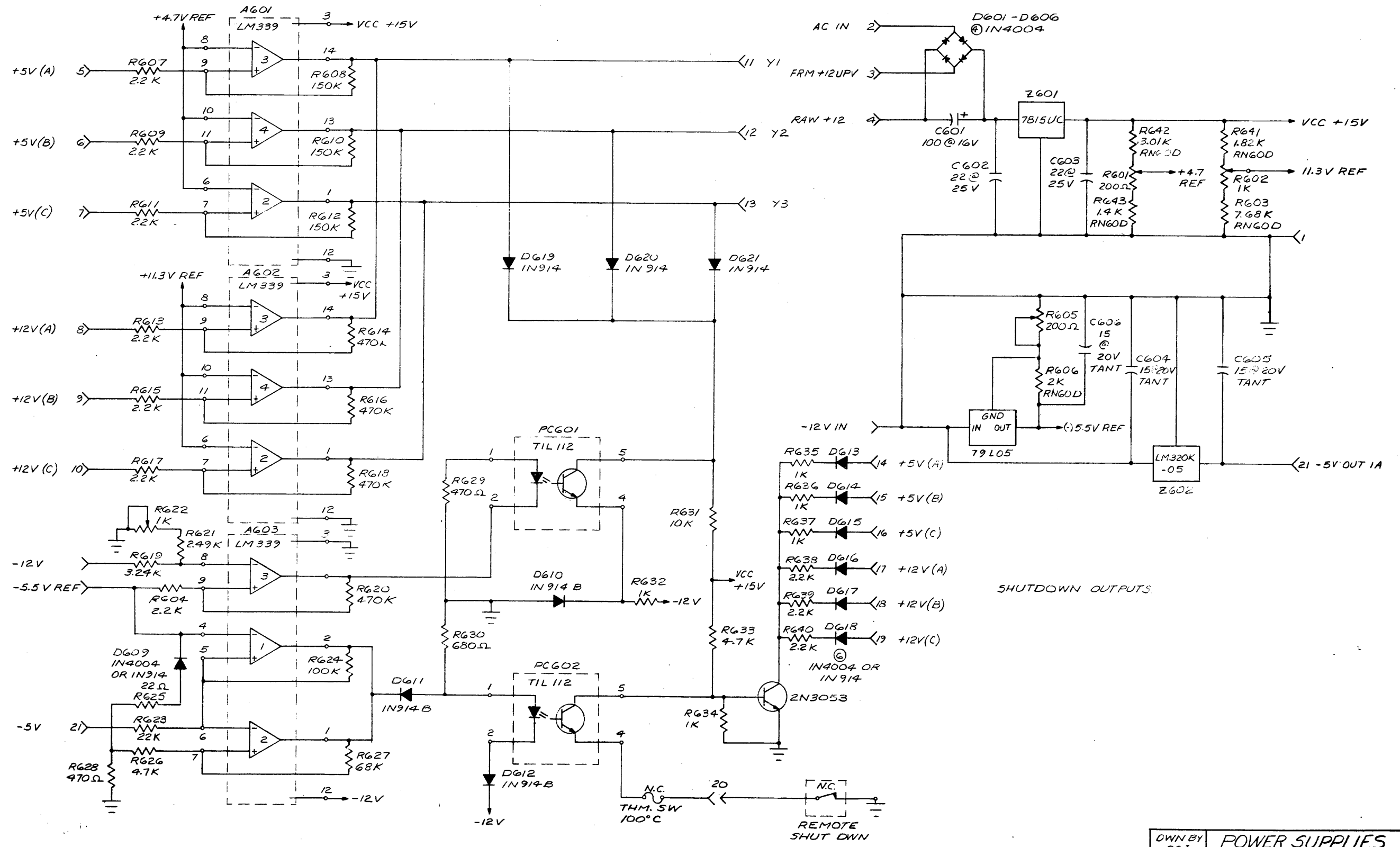
	<u>Sheet No.</u>
Transformer	1
Regulator Modules	1
Logic Module	2
-5 Volt Regulator	2



AC LINE VOLTS	CONVERT TO	UNITS
80 TO 110	1.5	7 TO 4
97 TO 132	1.6	1 TO 4
140 TO 220	1.5	2 TO 4
194 TO 264	1.6	3 TO 4

OWN BY: POWER SUPPLIES  
 DATE: 4/19/78 WALLINGFORD, CONN.  
 SCHEMATIC  
 PSI 1157B 5/11

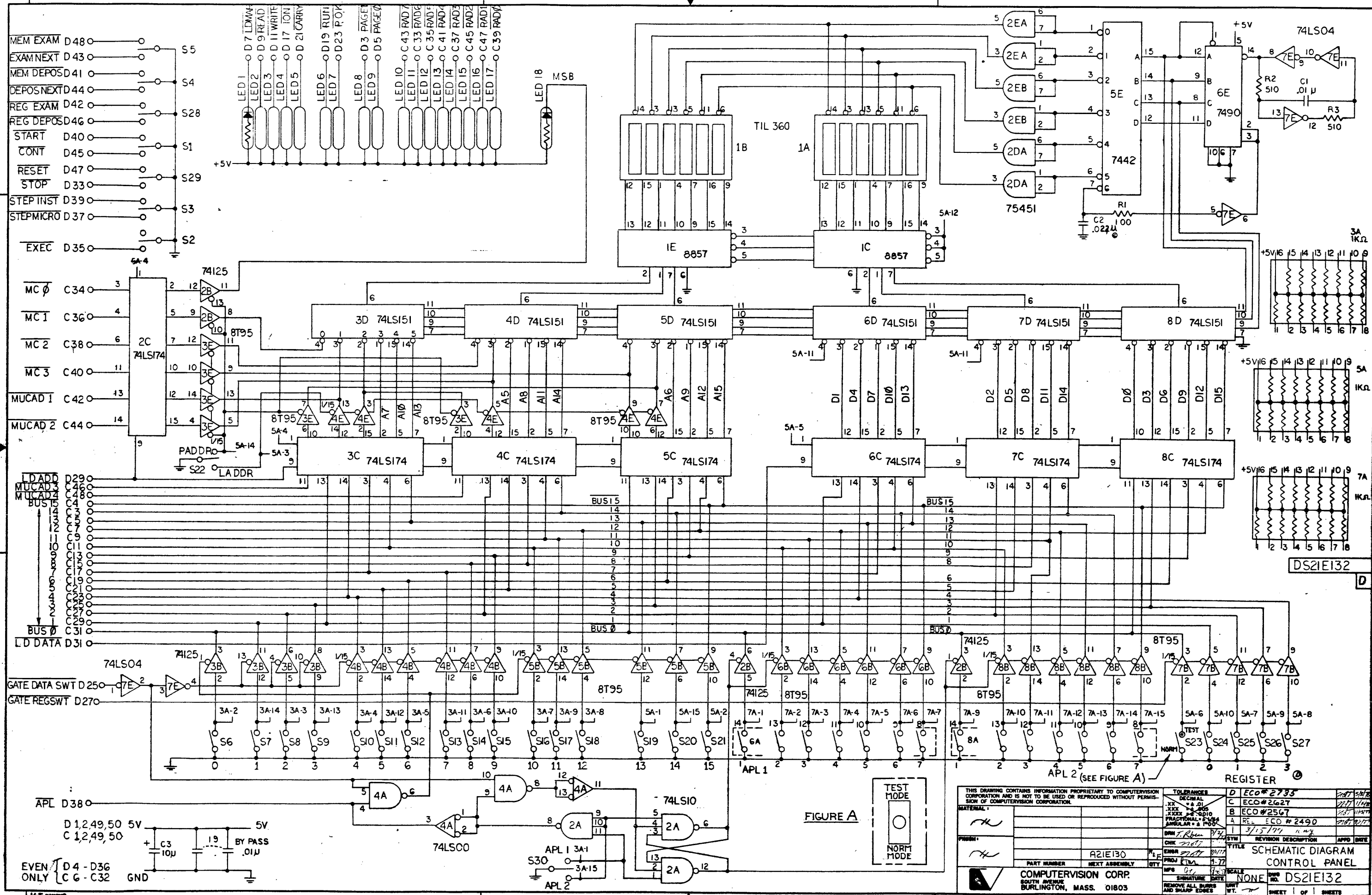
W3505A



OWN BY PGI 2/10/78	POWER SUPPLIES WALLINGFORD, CONN.
	SCHMATIC - LOGIC
	PS11157B SHZ

**Control Panel**

Logic Diagram



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TOLERANCE	DECIMAL	D	ECO# 2735	2/17/77
.XX	± .01	C	ECO# 2627	2/17/77
.XXX	± .005	B	ECO# 2567	2/17/77
XXXX	± .0010	A	REL ECO# 2490	2/17/77
FRACTIONAL ± POS				
ANGULAR ± POS				
DRAWN	T. Rhee	SYM	REVISION DESCRIPTION	APPRO DATE
CHEK	2/2/77			
ENGR	2/17/77			
PROJ	PLA			
DATE	4-77			
PART NUMBER		NEXT ASSEMBLY		QTY
A21E130				
COMPUTERVISION CORP.		SCALE		DWG NO.
SOUTH AVENUE		NONE		DS21E132
BURLINGTON, MASS. 01803		REMOVE ALL BURRS AND SHARP EDGES		SHEET
				OF
				SHEETS

FIGURE A

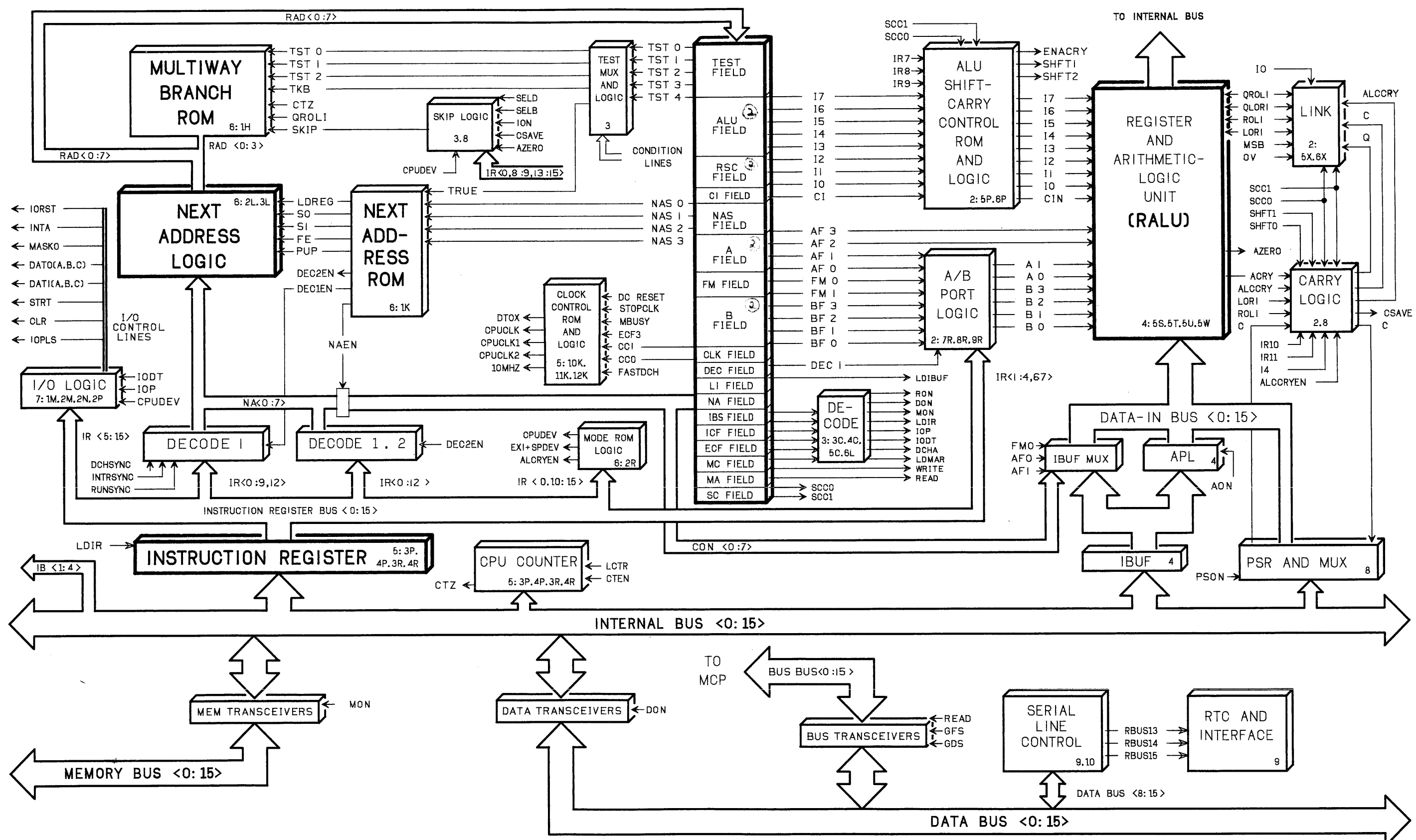
DS21E132

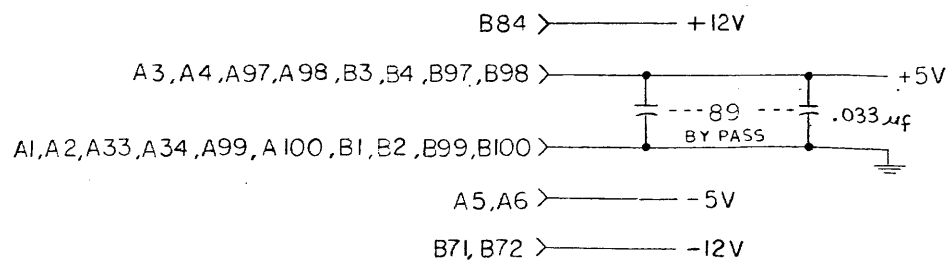
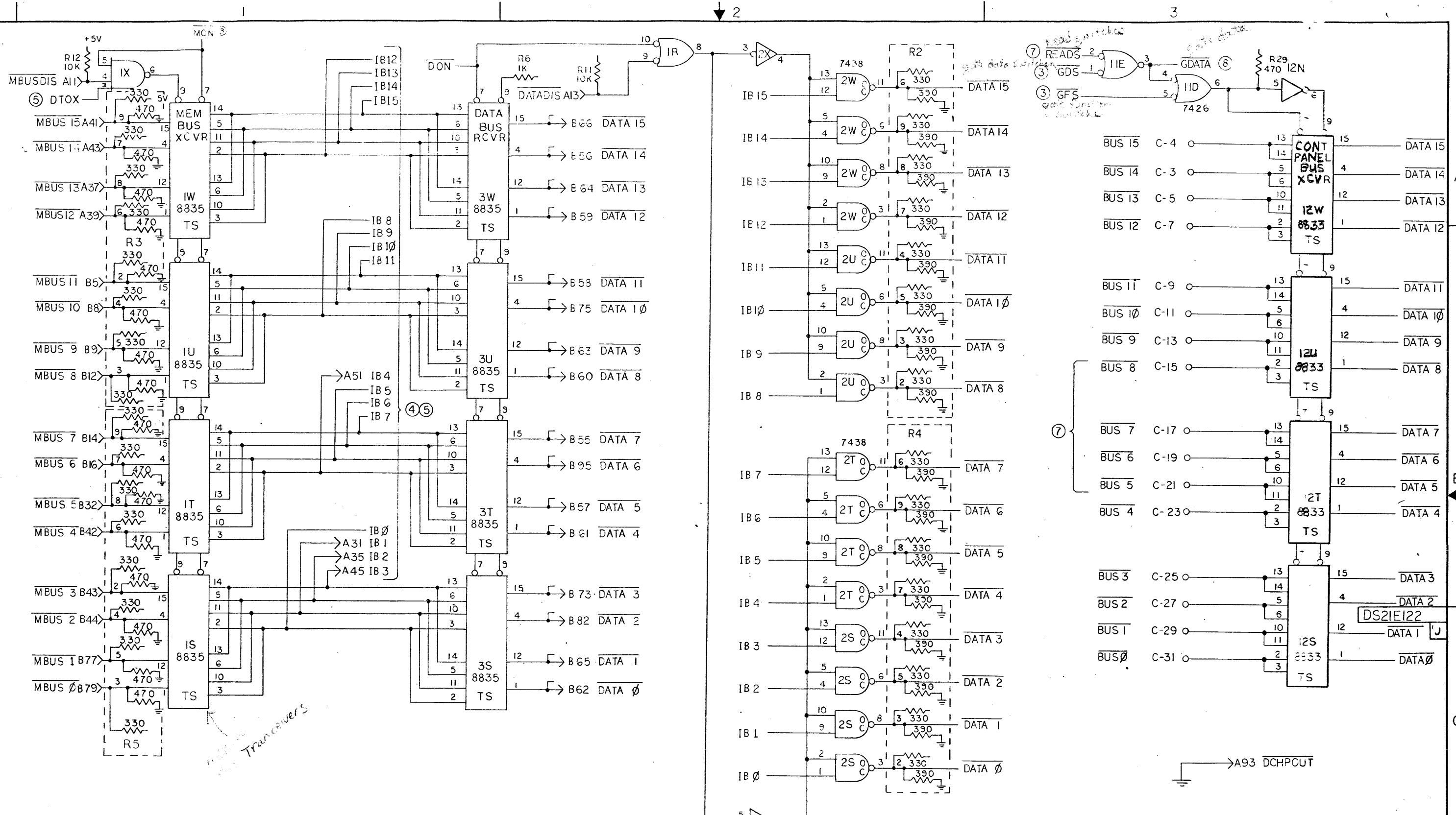
D

### Central Processor Unit

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Microinstruction Decode	2,3
Test Multiplexer	3
RALU	4
APL ROMs	4
Instruction Register	5
CPU Clock	5
FPLAs	6
Next Address Logic	6
I/O Logic	7,9
Control Panel Encoding	7
Processor State Register	8
Control Panel Interface	8
Real Time Clock	9
Serial Line Control	10

*Handwritten notes:*  
CPU - see page 2-2  
(CPU) and (APL) ROMs  
CPU - see page 2-2

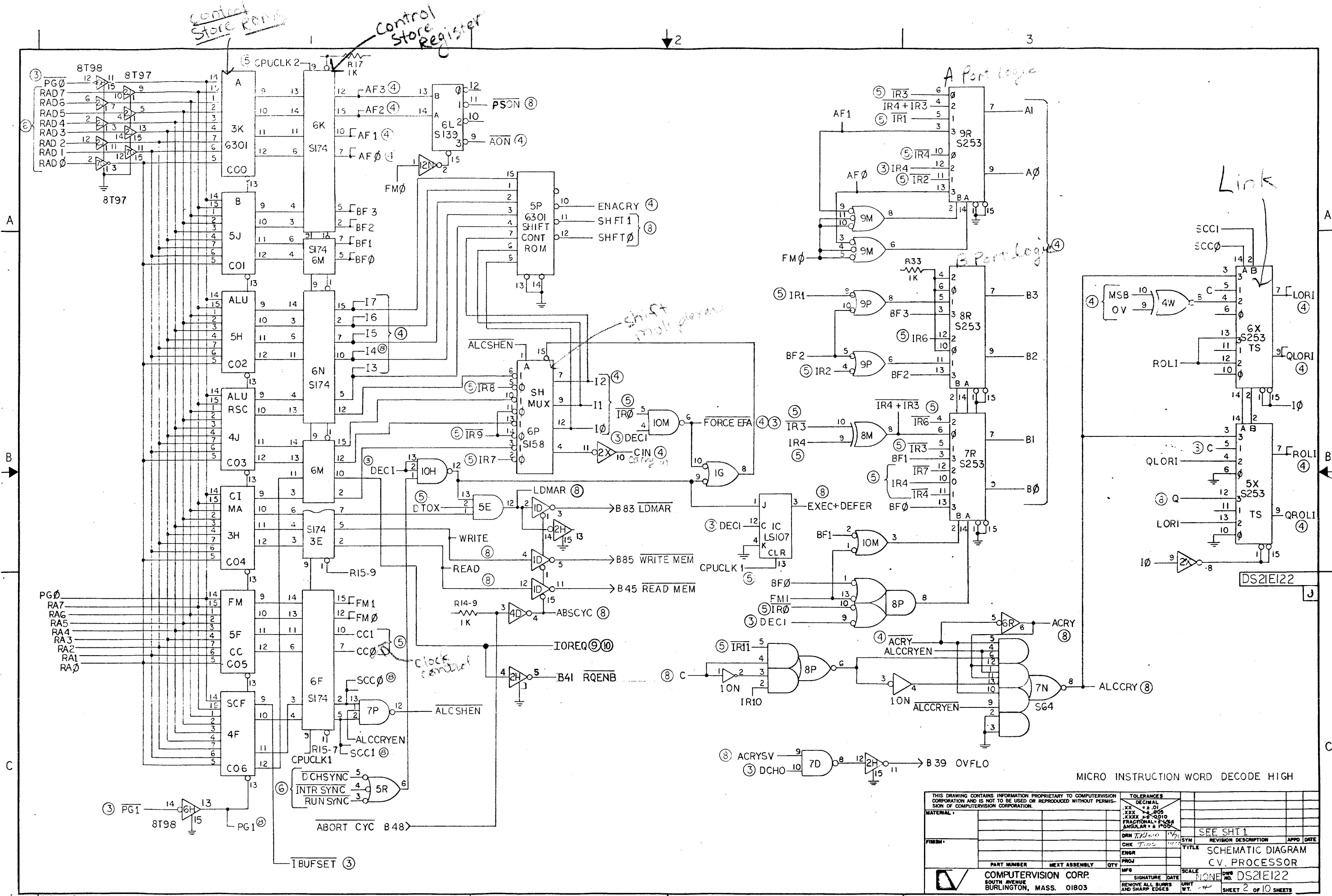




CONTROL PNL. BUS & DATA AND MEMORY BUS DRIVERS

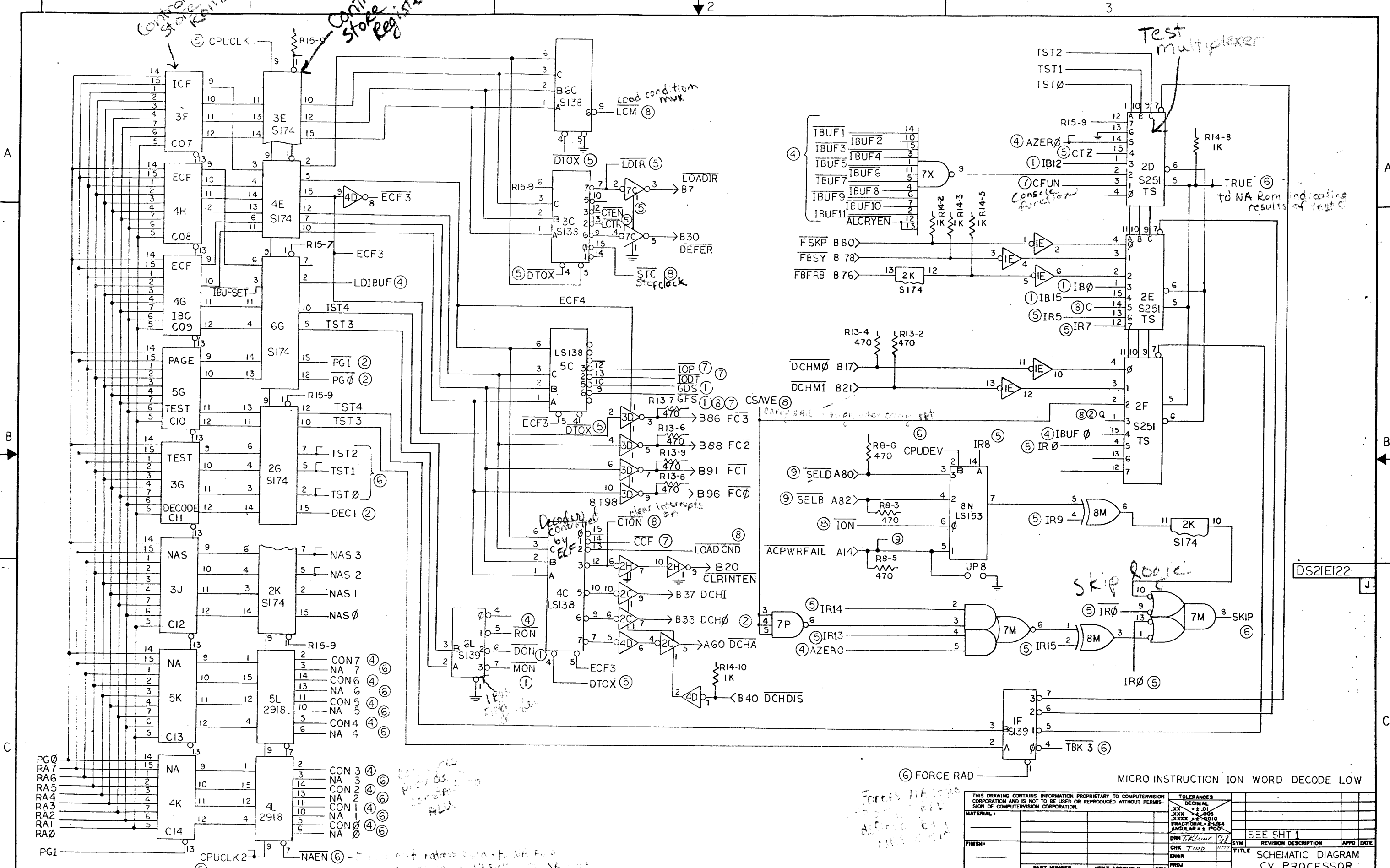
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX ±.01 .XXX ±.005 .XXXX ±.0010 FRACTIONAL 3/16 ±.004 ANGULAR & HOLES DRN T. Rivet CHK T100	J ECO# 3298 G/2 ECO# 2745 B/2 ECO# 2700 A/2 REL ECO# 2587 B RELEASE ECO 2577	1/2 1/2 1/2 4/5 1/2 1/2 1/2 1/2 1/2
MATERIAL:		DRN T. Rivet	SYM	REVISION DESCRIPTION CHK APPD DATE
FINISH:		CHK T100	TITLE SCHEMATIC DIAGRAM C.V. PROCESSOR	
PART NUMBER	NEXT ASSEMBLY	QTY	UNIT NO. DS21E122	
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SCALE NONE	SHEET 1 OF 10 SHEETS	





MICRO INSTRUCTION WORD DECODE HIGH

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX ±.01 .XXX ±.005 .XXXX ±.0010 FRACTIONAL 1/16 ±.00625 1/8 ±.015625 1/4 ±.03125 ANGULAR ±.1°	
MATERIAL:		DRN: T. J. ...	SYN: ...
FINISH:		CHK: T. J. ...	ENGR: ...
PART NUMBER:	NEXT ASSEMBLY:	QTY:	
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SCALE: NONE DWG NO.: DS2IE122 SHEET 2 OF 10 SHEETS	



Control Store Register

Control Store Register

Test Multiplexer

Skip Logic

FORCE RAD

MICRO INSTRUCTION ION WORD DECODE LOW

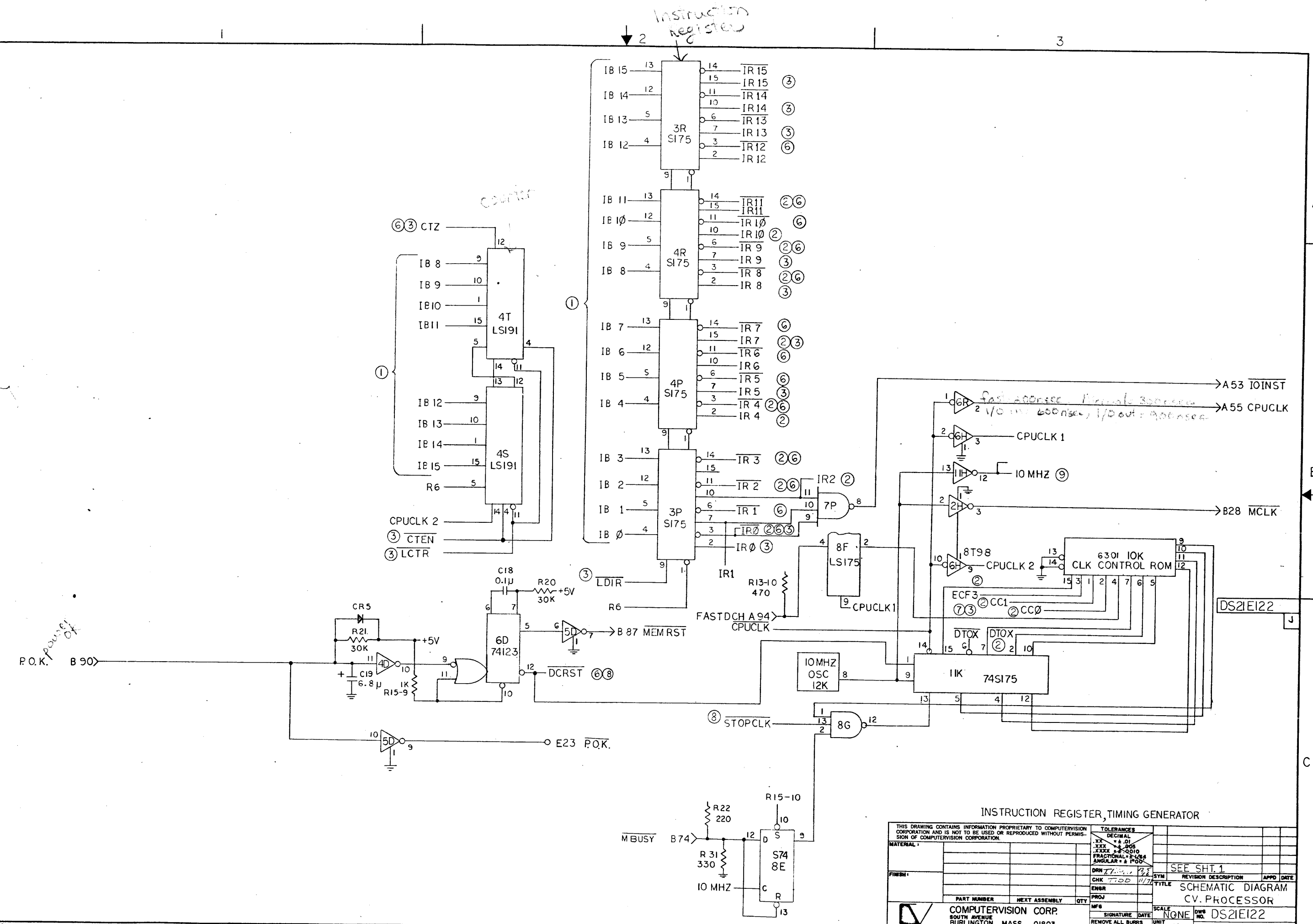
DS2IE122

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX ±.01 .XXX ±.005 XXX ±.010 FRACTIONAL ±.004 ANGULAR ±.1°		SEE SHT 1	
MATERIAL		DRN T. R. BURR	CHK T. J. D.	ENGR	
FINISH		PROJ			
PART NUMBER	NEXT ASSEMBLY	QTY	MFG	SIGNATURE	DATE
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SCALE	NONE	DWS NO.	DS2IE122
REMOVE ALL BURRS AND SHARP EDGES		UNIT	WT.	SHEET 3 OF 10 SHEETS	



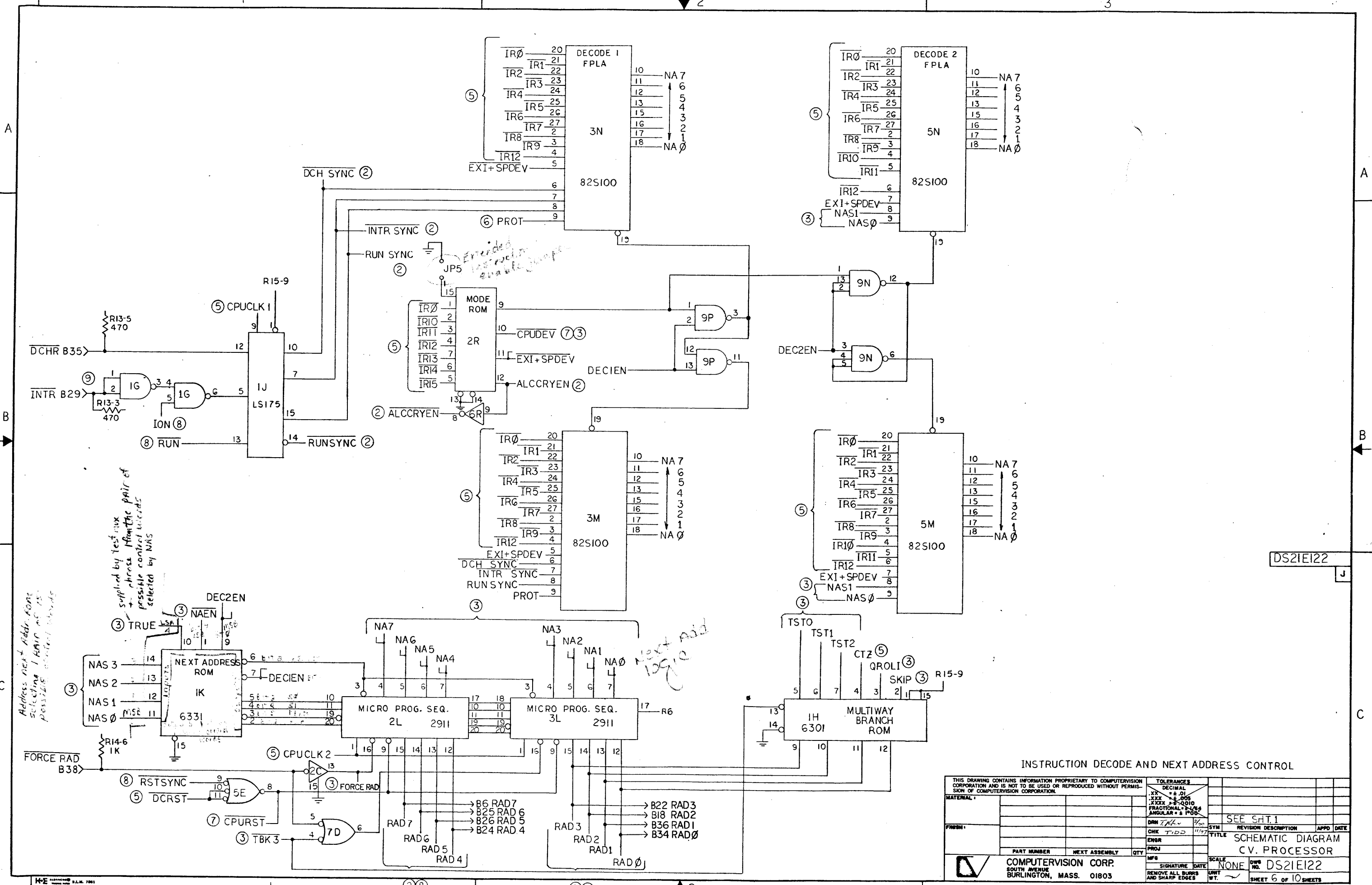
Instruction Register

COUNTER



INSTRUCTION REGISTER, TIMING GENERATOR

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX ±.01 .XXX ±.005 FRACTIONAL ± 1/16 ANGULAR ± .000		
MATERIAL:		DRN	11/77	SYM
FINISH:		CHK	TOD 11/77	REVISION DESCRIPTION
		ENGR		APPD DATE
		PROJ		TITLE
PART NUMBER	NEXT ASSEMBLY	QTY		SCHMATIC DIAGRAM
COMPUTERVISION CORP.				CV PROCESSOR
SOUTH AVENUE				DWG NO. DS21E122
BURLINGTON, MASS. 01803				SHEET 5 OF 10 SHEETS



Address next Addr. from selecting 1 HADR of 15 possible control words supplied by test mix + choose from the pair of possible control words selected by NAS

Next Addr Logic

DS21E122

INSTRUCTION DECODE AND NEXT ADDRESS CONTROL

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL XXX ± 0.01 XXX ± 0.005 XXX ± 0.0010 FRACTIONAL ± 1/64 ANGULAR ± 1° 00'	
MATERIAL:		DATE	SEE SHT. 1
FINISH:		CHK TDD	SYN REVISION DESCRIPTION APPD DATE
		ENGR	TITLE SCHEMATIC DIAGRAM
		PROJ	C.V. PROCESSOR
PART NUMBER	NEXT ASSEMBLY	QTY	
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		MFG	SCALE NONE
		SIGNATURE	DWG NO. DS21E122
		DATE	UNWT
		REMOVE ALL BURRS AND SHARP EDGES	SHEET 6 OF 10 SHEETS

A

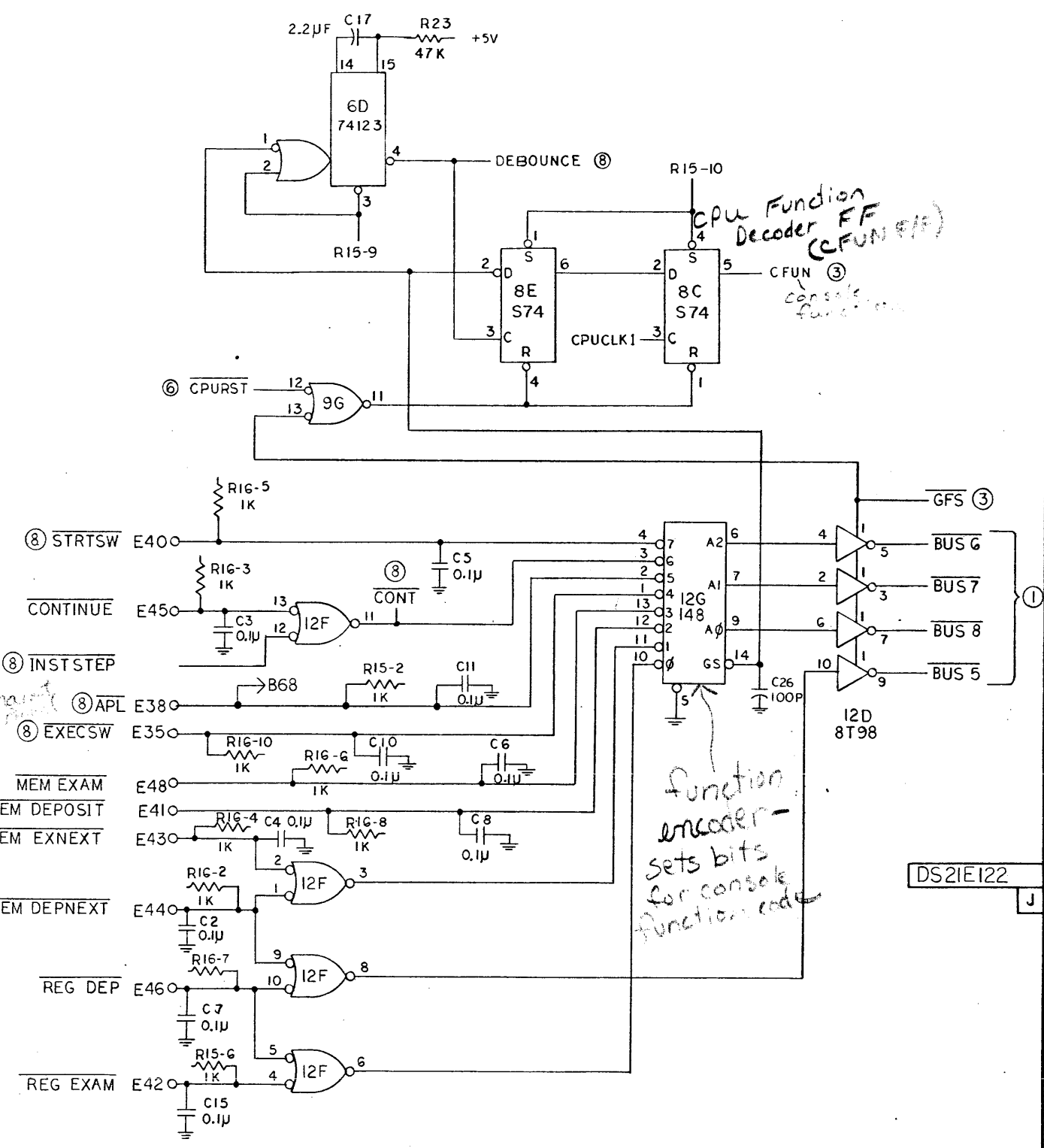
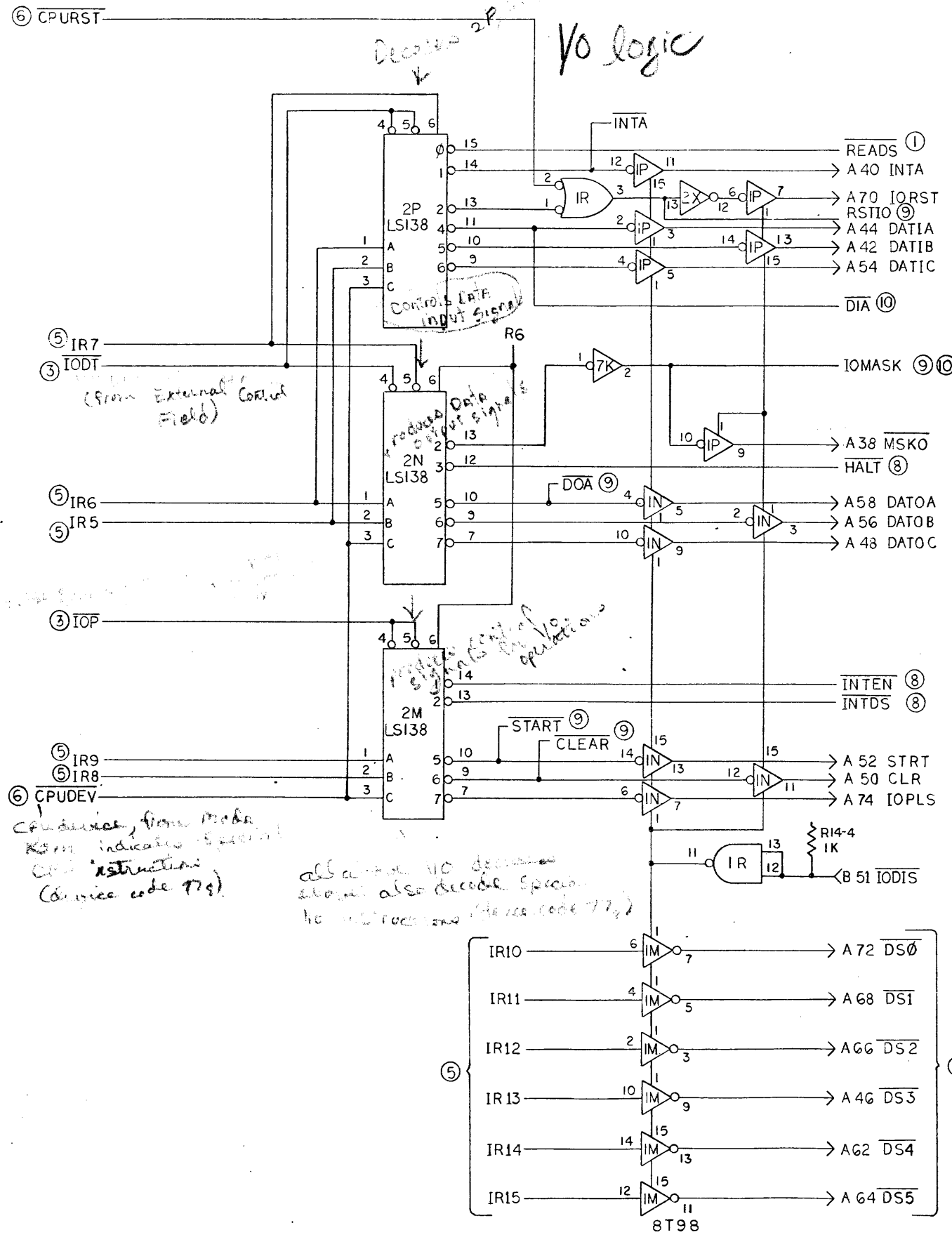
B

C

A

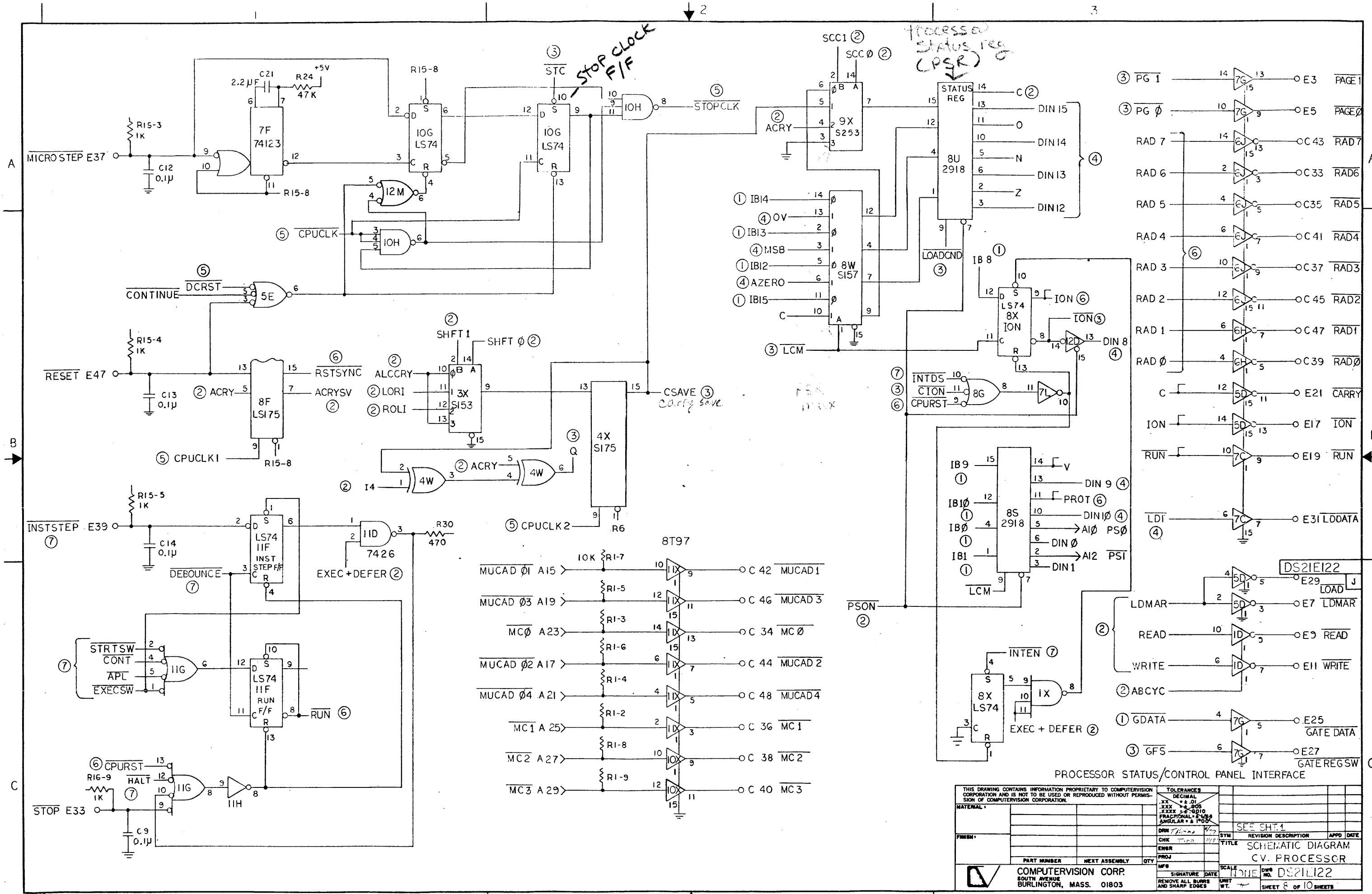
B

C



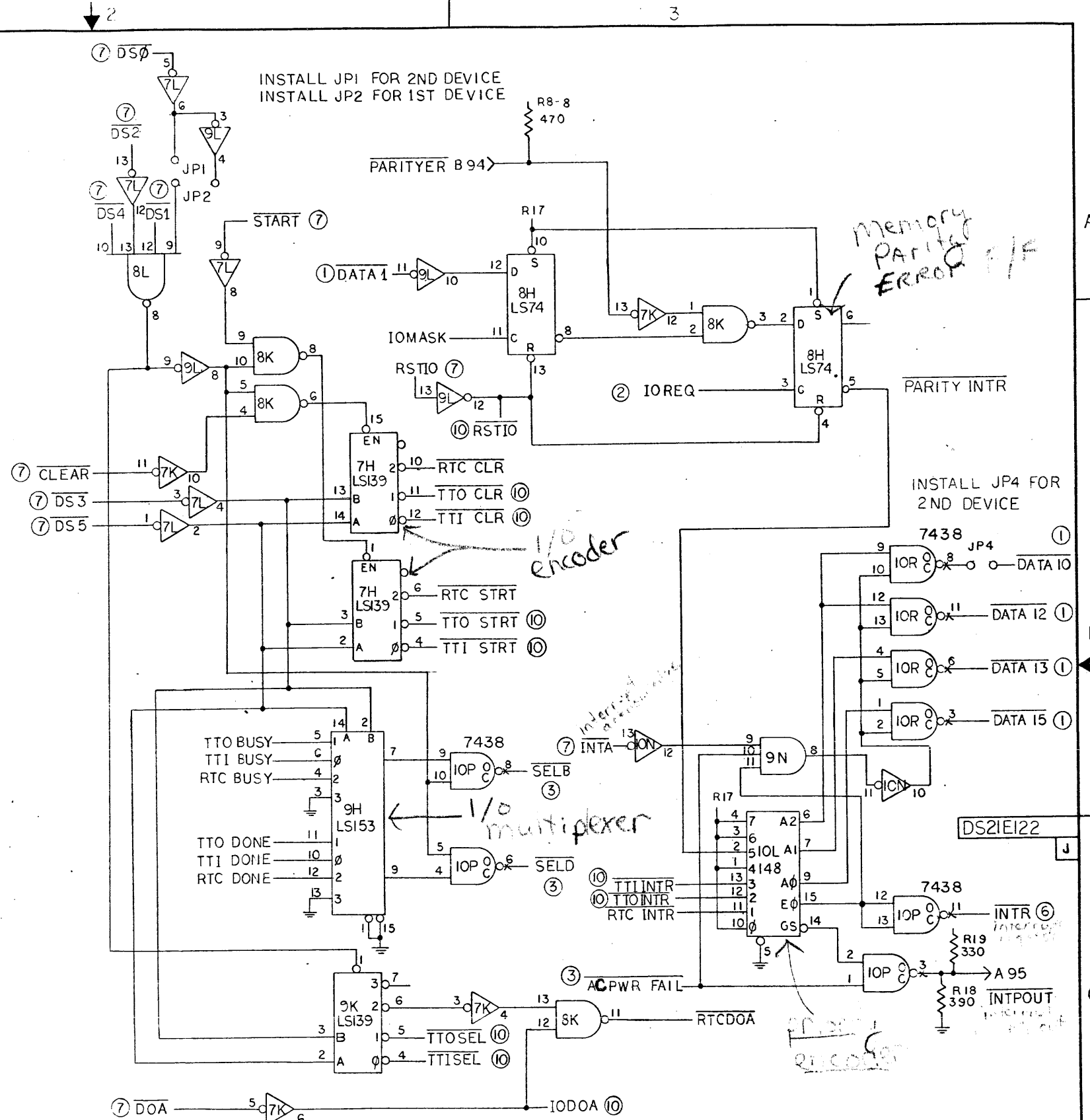
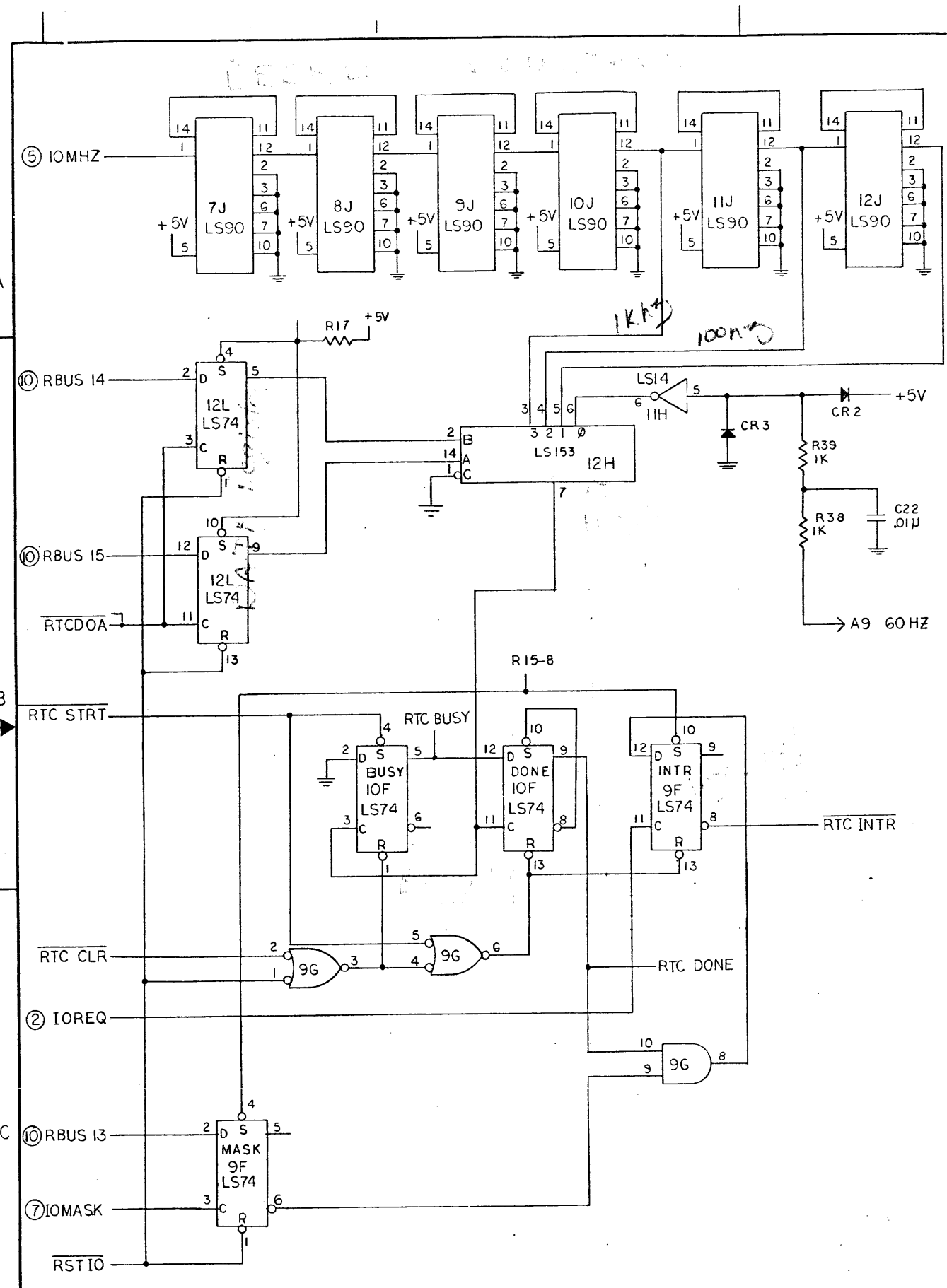
CONTROL PANEL FUNCTION ENCODE I/O PULSE GENERATOR

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL XX ± 0.01 XXX ± 0.005 FRACTIONAL ± 1/16" ANGULAR ± 1°00'			
MATERIAL:		DRN: <i>[Signature]</i>	CHK: <i>[Signature]</i>	ENGR:	PROJ:
FINISH:		SYN REVISION DESCRIPTION		APPD DATE	
PART NUMBER		NEXT ASSEMBLY		QTY	
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SCALE: NONE		DWP NO. DS21E122	
REMOVE ALL BURRS AND SHARP EDGES		SIGNATURE DATE		UNIT WT.	
		SEE SHT. 1		TITLE: SCHEMATIC DIAGRAM CV. PROCESSOR	
				SHEET 7 OF 10 SHEETS	



PROCESSOR STATUS/CONTROL PANEL INTERFACE

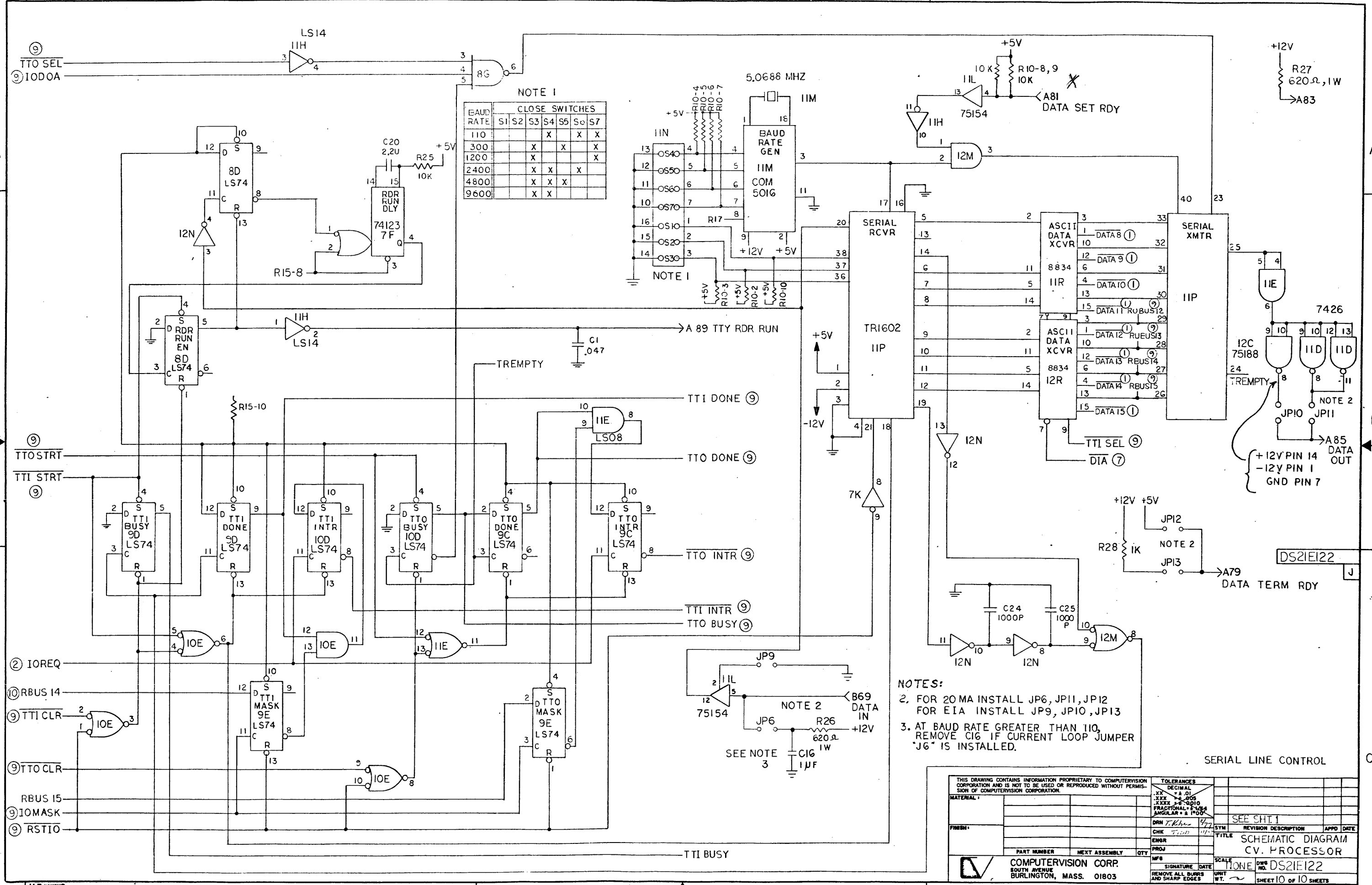
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTATION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISS. SIGN OF COMPUTATION CORPORATION.		TOLERANCES DECIMAL XX ± .01 XXX ± .005 XXXX ± .0010 FRACTIONAL ± 1/16 ANGULAR ± .002	
MATERIAL		DATE	REV
FINISH		CHK	ENGR
PART NUMBER	NEXT ASSEMBLY	QTY	PROJ
COMPUTATION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SIGNATURE	DATE
SCALE		UNIT	NO.
REMOVE ALL BURRS AND SHARP EDGES		W.T.	SHEET 8 OF 10 SHEETS



I/O LOGIC AND REAL TIME CLOCK

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVERSION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVERSION CORPORATION.		TOLERANCES DECIMAL .XX ±.01 .XXX ±.005 .XXXX ±.0010 FRACTIONAL ± 1/16" ANGULAR ± 1°00'	
MATERIAL:		DRN T. P. [Signature]	SYN [Signature]
FINISH:		CHK [Signature]	APPD [Signature]
ENGR:		PROJ:	
PART NUMBER	NEXT ASSEMBLY	QTY	
COMPUTERVERSION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SCALE	DWG NO. DS21E122
SIGNATURE DATE		UNIT	SHEET 9 OF 10 SHEETS





NOTE 1

EAUD RATE	S1	S2	S3	S4	S5	S6	S7
110			X	X	X	X	X
300		X	X	X	X	X	X
1200	X	X	X	X	X	X	X
2400	X	X	X	X	X	X	X
4800	X	X	X	X	X	X	X
9600	X	X	X	X	X	X	X

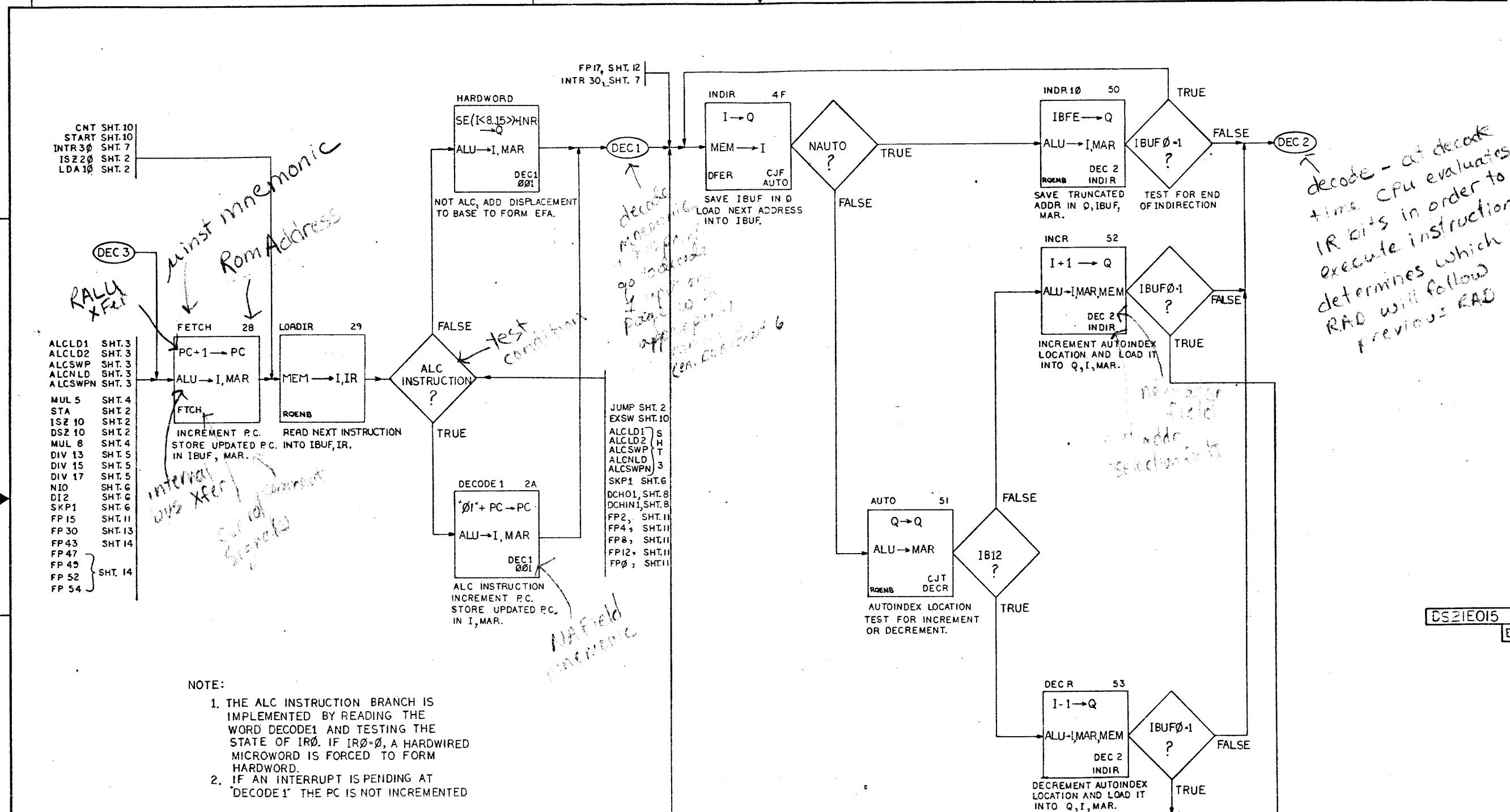
- NOTES:
- FOR 20 MA INSTALL JP6, JP11, JP12 FOR EIA INSTALL JP9, JP10, JP13
  - AT BAUD RATE GREATER THAN 110, REMOVE ALL BUBBS, REMOVE LOOP JUMPER "J6" IS INSTALLED.

SERIAL LINE CONTROL

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX ± .01 .XXX ± .005 FRACTIONAL ANGULAR ± 1°00'	
MATERIAL:		DRN T. Kline 3/77	SEE SHT. 1
FRESH:		CHK T. Kline 4/77	REVISION DESCRIPTION
		ENGR	TITLE SCHEMATIC DIAGRAM CV. PROCESSOR
		PROJ	DWS NO. DS2IE122
PART NUMBER	NEXT ASSEMBLY	QTY	SCALE 1:1
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SIGNATURE DATE	UNIT WT.
		REMOVE ALL BUBBS AND SHARP EDGES	SHEET 10 OF 10 SHEETS

### Microprogram Flow Chart

	<u>Sheet No.</u>
Instruction Fetch	1
Indirect Addressing	1
Move Data Instructions	2
Modify Memory Instructions	2
Jump Instructions	2
Arithmetic/Logic Instructions	3
Unsigned Integer Multiplication	4
Unsigned Integer Division	5
I/O Instructions	6
Interrupts	7
Data Channels	8
Pseudo-Instructions	9
Console Functions	9,10
Floating Point Interface	11-14
Microdiagnostics	15-27

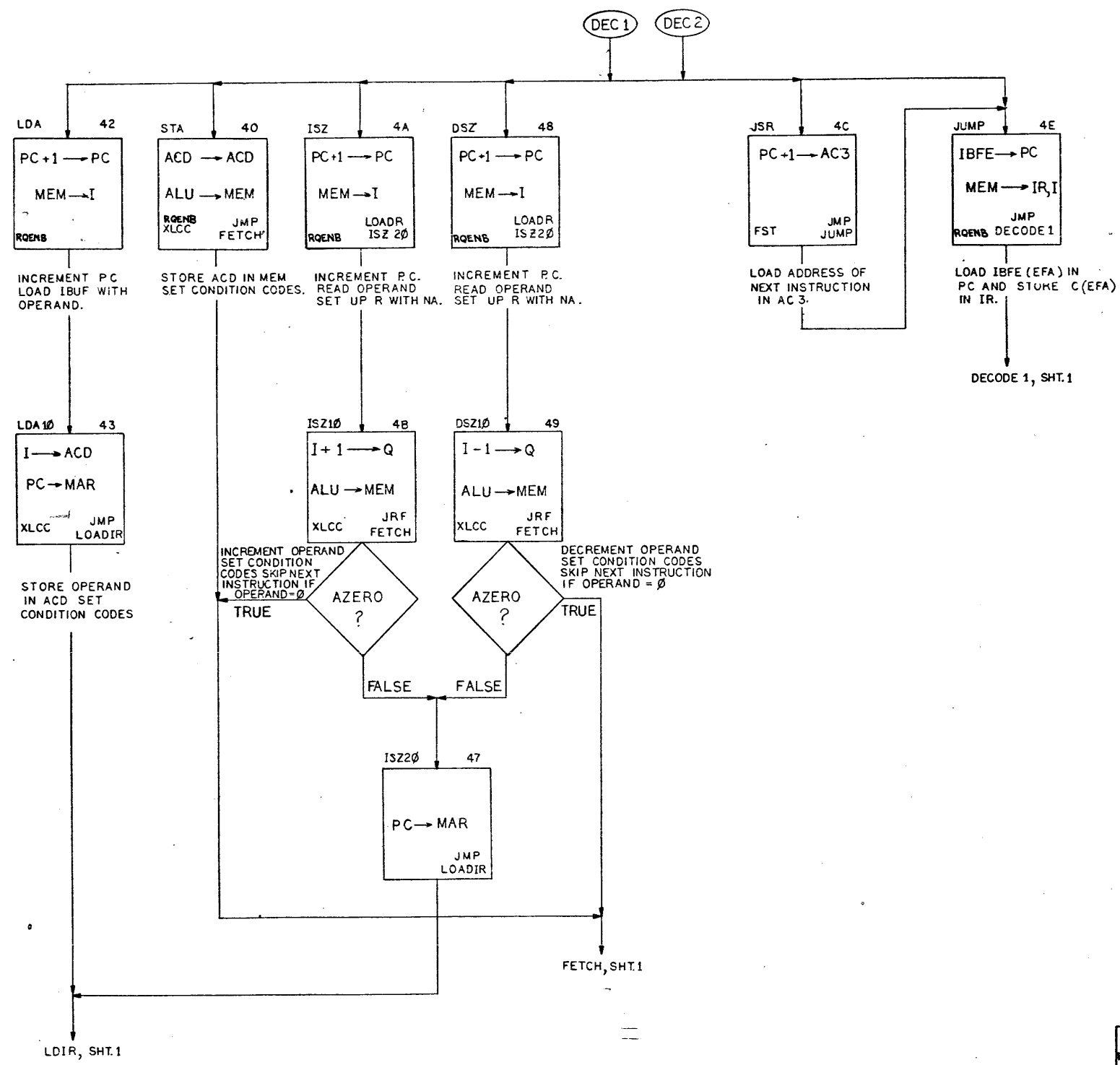


**NOTE:**

1. THE ALC INSTRUCTION BRANCH IS IMPLEMENTED BY READING THE WORD DECODE1 AND TESTING THE STATE OF IR0. IF IR0=0, A HARDWIRED MICROWORD IS FORCED TO FORM HARDWORD.
2. IF AN INTERRUPT IS PENDING AT 'DECODE 1' THE PC IS NOT INCREMENTED

**INSTRUCTION FETCH INDIRECT ADDRESSING**

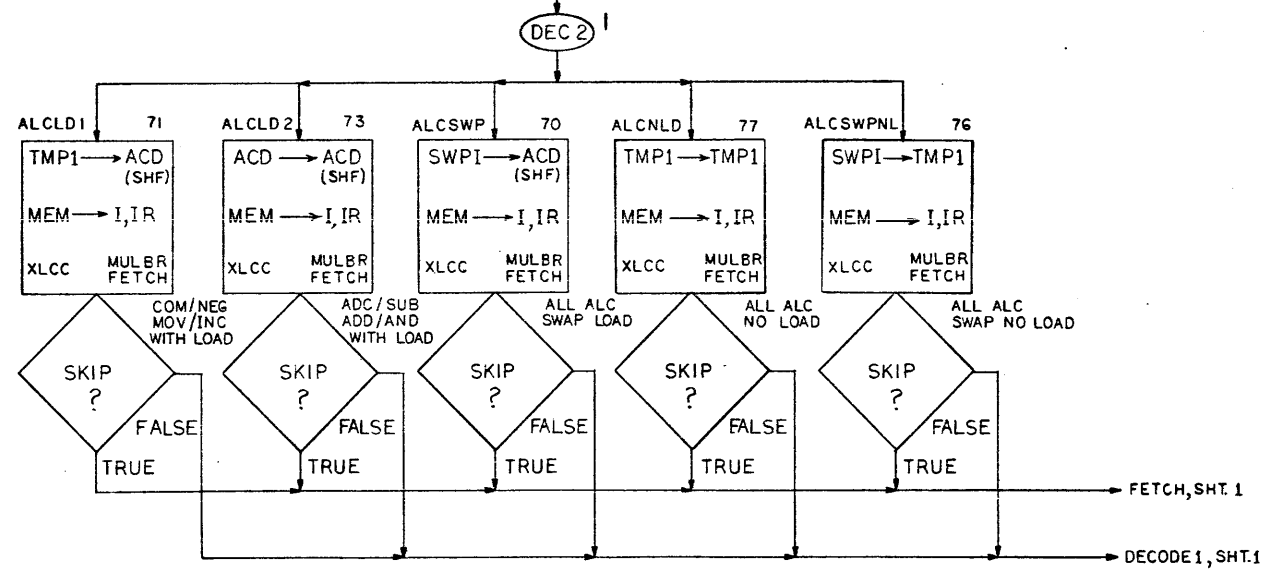
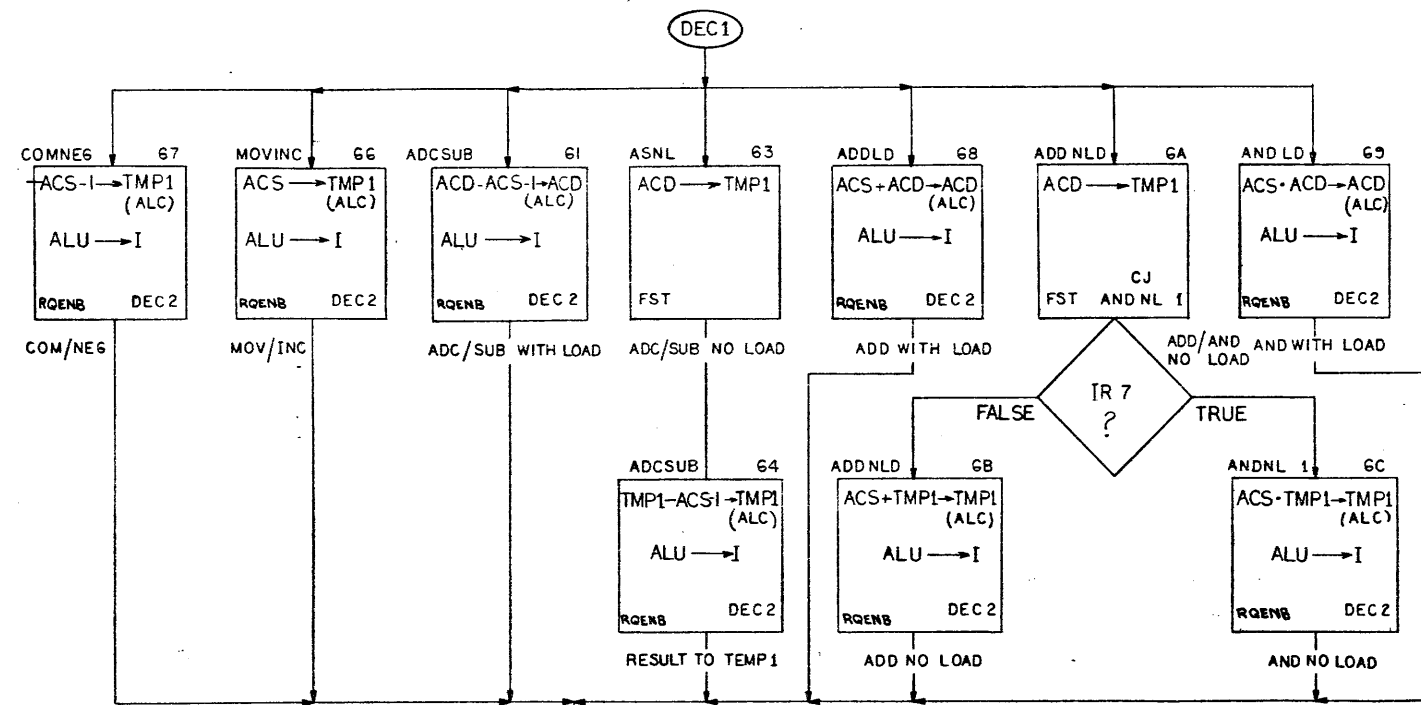
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION.		REVISION	
MATERIAL:		REV	DATE
		E	ECO #3433
		D	ECO #3298
		B	ECO #2779
		A	RELEASE ECO 2577
DATE:		BY	REVISION DESCRIPTION
CHK:		APPD	DATE
PART NUMBER:	NEXT ASSEMBLY:	QTY:	
COMPUTEVISION CORP.		NONE	
SOUTH AVENUE		DS21E015	
BURLINGTON, MASS. 01803		SHEET 1 OF 27 SHEETS	



CS21E015  
E

MOVE DATA MODIFY MEMORY AND JUMP INSTRUCTIONS

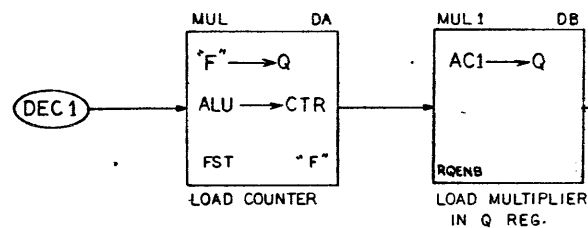
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL ±.01 ±.005 ±.0010 FRACTIONAL ±.0004 ANGULAR ±.004	
MATERIAL:		DATE: 8/77	BY: [Signature]
DESIGN:		CHK:	APP'D: [Signature]
ENGR:		PROJ:	
PART NUMBER:	NEXT ASSEMBLY:	QTY:	SCALE: NONE
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SIGNATURE:	DATE: NONE
		REMOVE ALL DIMS AND SHARP EDGES	WT:
		TITLE: CVP MICROPROGRAM FLOW CHARTS	
		PART NO: CS21E015	
		SHEET 2 OF 27 SHEETS	



DS21E015  
E

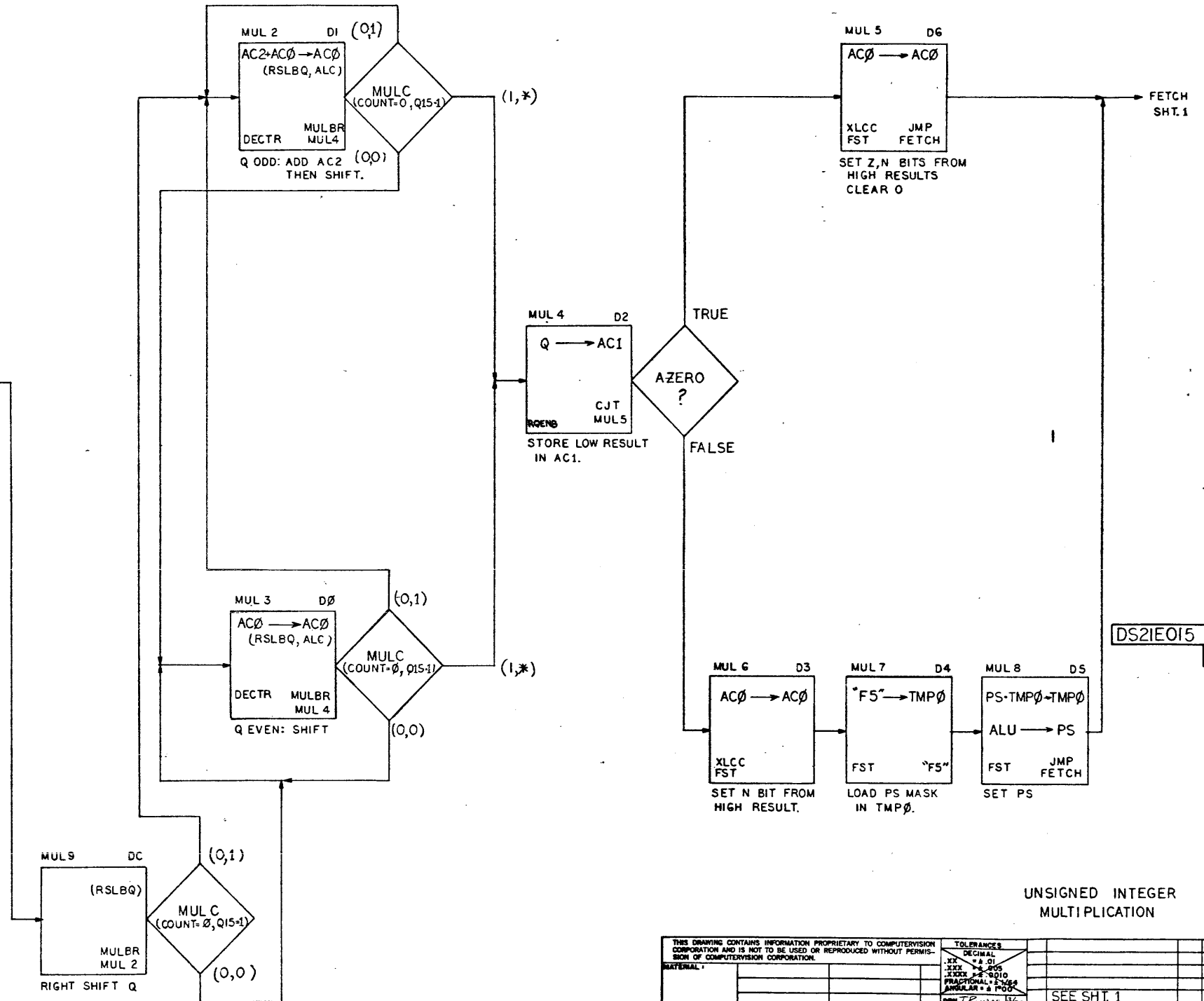
ALC INSTRUCTIONS

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX .XXX FRACTIONAL ANGULAR ± 90°		SEE SHT. 1	
MATERIAL:		CHK:		SYN:	REVISION DESCRIPTION
FINISH:		ENGR:		PROJ:	APPRO DATE
PART NUMBER	NEXT ASSEMBLY	QTY	MP#	SCALE	TITLE
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			SIGNATURE DATE	NONE	CVP MICROPROGRAM FLOW CHARTS
			REMOVE ALL BURRS AND SWARP EDGES	UNIT WT.	DS21E015
					SHEET 3 OF 27 SHEETS



**INPUT:**  
 AC2 = MULTIPLICAND  
 AC1 = MULTIPLIER  
 AC0 = ADDITIVE CONSTANT

**OUTPUT:**  
 AC2 = UNCHANGED  
 AC1 = LOW ORDER WORD OF  $AC0 + (AC1 * AC2)$   
 AC0 = HIGH ORDER WORD OF  $AC0 + (AC1 * AC2)$   
 ZBIT =  $((AC1 EQ 0) .AND. (AC0 .EQ 0))$   
 N = MSB OF AC0  
 C = NO CHANGE  
 0 = 0



UNSIGNED INTEGER  
 MULTIPLICATION

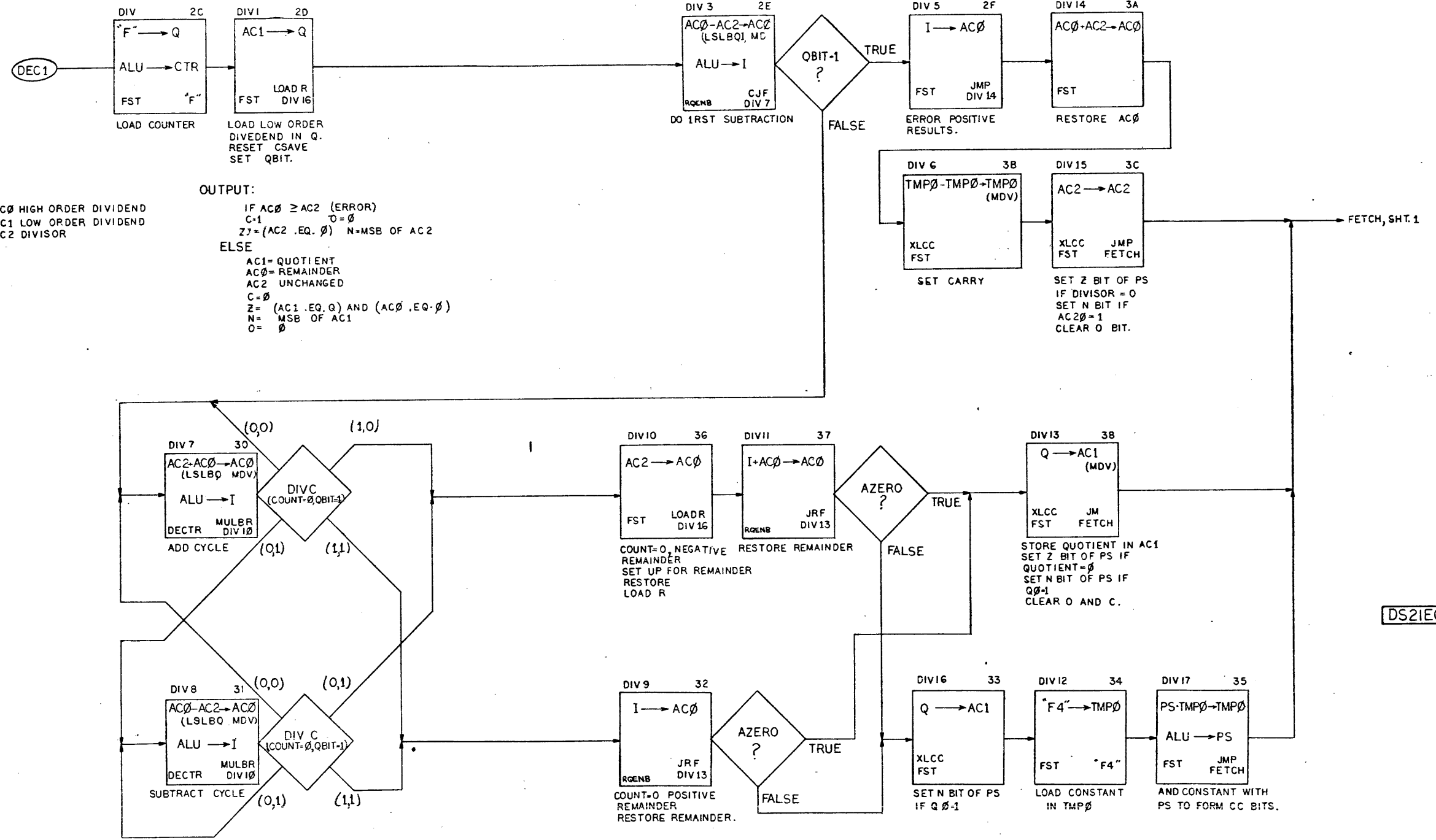
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		<b>TOLERANCES</b> DECIMAL .XX ± .01 .XXX ± .005 .XXXX ± .0010 FRACTIONAL ± 1/16" MIN. ANGULAR ± .0001"	
MATERIAL:	PART NUMBER:	NEXT ASSEMBLY:	QTY:
PREP:	CHECKED:	ENGR:	PROJ:
SIGNATURE:	DATE:	SCALE:	DWG NO.:
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		NONE	DS21E015
REMOVE ALL BURRS AND SHARP EDGES		UNIT:	SHEET 4 OF 27 SHEETS

DS21E015

E

INPUT:  
 AC0 HIGH ORDER DIVIDEND  
 AC1 LOW ORDER DIVIDEND  
 AC2 DIVISOR

OUTPUT:  
 IF  $AC0 \geq AC2$  (ERROR)  
 C-1  
 Z = 0  
 Z = (AC2.EQ.0) N=MSB OF AC2  
 ELSE  
 AC1= QUOTIENT  
 AC0= REMAINDER  
 AC2 UNCHANGED  
 C=0  
 Z= (AC1.EQ.Q) AND (AC0.EQ.0)  
 N= MSB OF AC1  
 O= 0



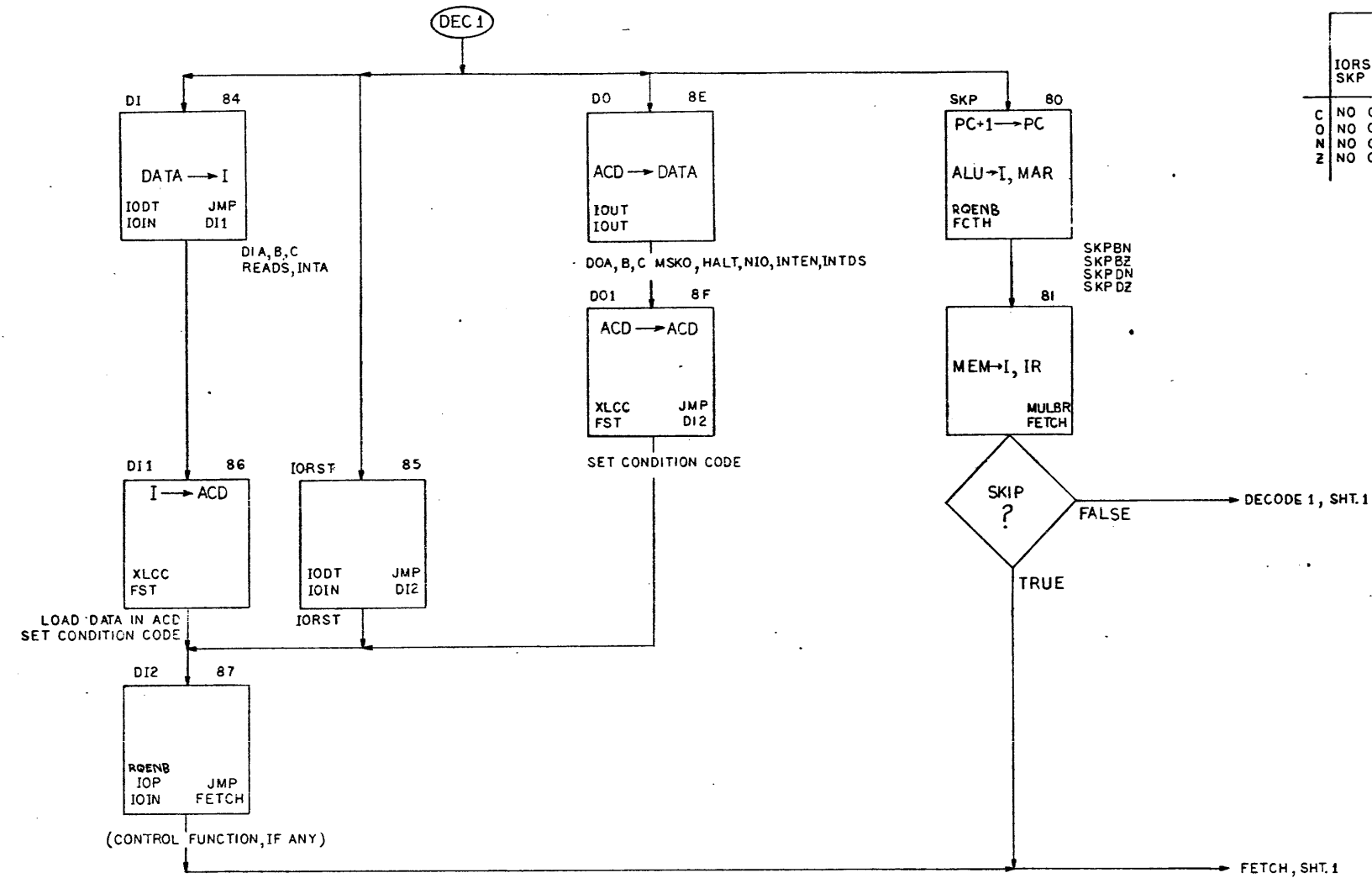
DS21E015  
 E

UNSIGNED INTEGER DIVISION

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.			TOLERANCES DECIMAL .XX ± .01 .XXX ± .005 .XXXX ± .0010 FRACTIONAL ± .005 ANGULAR ± .005		
MATERIAL:			SEE SHT 1	REV	DATE
FINISH:			REVISION DESCRIPTION	APPD	DATE
			TITLE		
			CVP MICROPROGRAM		
			FLOW CHART		
			SCALE		
			NONE		
			SHEET 5 OF 27 SHEETS		
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			SIGNATURE DATE REMOVE ALL BURRS AND SHARP EDGES		

CONDITION CODE BITS FOR I/O

	IORST SKP	DIA,B,C READS INTA	DOA,B,C MSKO HALT NIO INTEN INTDS
C	NO CHANGE	NO CHANGE	NO CHANGE
O	NO CHANGE	0	0
N	NO CHANGE	MSB DATA IN	MSB DATA OUT
Z	NO CHANGE	DATA IN = 0	DATA OUT = 0



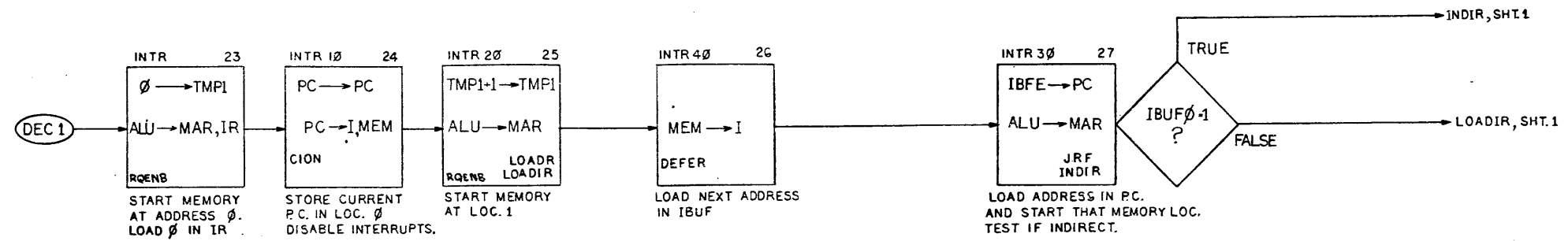
25521E015

E

I/O INSTRUCTIONS

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL XX ± .01 XXX ± .005 FRACTIONAL ± 1/16 ANGULAR & PCD		
MATERIAL:		DRN: <i>T. Anderson</i> 9/77	CHK:	ENGR:
FINISH:		PROJ:	TITLE: CVP MICR PROGRAM FLOW CHART	
PART NUMBER:	NEXT ASSEMBLY:	QTY:	SCALE: NONE	DWG NO: D251E015
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SIGNATURE:	DATE:	SHEET 6 of 27





DS21E015  
E

INTERRUPT

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX ± .01 XXX ± .005 XXX ± .010 FRACTIONAL ± .005 ANGULAR ± .002			
MATERIAL:				SEE SHT. 1	
DATE:				REV	APPR DATE
CHK				TITLE	
ENGR				CVP MICROPROGRAM	
PROJ				FLOW CHART	
PART NUMBER	NEXT ASSEMBLY	QTY		SCALE	None
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			SIGNATURE DATE	DWG NO.	DS21E015
REMOVE ALL BURRS AND SHARP EDGES			SHEET	SHEET 7 OF 27 SHEETS	



EXAM, SHT. 10  
 EXAMN, SHT. 10  
 DEP 200, SHT. 10  
 STOP SHT. 10

REGEX, SHT. 10  
 SHT. 25

RST 200 F0  
 MEM → I, IR  
 IOIN JMP HALT  
 READ MEMORY INTO I, IR (DISPLAY CONTENTS OF MEMORY IN DATA LIGHTS.)

HALT 03  
 CJF HALT  
 WAIT FOR CONSOLE FUNCTION REQUEST.

CFUN ?  
 FALSE  
 TRUE

04  
 FS → IR, I  
 LOAD FUNCTION SWITCHES IN IR.

05  
 DS → I  
 COND  
 LOAD DATA SWITCHES IN Ibuf.

COND

COND

APL EA  
 FF+1 → Q  
 CCF \*FF"  
 CLEAR CONSOLE FUNCTION F-F  
 LOAD 10016 IN Q

EB  
 PC-PC → PC (LSLBQ)  
 ALU → I, MAR  
 JMP APL 200  
 CLEAR PC, I MAR  
 START MEMORY.

APL 200 20  
 APL → TMP0  
 ALU → MEM  
 LOADR RQENB  
 CONT  
 STORE CONTENTS OF APL ROM IN MEMORY.

21  
 I+1 → TMP0  
 ALU → MAR, I  
 INCREMENT Ibuf, MAR.

22  
 I-Q → TMP0  
 JRT APL 200  
 TEST IF DONE

AZERO ?  
 FALSE  
 TRUE

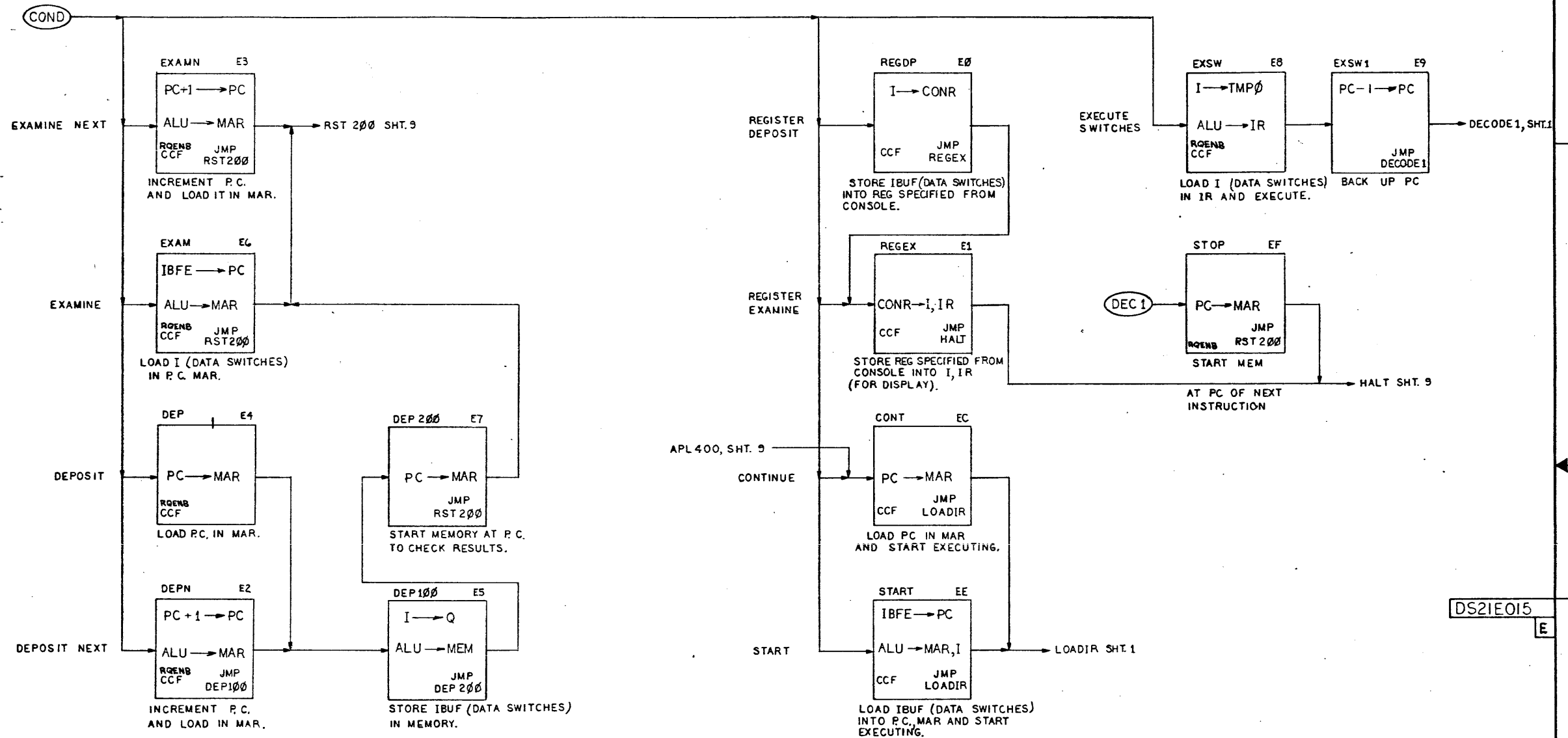
CNT, SHT. 10

DS2IE015

E

CONSOLE FUNCTIONS I  
 (RESET, HALT STATE, APL)

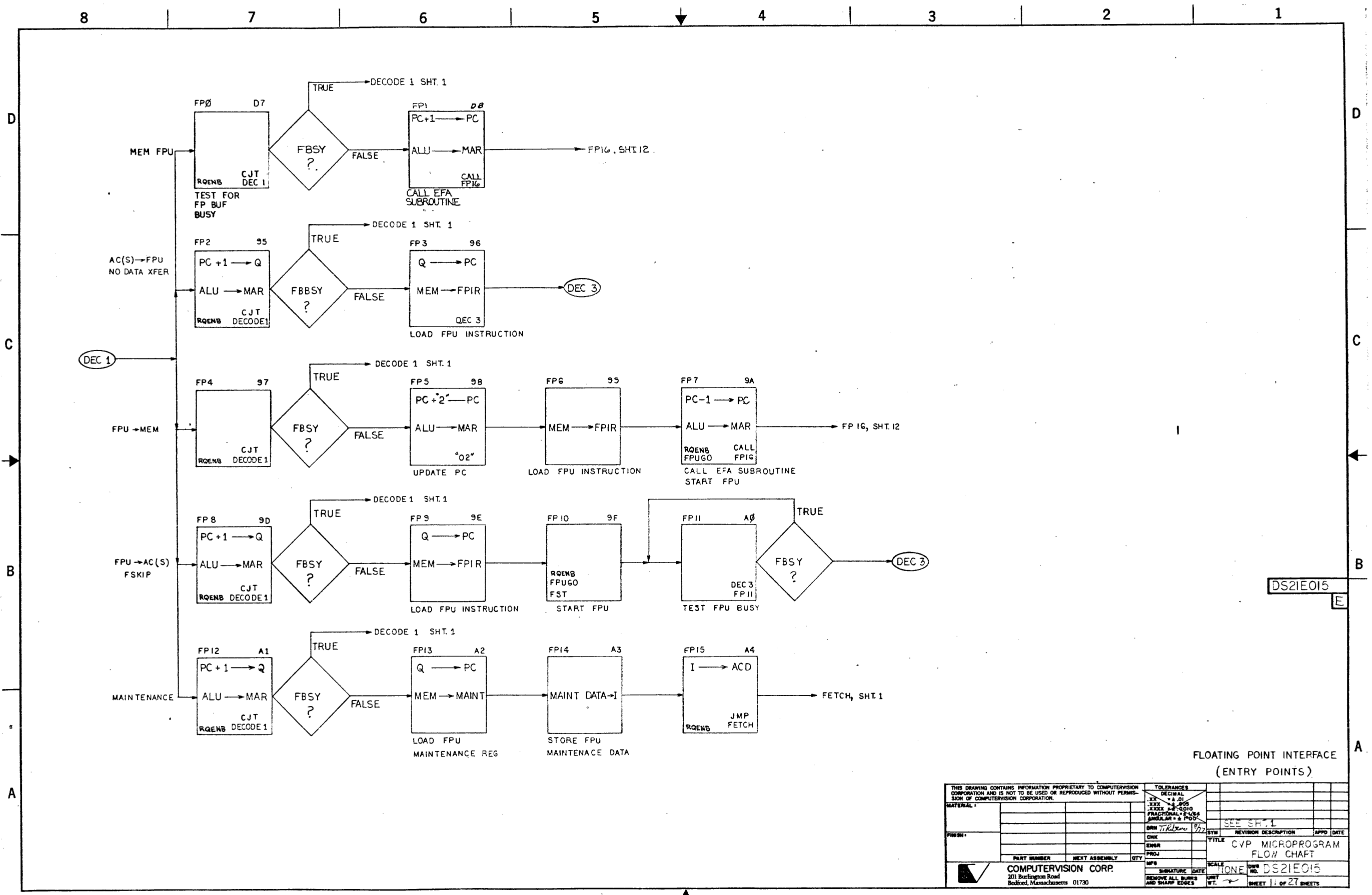
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL +0.01 -0.005 FRACTIONAL ANGULAR ± 30°		SYN	
MATERIAL		DATE	7/23/72	SYN	REVISION DESCRIPTION
FINISH		CHK		TITLE	CVP MICROPROGRAM FLOW CHART
		ENGR		SCALE	1:1
		PROJ		UNIT	INCH
PART NUMBER	NEXT ASSEMBLY	QTY	MP#	SIGNATURE	DATE
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			SCALE	UNIT	SHEET 9 OF 17 SHEETS



DS21E015  
E

CONSOLE FUNCTIONS II

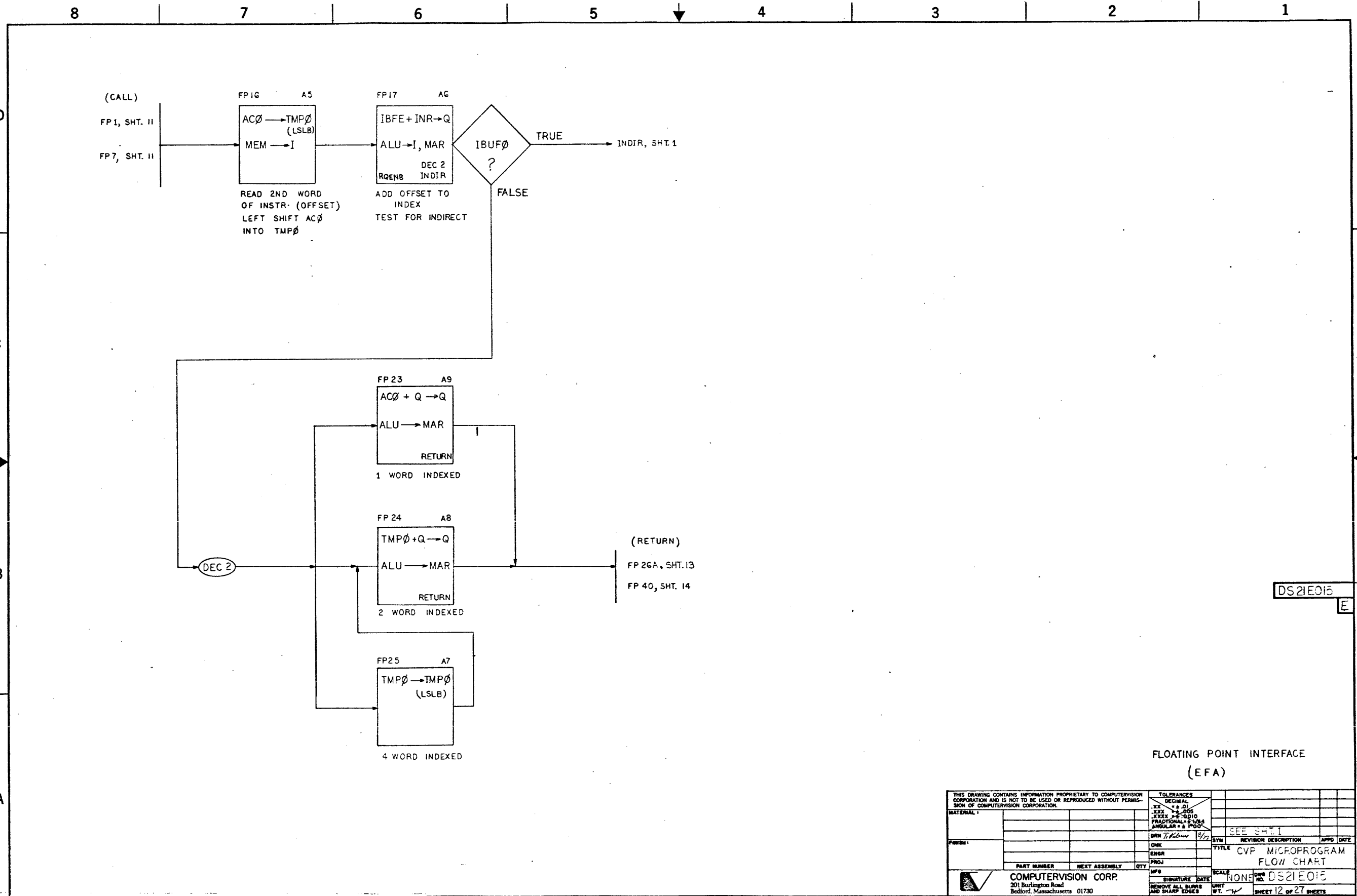
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL - .01 - .005 - .0010 FRACTIONAL - 2/64 ANGULAR - 8' P/64			
MATERIAL:		DRN: <i>7.1.6</i>	DATE: <i>1/72</i>	SYN: <i>SEE SHT. 1</i>	APPD DATE:
FINISH:		CHK:	ENGR:	TITLE: CVP MICROPROGRAM FLOW CHART	
PART NUMBER:	NEXT ASSEMBLY:	QTY:	PROJ:	SCALE: NONE	DWG NO. DS21E015
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			SIGNATURE:	DATE:	SHEET 10 OF 27 SHEETS



FLOATING POINT INTERFACE  
(ENTRY POINTS)

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES			
		DECIMAL			
		.XX = .01			
		.XXX = .005			
		.XXXX = .0010			
		FRACTIONAL = X/64			
		ANGULAR = ° POS			
MATERIAL		DRN <i>T. H. Brown</i> 9/72		SYN	
FINISH		CHK		REVISION DESCRIPTION	
		ENGR		APPRO DATE	
		PROJ		TITLE	
PART NUMBER		NEXT ASSEMBLY		QTY	
COMPUTERVISION CORP.		SCALE		DWN NO.	
201 Burlington Road		NONE		DS21E015	
Bedford, Massachusetts 01730		SIGNATURE DATE		SHEET 1 OF 27 SHEETS	
		REMOVE ALL BURRS AND SHARP EDGES		WGT.	

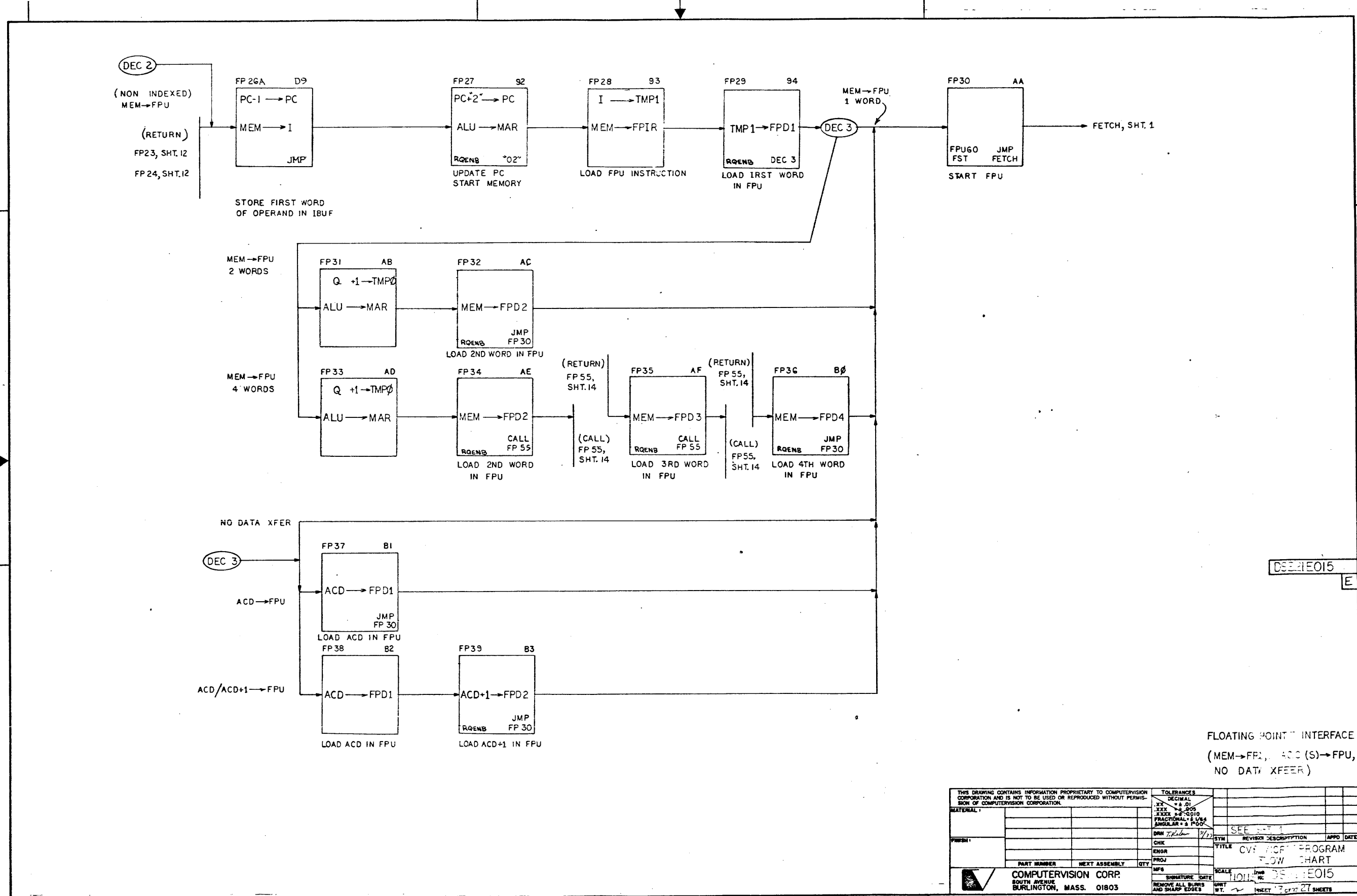
DS21E015  
E



DS21E015  
E

FLOATING POINT INTERFACE  
(EFA)

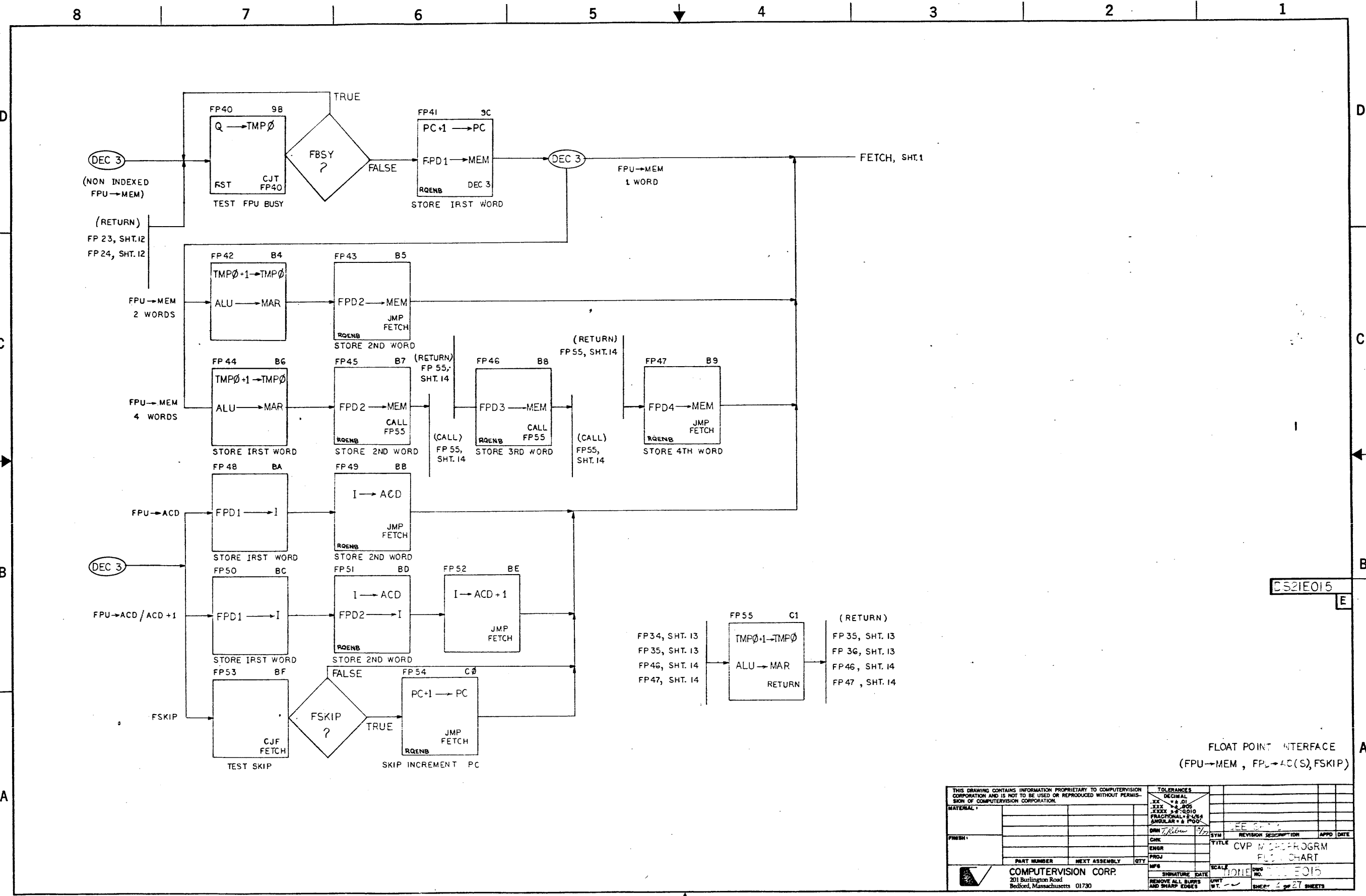
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES			
		DECIMAL			
		.XX $\pm$ .01			
		.XXX $\pm$ .005			
		.XXXX $\pm$ .0010			
		FRACTIONAL $\pm$ .004			
		ANGULAR $\pm$ 3' 00"			
MATERIAL:		DRN	T. Kline	8/72	SEE SHT. 1
FORM:		CHK			REVISION DESCRIPTION
		ENGR			APPO DATE
		PROJ			TITLE
PART NUMBER		NEXT ASSEMBLY	QTY	SCALE	NONES DS21E015
COMPUTERVISION CORP.		201 Burlington Road		SIGNATURE	DATE
Bedford, Massachusetts 01730				REMOVE ALL BURRS AND SHARP EDGES	APPT
				WT.	SHEET 12 OF 27 SHEETS



DSE1E015  
 E

FLOATING POINT INTERFACE  
 (MEM->FPU, ADD(S)->FPU,  
 NO DATA XFER)

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.				TOLERANCES DECIMAL .XX = ±.01 .XXX = ±.005 FRACTIONALS 1/4" & 3/16" ANGULAR ± .5 DEG	
MATERIAL:				DRN 7/1/72	SYN
FINISH:				CHK	REVISION DESCRIPTION
				ENGR	TITLE
				PROJ	SCALE
PART NUMBER	NEXT ASSEMBLY	QTY		SIGNATURE DATE	UNIT WT.
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			SCALE 1:100 DSE1E015 REMOVE ALL BURRS AND SHARP EDGES		

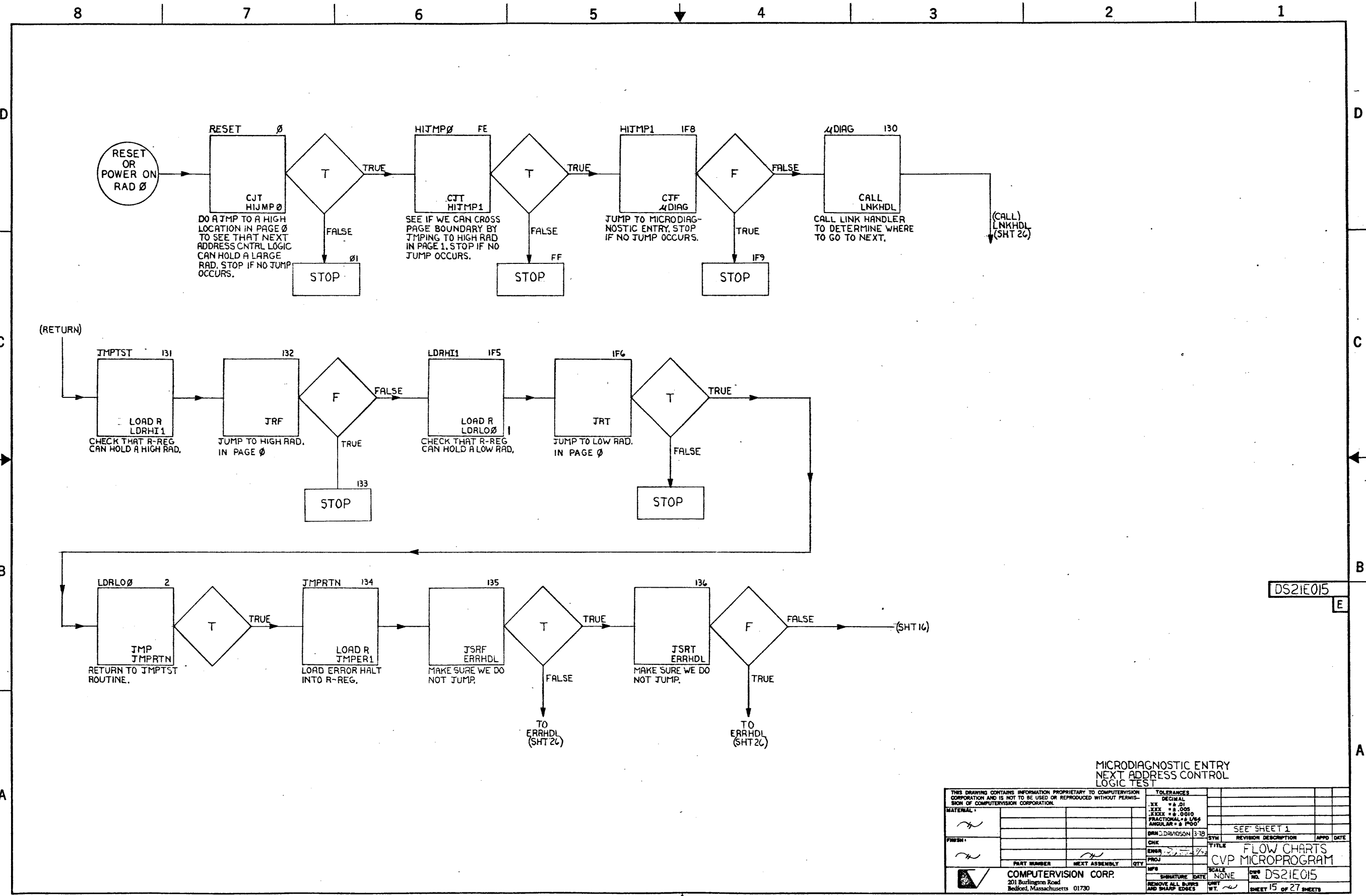


C521E015

FLOAT POINT INTERFACE  
(FPU -> MEM, FPU -> ACD(S), FSKIP)

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL XXX ± 0.01 XXX ± 0.005 FRACTIONAL 2-16 ANGULAR ± 30'	
MATERIAL		DATE	1/72
FINISH		SYN	
		ENGR	
		PROJ	
		QTY	
PART NUMBER	NEXT ASSEMBLY	TITLE CVP MICROPROGRAM FLOW CHART	
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SCALE	DWG NO. C521E015
SIGNATURE DATE		UNIT	SHEET 2 OF 27 SHEETS
REMOVE ALL BURRS AND SHARP EDGES		W.T.	

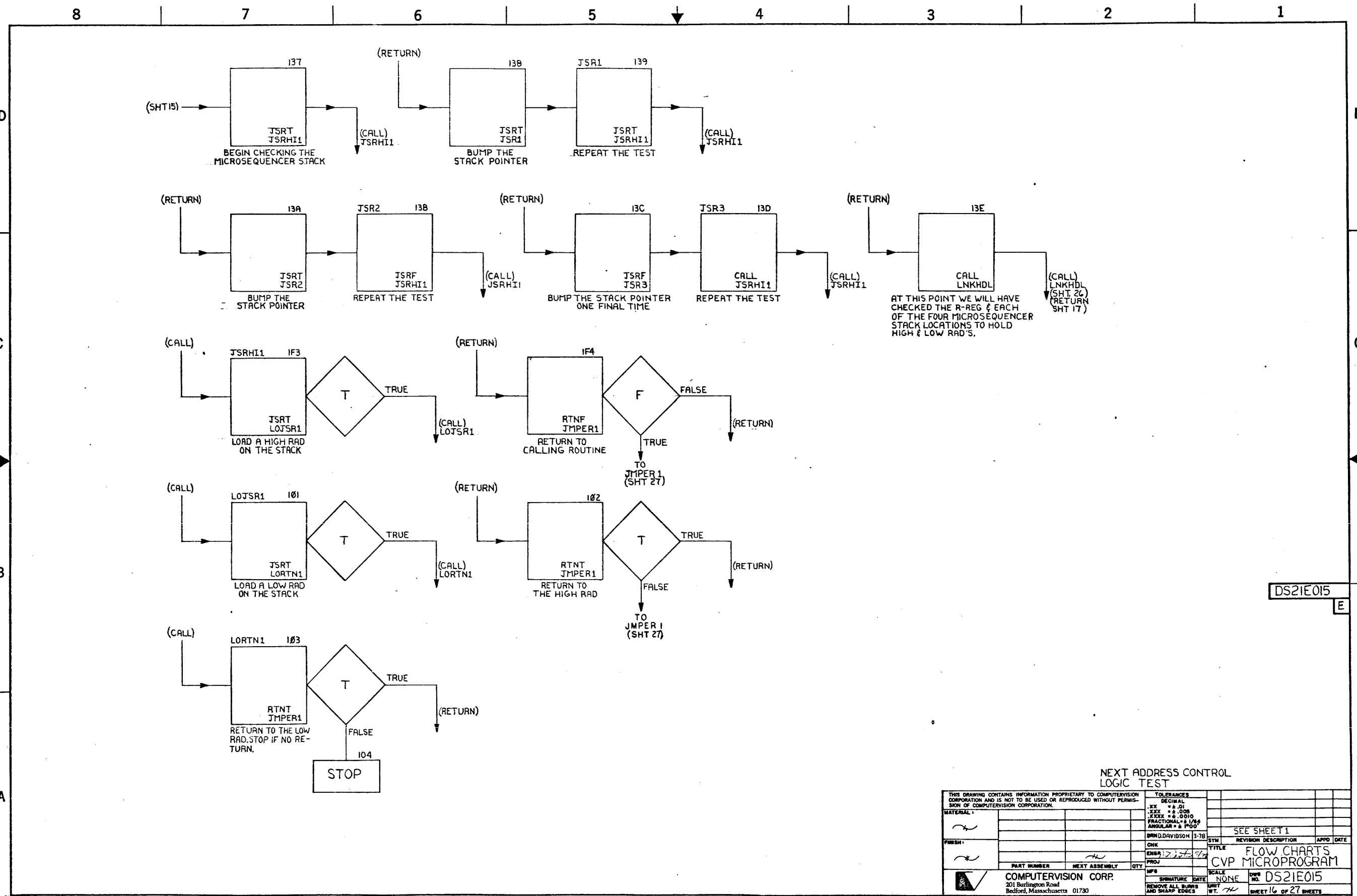




DS21E015

MICRODIAGNOSTIC ENTRY  
NEXT ADDRESS CONTROL  
LOGIC TEST

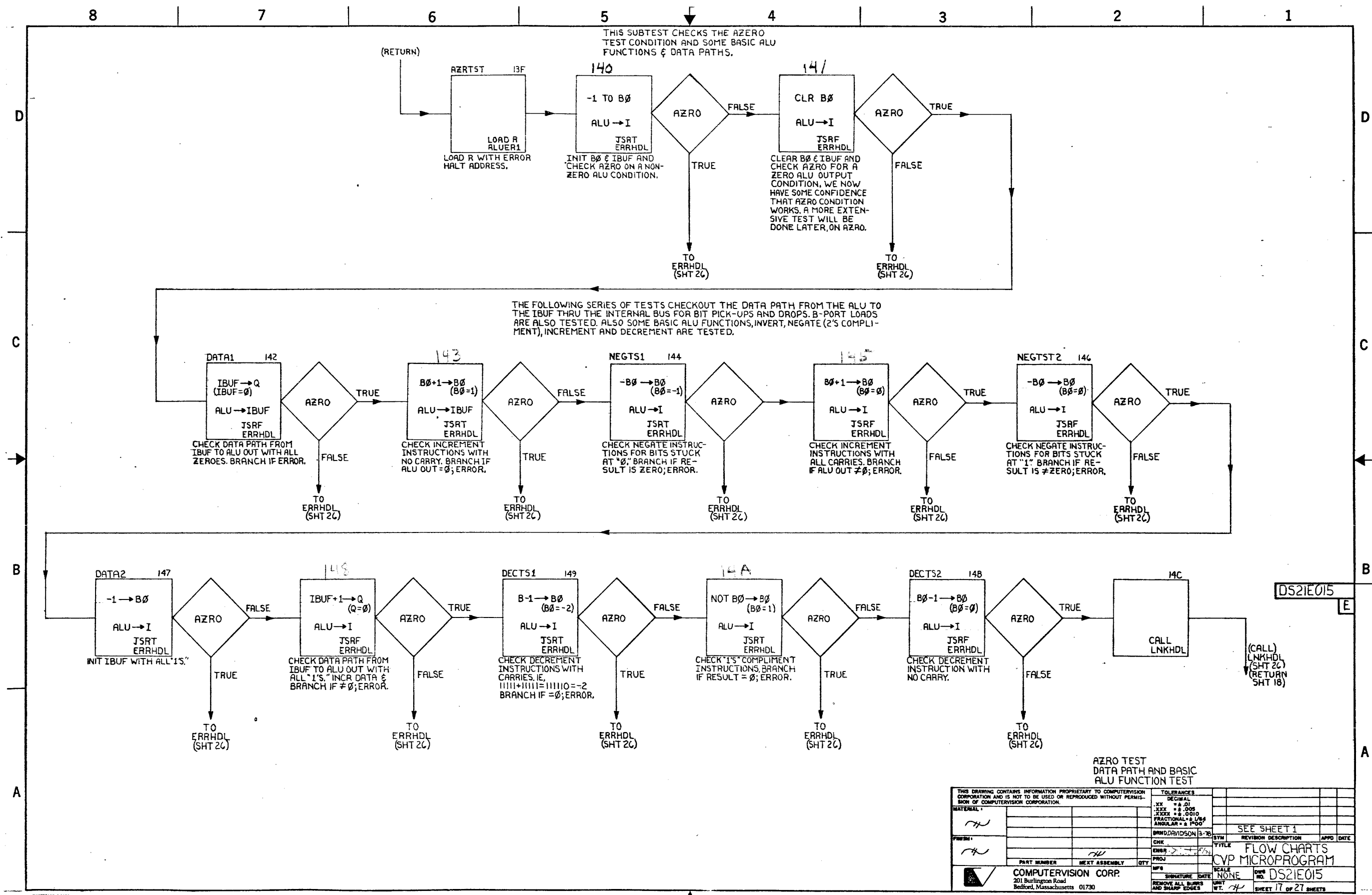
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX = ±.01 .XXX = ±.005 FRACTIONAL = ± 1/16" ANGULAR = ± 30'			
MATERIAL:		DRN: DAVIDSON	3-78	SYM	SEE SHEET 1
FINISH:		CHK		REV	
		ENGR		DATE	
		PROJ			
PART NUMBER	NEXT ASSEMBLY	QTY		TITLE	FLOW CHARTS CVP MICROPROGRAM
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730			SCALE	DWG NO.	DS21E015
REMOVE ALL DIMS AND SHARP EDGES			SIGNATURE	DATE	
			WT.		SHEET 15 OF 27 SHEETS



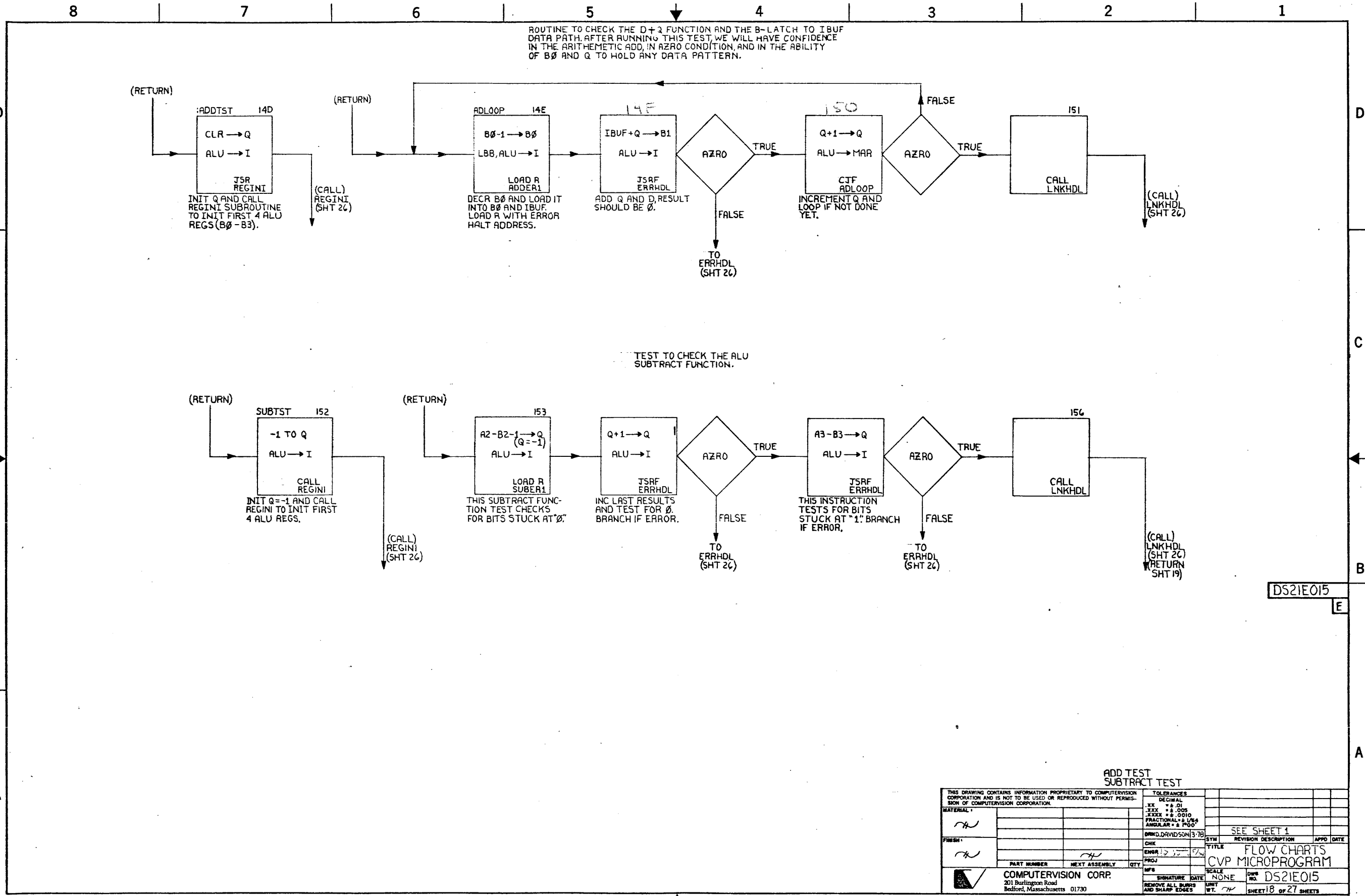
DS21E015

NEXT ADDRESS CONTROL LOGIC TEST

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.				TOLERANCES .XX = .01 .XXX = .005 .XXXX = .0010 FRACTIONAL = 1/16" ANGULAR = .000"	
MATERIAL:				SYN	SEE SHEET 1
FINISH:				CHK	REVISION DESCRIPTION
				ENR: 2/2/72	APPD DATE
				PROJ	TITLE
PART NUMBER	NEXT ASSEMBLY	QTY			FLOW CHARTS
					CVP MICROPROGRAM
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730			SCALE	DWG NO.	DS21E015
			REMOVE ALL BURRS AND SHARP EDGES	SHEET	16 of 27 SHEETS

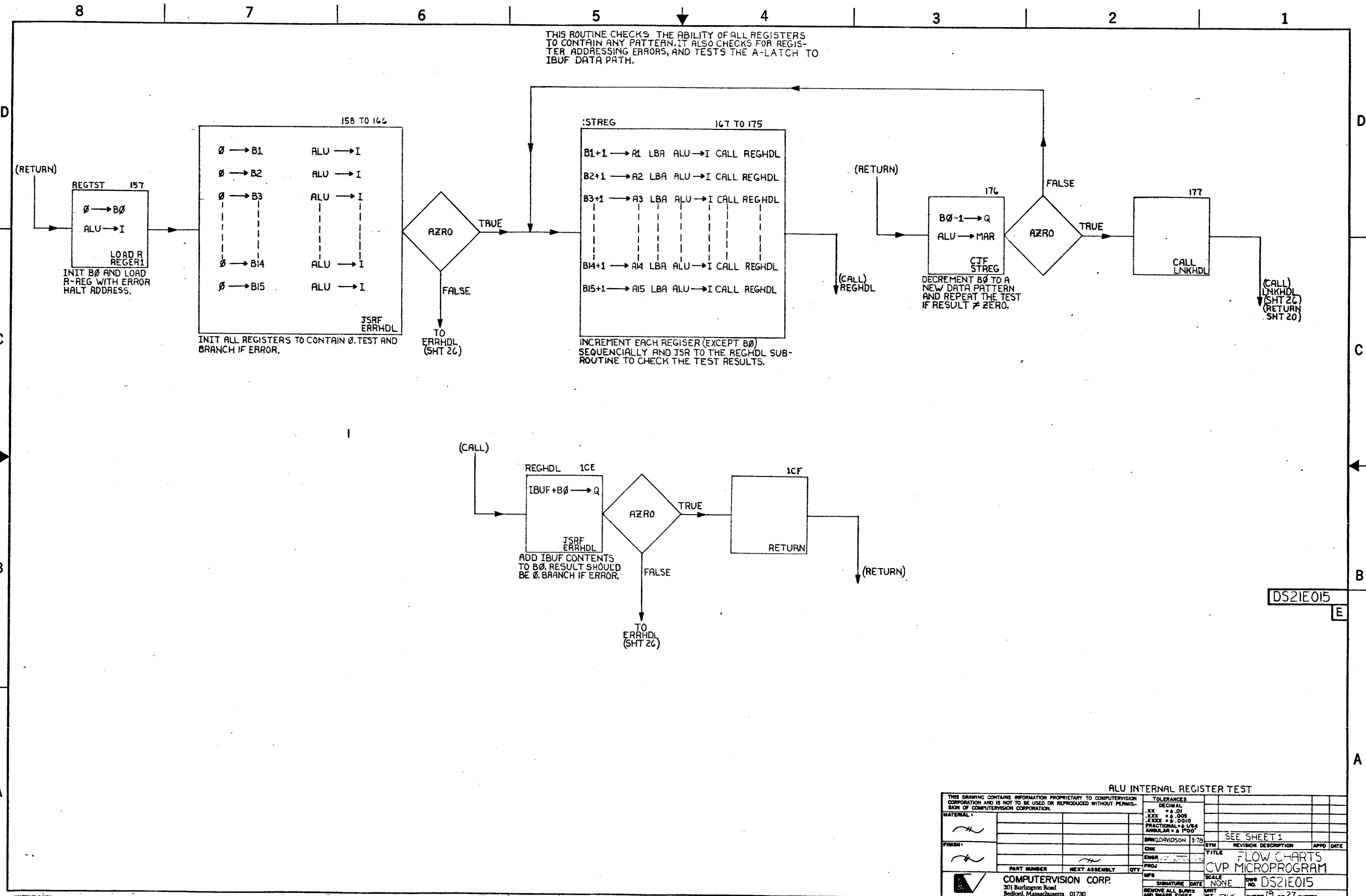


THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVERSION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVERSION CORPORATION.		TOLERANCES	
DECIMAL: .XX ± .01			
FRACTIONAL: ± 1/32"			
ANGULAR: ± 1°00'			
MATERIAL: <i>7</i>		SYN: <i>3-76</i>	
FINISH: <i>7</i>		REVISION DESCRIPTION: SEE SHEET 1	
PART NUMBER: <i>7</i>		TITLE: FLOW CHARTS CVP MICROPROGRAM	
NEXT ASSEMBLY: <i>7</i>		SCALE: NONE	
QTY: <i>7</i>		DWG NO: DS21E015	
COMPUTERVERSION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE: <i>7</i> DATE: <i>7/52</i>	
		REMOVE ALL BURRS AND SHARP EDGES	
		SHEET 17 OF 27 SHEETS	



DS21E015

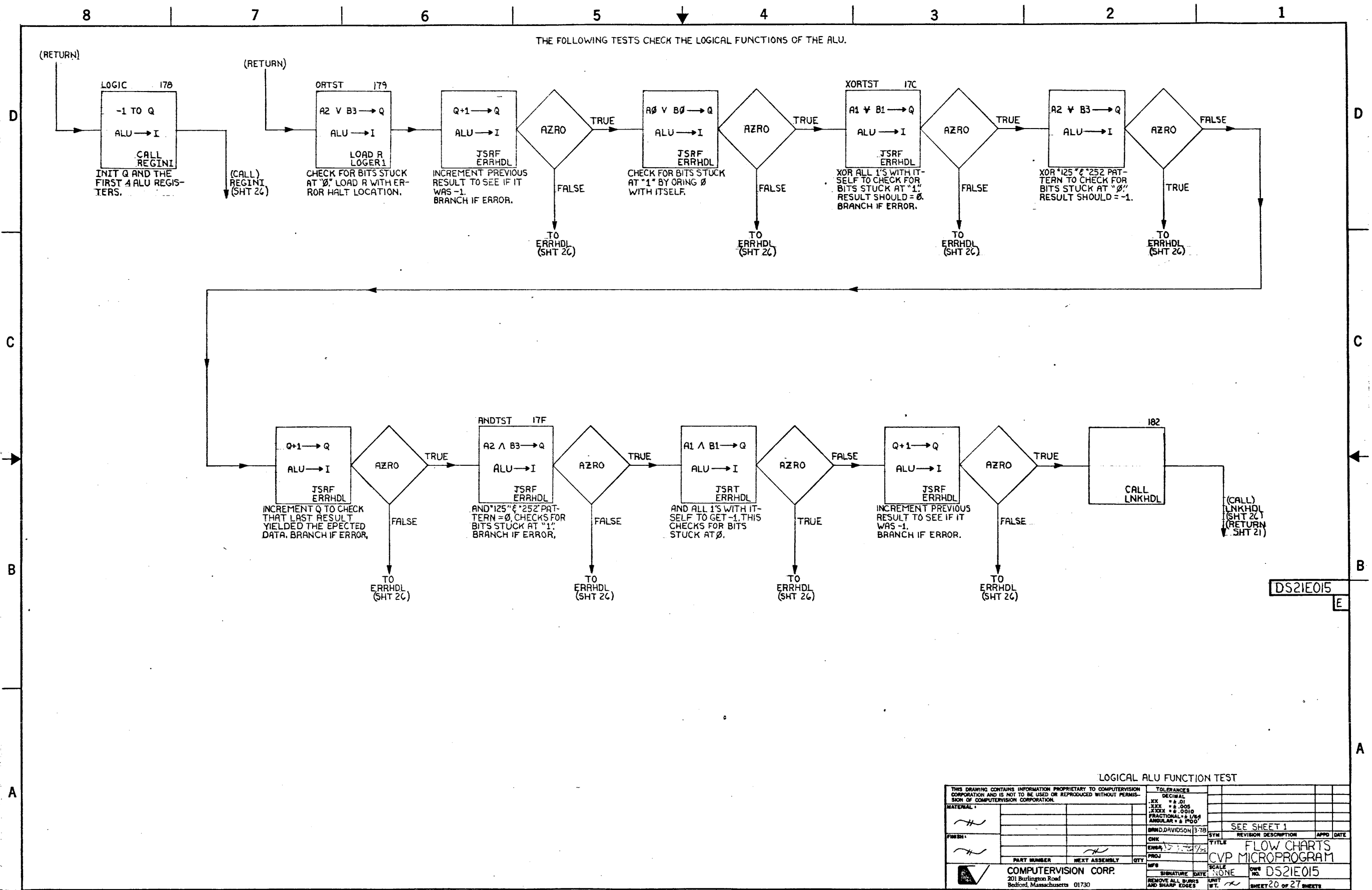
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.				<b>TOLERANCES</b> DECIMAL .XX    ± .01 .XXX   ± .005 FRACTIONAL ± 1/64 ANGULAR ± .007	
MATERIAL		FINISH		CHK	
				ENGR	
				PROJ	
PART NUMBER	NEXT ASSEMBLY	QTY	MP#	SIGNATURE	DATE
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730			SCALE	NONE	DWG NO.
			REMOVE ALL BURRS AND SHARP EDGES	UNIT	WT.
					SEE SHEET 1
					REVISION DESCRIPTION
					APPRO DATE
					TITLE
					FLOW CHARTS
					CVP MICROPROGRAM
					SCALE NONE
					DWG NO. DS21E015
					SHEET 18 OF 27 SHEETS



DS21E015

ALU INTERNAL REGISTER TEST

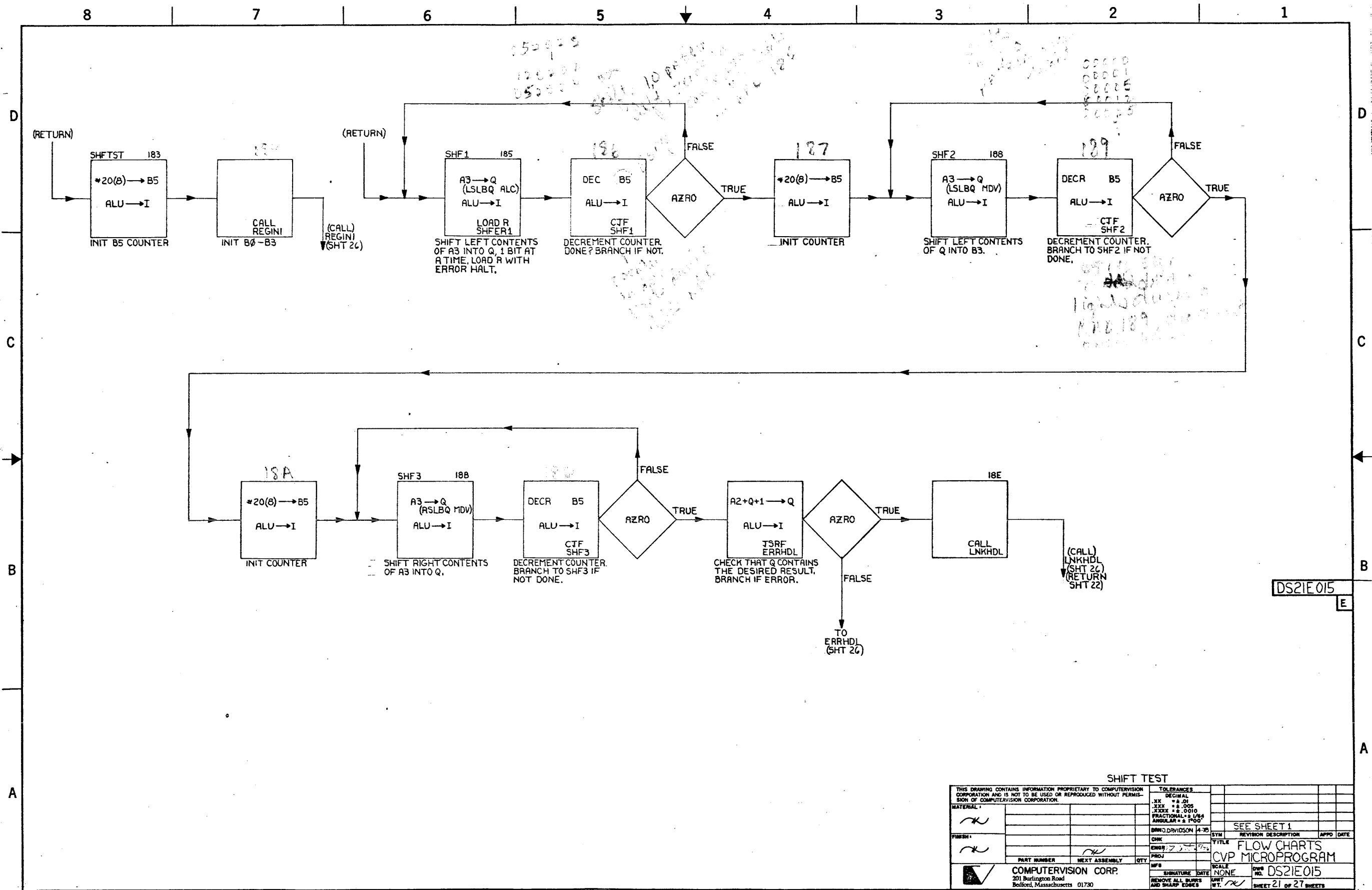
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVERSION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVERSION CORPORATION.		TOLERANCES DECIMAL .XX ±.01 .XXX ±.005 .XXXX ±.0010 FRACTIONAL ± 1/64 ANGLES ± .5 DEG		SEE SHEET 1	
MATERIAL		CHK	BRND/DAVIDSON	3-75	SYM
FINISH		ENGR			REVISION DESCRIPTION
		PROJ			TITLE FLOW CHARTS CVP MICROPROGRAM
		PART NUMBER	NEXT ASSEMBLY	QTY	APPRO DATE
COMPUTERVERSION CORP. 201 Burlington Road Bedford, Massachusetts 01730			SIGNATURE	DATE	DWG NO. DS21E015
REMOVE ALL SURFS AND SHARP EDGES			UNIT		SHEET 19 OF 27 SHEETS



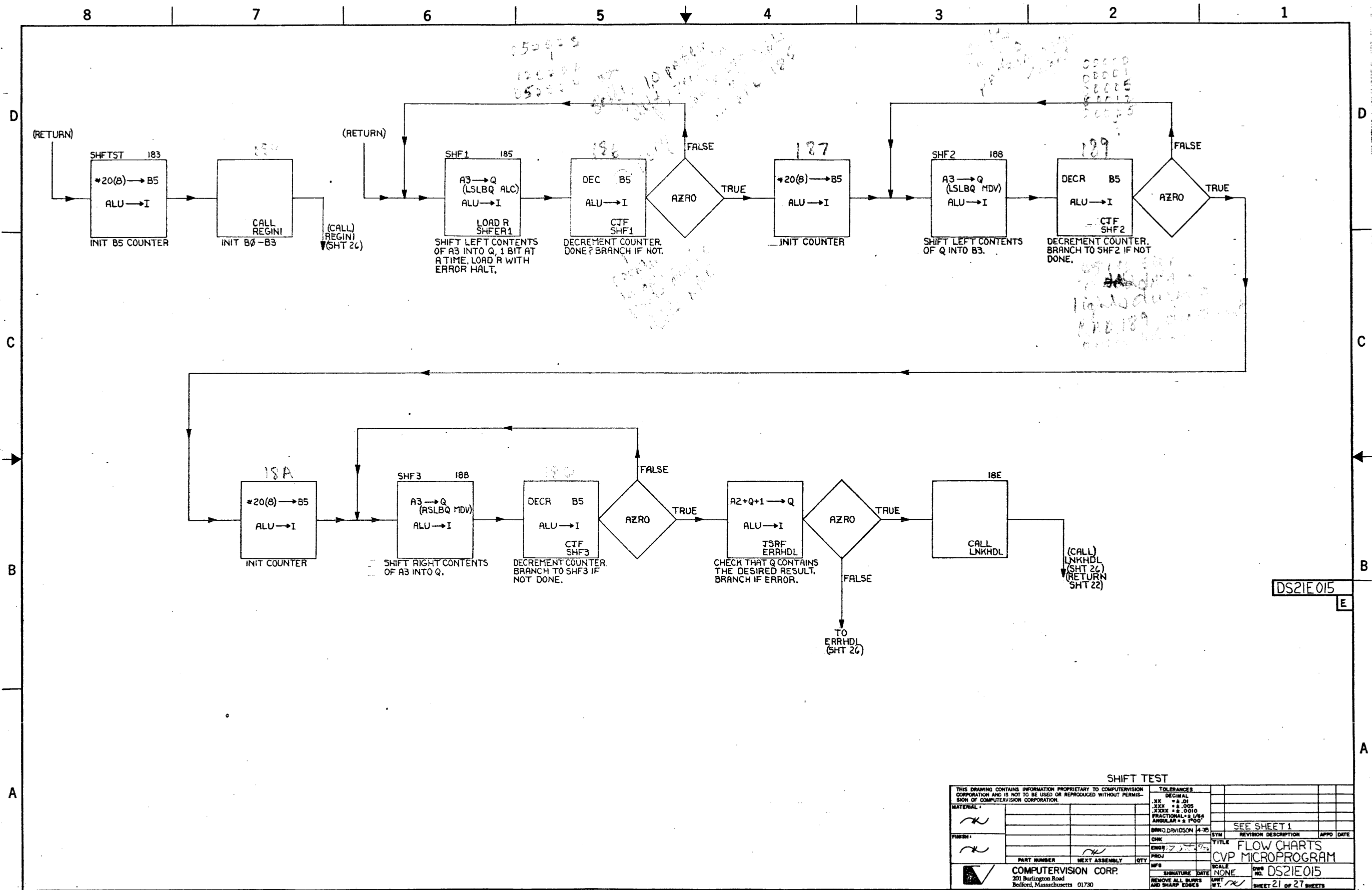
DS21E015

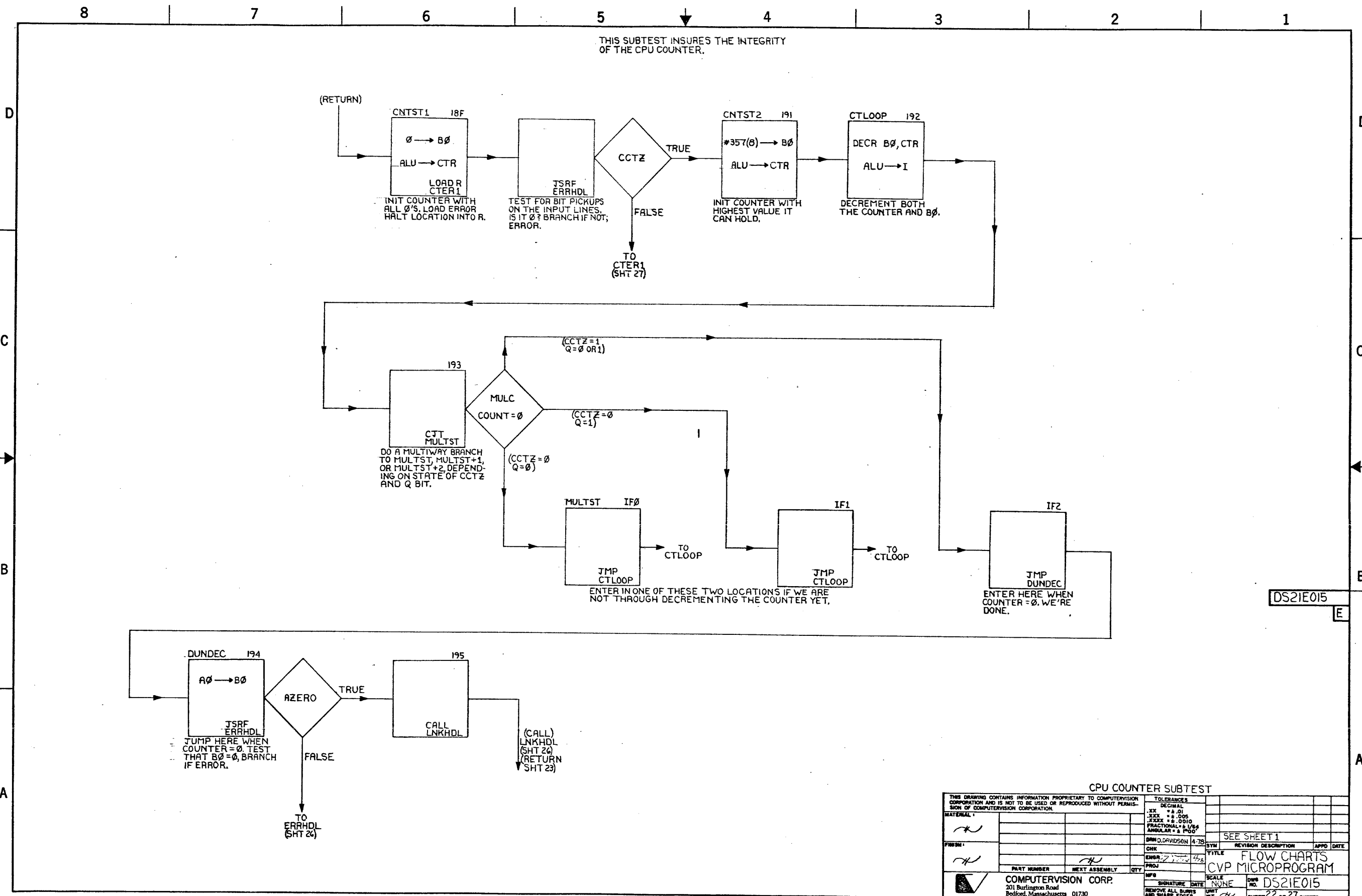
LOGICAL ALU FUNCTION TEST

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.			TOLERANCES DECIMAL ± .01 ± .005 ± .0010 FRACTIONAL ± 1/64 ANGULAR ± .000"	
MATERIAL:			SEE SHEET 1	
FINISH:			SYN	REVISION DESCRIPTION
			CHK	APPRO DATE
			ENGR	
			PROJ	TITLE
PART NUMBER	NEXT ASSEMBLY	QTY	MFG	CVP MICROPROGRAM
			SCALE	DWG NO. DS21E015
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730			SIGNATURE DATE	SHEET 20 OF 27 SHEETS
			REMOVE ALL BURRS AND SHARP EDGES	



DS21E015



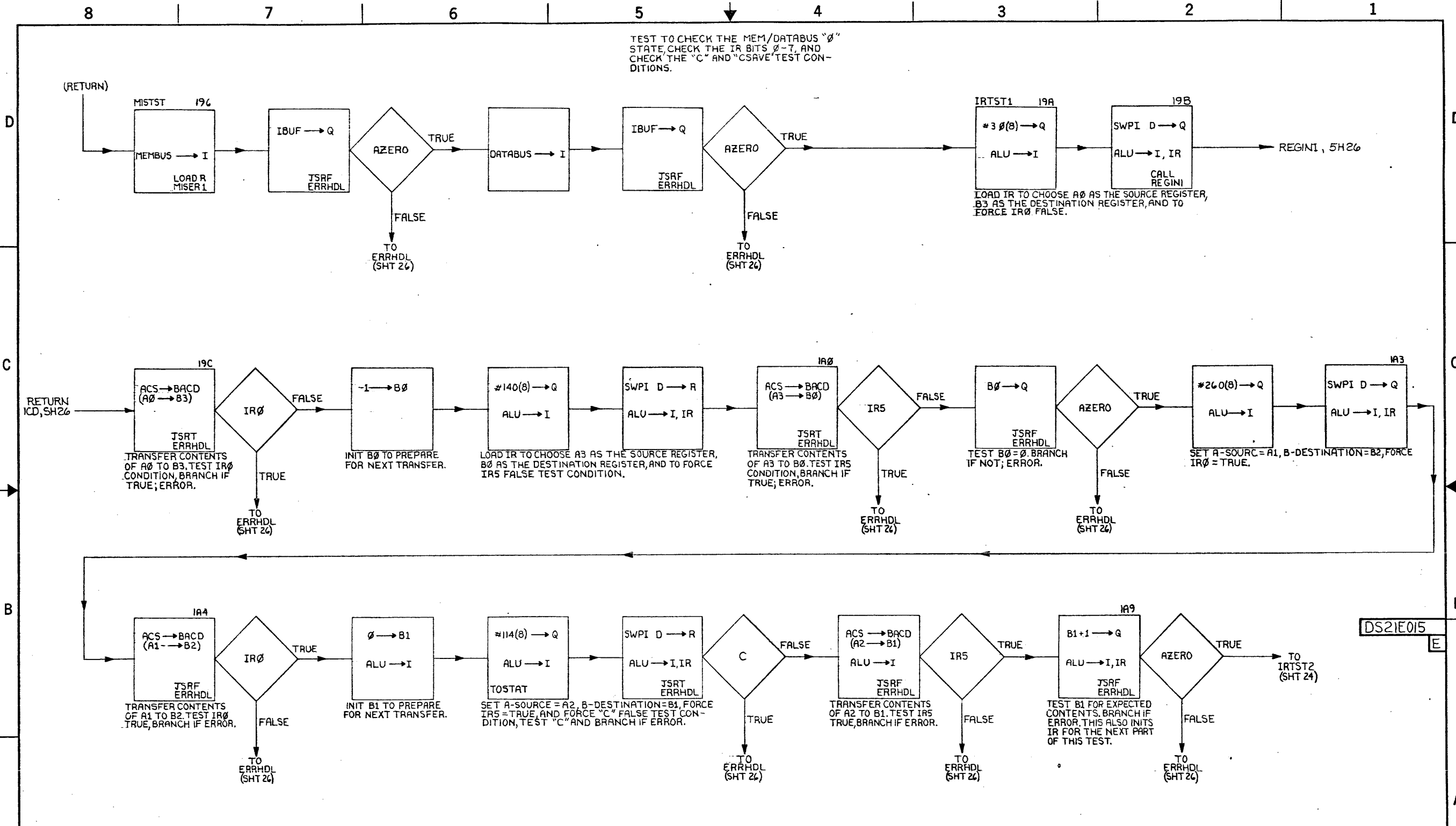


DS21E015

CPU COUNTER SUBTEST

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSON OF COMPUTERVISION CORPORATION.		TOLERANCES			
		DECIMAL			
		.XX ± .01			
		.XXX ± .005			
		.XXXX ± .0010			
		FRACTIONAL ± 1/64			
		ANGULAR ± .0001			
MATERIAL:		DRWD. DAVIDSON 4.78		SEE SHEET 1	
FINISH:		CHK		SYN	
PART NUMBER		NEXT ASSEMBLY		QTY	
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE		SCALE	
REMOVE ALL BURRS AND SHARP EDGES		DATE		NO. DS21E015	
		UNIT		SHEET 22 OF 27 SHEETS	





DS21E015

MISCELLANEOUS TESTS

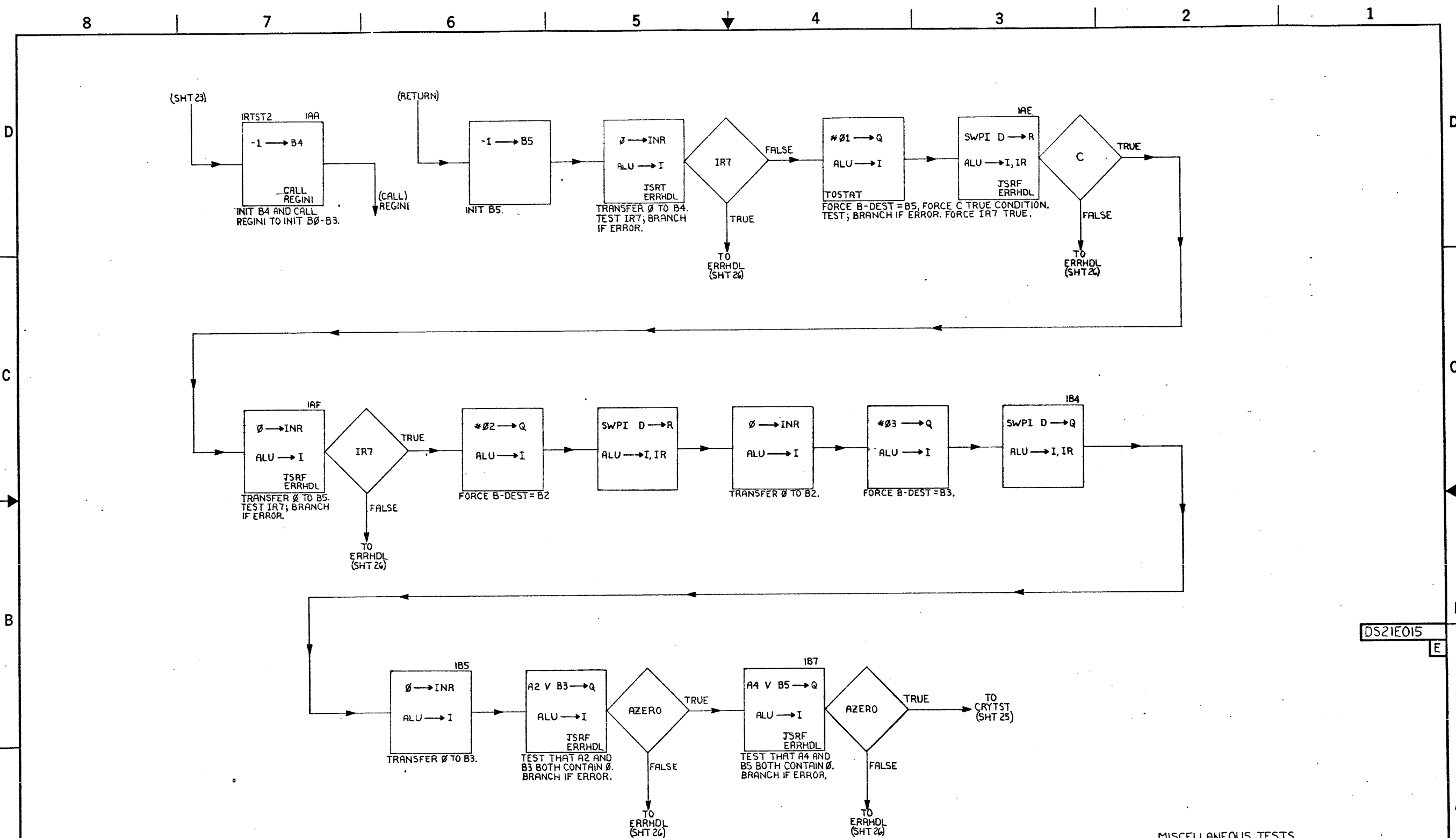
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES	
MATERIAL:		XX	DECIMAL
FINISH:		XXX	± 0.01
PART NUMBER:		XXXX	± 0.005
NEXT ASSEMBLY:		FRACTIONAL	± 1/64
QTY:		ANGULAR	± 30"
COMPUTERVISION CORP.		BRND.DRVIDSON	4-78
201 Burlington Road		CHK	
Bedford, Massachusetts 01730		ENGR	1/2
		PROJ	
		SCALE	NONE
		SIGNATURE	DATE
		REMOVE ALL BURRS AND SHARP EDGES	UNIT WT.

SEE SHEET 1

TITLE: FLOW CHARTS CVP MICROPROGRAM

REV. NO.: DS21E015

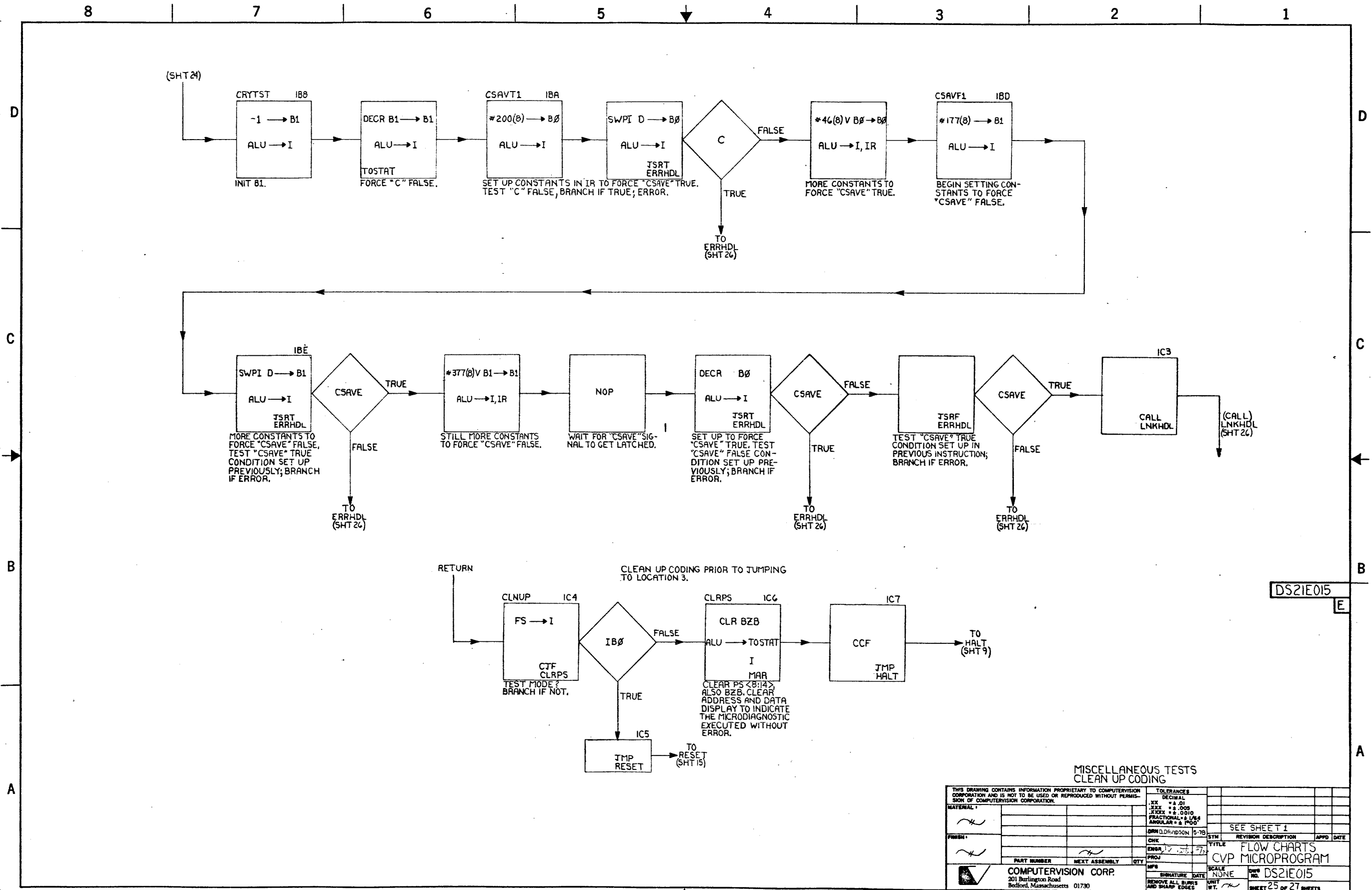
SHEET 23 OF 27 SHEETS



DS21E015

MISCELLANEOUS TESTS

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERSERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERSERVISION CORPORATION.		TOLERANCES			
		DECIMAL			
		.XX ±.01			
		.XXX ±.005			
		.XXXX ±.0010			
		FRACTIONAL ± 1/16"			
		ANGULAR ± 30°			
MATERIAL		DRAWN/DRAWN/SON 5-78		SEE SHEET 1	
FINISH		DATE 7-1-78		SYN REVISION DESCRIPTION APPD DATE	
PART NUMBER		NEXT ASSEMBLY		QTY	
COMPUTERSERVISION CORP.		SCALE NONE		DWS NO. DS21E015	
201 Burlington Road		SIGNATURE DATE		UNIT	
Bedford, Massachusetts 01730		REMOVE ALL BURRS AND SHARP EDGES		SHEET 24 OF 27 SHEETS	

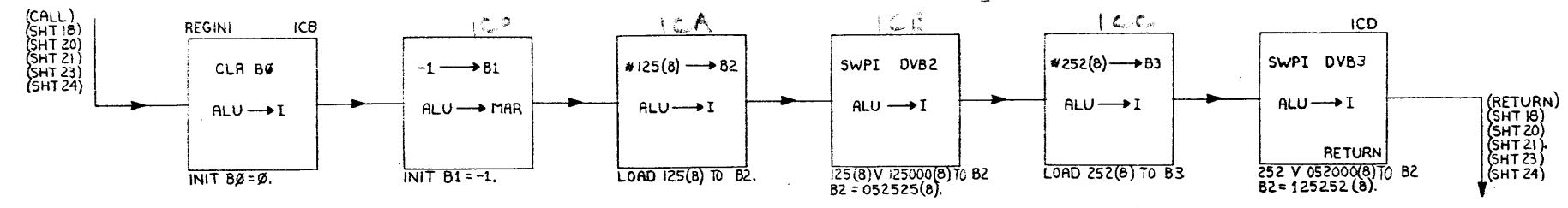


DS21E015

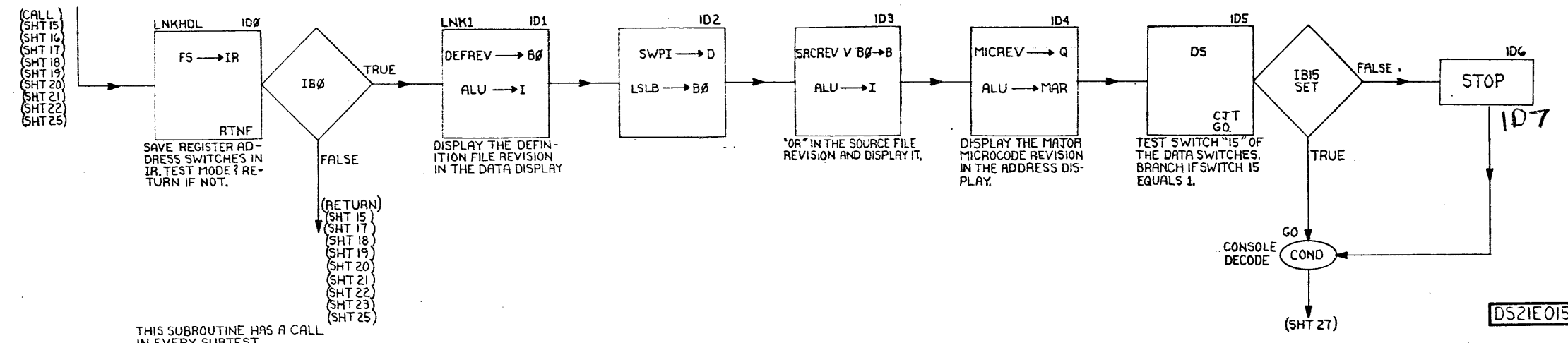
TOLERANCES		SYMBOL	
.XX	DECIMAL		
.XXX	+ .01		
.XXX	+ .005		
.XXX	+ .0010		
FRACTIONAL	+ .004		
ANGULAR	+ .000		
MATERIAL:		SEE SHEET 1	
FINISH:		TITLE	
DRAWN: DAVIDSON 5-78		REVISION DESCRIPTION	
CHK:		APPRO DATE	
ENGR: [Signature]		SYM	
PROJ:		SCALE	
PART NUMBER		SCALE NONE	
NEXT ASSEMBLY		DWN NO. DS21E015	
MFG:		SIGNATURE DATE	
COMPUTERVISION CORP.		REMOVE ALL BURS AND SHARP EDGES	
201 Burlington Road		UNIT	
Bedford, Massachusetts 01730		SHEET 25 OF 27 SHEETS	

DIAGNOSTIC SUBROUTINES

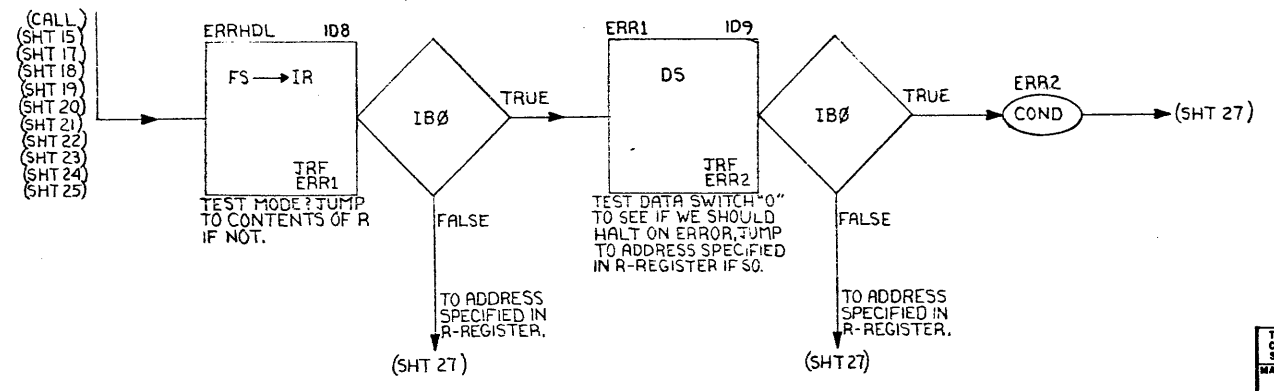
SUBROUTINE TO INITIALIZE ALU REGISTERS B0 THRU B3.



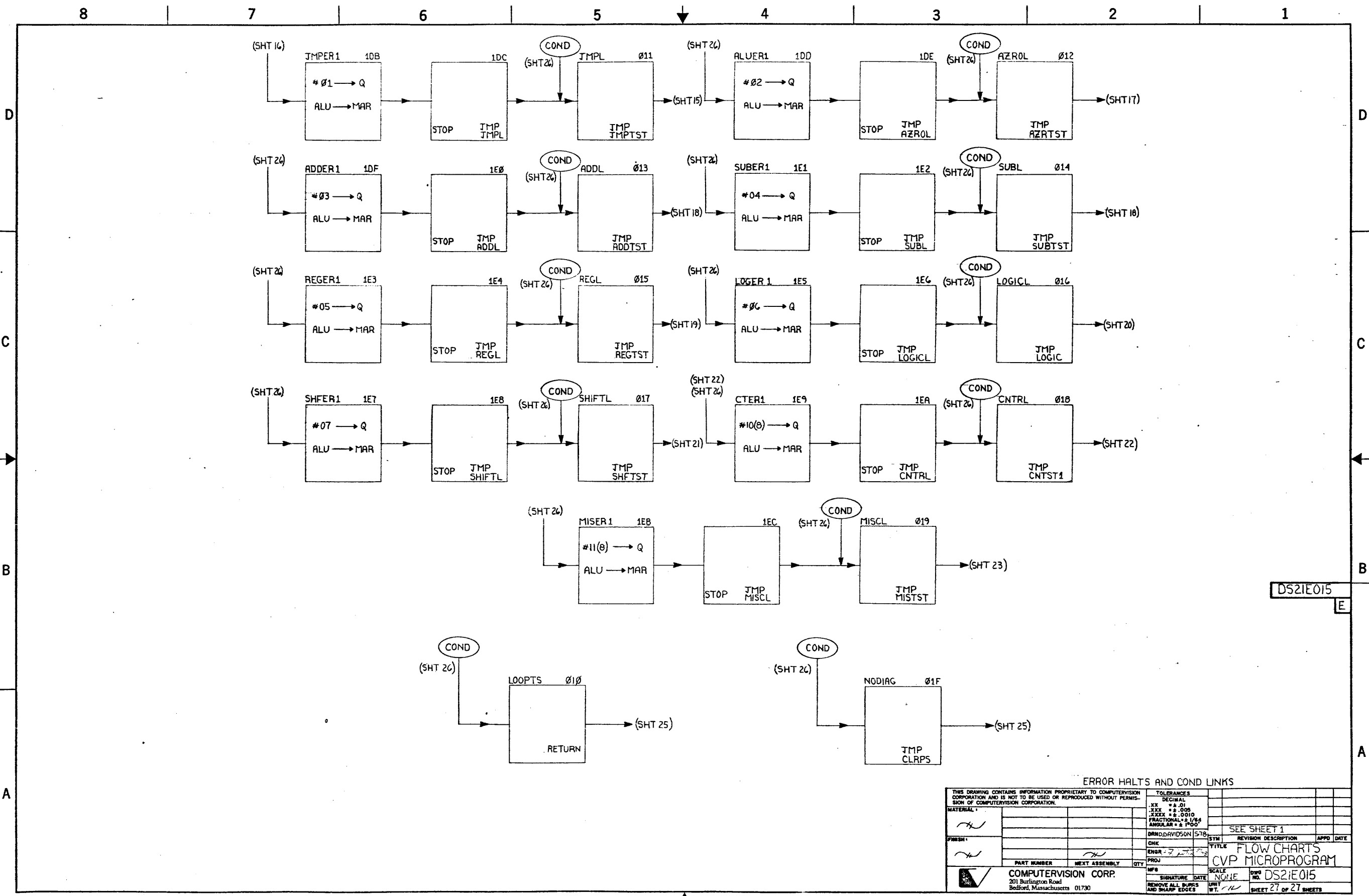
THIS SUBROUTINE HAS A CALL AT THE END OF EVERY SUBTEST.



THIS SUBROUTINE HAS A CALL IN EVERY SUBTEST.



DIAGNOSTIC SUBROUTINE				TOLERANCES	
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVERSION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVERSION CORPORATION.				DECIMAL	
MATERIAL:				.XX	= .01
				.XXX	= .005
				.XXXX	= .0010
				FRACTIONAL	= 1/64
				ANGULAR	= 30°
DRAWN: DAVIDSON 15-78				CHK	SEE SHEET 1
ENGR: [Signature]				APP'D	DATE
PART NUMBER				SCALE	
NEXT ASSEMBLY				SCALE	NONE
QTY				SHEET	NO. DS21E015
COMPUTERVERSION CORP.				SHEET	26 OF 27 SHEETS
201 Burlington Road				WT.	
Bedford, Massachusetts 01730					



DS21E015  
E

ERROR HALTS AND COND LINKS

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES	
		DECIMAL	
		.XX ± .01	
		.XXX ± .005	
		.XXXX ± .0010	
		FRACTIONAL ± 1/64	
		ANGULAR ± 1'00"	
MATERIAL		DRWD:DAVIDSON	578
FRESH		CHK	
		ENGR	
		PROJ	
PART NUMBER	NEXT ASSEMBLY	QTY	
COMPUTERVISION CORP.		SCALE	NONE
201 Burlington Road		DWG NO.	DS21E015
Bedford, Massachusetts 01730		SHEET	27 OF 27 SHEETS

**128/32K A/B-Port Memory Unit  
DS21E252**

	<u>Sheet No.</u>
Address Selection	1
Jumper Configuration	1
Memory Prioritizing	2
Refresh and Timing Logic	2
Data In Multiplexer	3
Data Out Latch	3
Parity Logic	3
Bus Control Logic	4
Bus Logic	5
Memory Address Logic	5
A-Port/B-Port Select Logic	6
Address Multiplexer Logic	6
Refresh Counter Logic	6
Row Address Strobe Clock	6
I/O Logic	7
Memory Row A	8
Memory Row B	9
Memory Row C	10
Memory Row D	11
Memory Row E	12
Memory Row F	13
Memory Row G	14
Memory Row H	15
B-Port Connectors	16

*1P2 on page 3-2  
CSP100 Technical*

DA21E250-X CONFIGURATION TABLE

	SINGLE PORT	DUAL PORT, DISTRIBUTED MODE	DUAL PORT, GPU MODE	SINGLE PORT 32K
POPULATED WITH 4K RAMS (MK 4027-3)	USE CONFIGURATION BLOCKS A,A1,B	USE CONFIGURATION BLOCKS A,A1,C,D,E	USE CONFIGURATION BLOCKS A,C,D,E	
POPULATED WITH 16K RAMS (MK 4116-3)	DA21E250-02 USE CONFIGURATION BLOCKS B,F	DA21E250-01 USE CONFIGURATION BLOCKS D,E,F,G	DA21E250-01 USE CONFIGURATION BLOCKS E,F,H	DA21E250-03 USE CONFIGURATION BLOCKS A1,I

CONFIGURATION BLOCK A) 32K HARDWARE CONFIGURATION (USING 4K RAMS)

- 1) REMOVE R22
- 2) ADJUST POT R31 SUCH THAT TP HAS A 29 UJS REP RATE
- 3) INSERT JUMPERS: JP9-2, JP11-2, JP13-2
- 4) POPULATE MEMORY ARRAY WITH MK4027-3 MEMORY CHIPS

CONFIGURATION BLOCK A1) APORT 32K ADDRESSING CHART

*APORT FIELD	AMCO	AMC1	AMC2	AMC3	**CLOSED CONTACTS ON SWITCH PACK IV
0	H	H	H	H	8
1	H	H	H	L	7,8
2	H	H	L	H	6,8
3	H	H	L	L	6,7,8
4	H	L	H	H	5,8
5	H	L	H	L	5,7,8
6	H	L	L	H	5,6,8
7	H	L	L	L	5,6,7,8
8	L	H	H	H	4,8
9	L	H	H	L	4,7,8
10	L	H	L	H	4,6,8
11	L	H	L	L	4,6,7,8
12	L	L	H	H	4,5,8
13	L	L	H	L	4,5,7,8
14	L	L	L	H	4,5,6,8
15	L	L	L	L	4,5,6,7,8

\* EACH FIELD NO. REPRESENTS ONE 32K SEGMENT OF MEMORY  
 \*\* ALL OTHER CONTACTS ON SWITCH PACK IV OPEN

CONFIGURATION BLOCK B) SINGLEPORT CONFIGURATION

- 1) DEPOPULATE PC BOARD AS PER BM21E250-02
- 2) ADD JUMPERS JP3, JP5, JP7

CONFIGURATION BLOCK C) BPORT 32K MEMORY ROW SELECT

- 1) INSERT JUMPERS: JP10-2, JP12-2, JP14-2

CONFIGURATION BLOCK D) BPORT 32K ADDRESSING AND I/O DEVICE CODE CHART

*BPORT FIELD OR I/O DEVICE CODE	BMC0 OR BDS0	BMC1 OR BDS1	BMC2 OR BDS2	BMC3 OR BDS3	**CLOSED CONTACTS ON SWITCH PACK 12S
0	H	H	H	H	6
1	H	H	H	L	4,6
2	H	H	L	H	3,6
3	H	H	L	L	3,4,6
4	H	L	H	H	2,6
5	H	L	H	L	2,4,6
6	H	L	L	H	2,3,6
7	H	L	L	L	2,3,4,6
8	L	H	H	H	1,6
9	L	H	H	L	1,4,6
10	L	H	L	H	1,3,6
11	L	H	L	L	1,3,4,6
12	L	L	H	H	1,2,6
13	L	L	H	L	1,2,4,6
14	L	L	L	H	1,2,3,6
15	L	L	L	L	1,2,3,4,6

\* EACH FIELD NO. REPRESENTS ONE 32K SEGMENT OF MEMORY  
 \*\* ALL OTHER CONTACTS ON SWITCH PACK 12S AND 9C OPEN

CONFIGURATION BLOCK E) LAST BOARD IN DAISY CHAIN

THE LAST DUAL PORT MEMORY BOARD IN A DAISY CHAIN MUST TERMINATE BPORT BUS SIGNALS. THE LAST DUAL PORT MEMORY IN A DAISY CHAIN ONLY MUST HAVE THE FOLLOWING RESISTORS: RP6,RP7,RP8, RP12, RES PACK 12F

CONFIGURATION BLOCK F) 128K HARDWARE CONFIGURATION/APORT 128K ADDRESSING M

- 1) R20 AND R22 INSERTED
- 2) INSERT JIMPER JP4
- 3) ADJUST POT R31 SUCH THAT TP HAS A 14.5 UJS REP RATE
- 4) INSERT JUMPERS JP9, JP11, JP13
- 5) POPULATE MEMORY ARRAY WITH MK4116-3 MEMORY CHIPS
- 6) APORT 128K ADDRESSING CHART

*APORT FIELD NO.	AMCO	AMC1	AMC2	AMC3	AMC3	**CLOSED CONTACTS ON SWITCH PACK IV
0,1,2,3	H	H	H	H	H	
4,5,6,7	H	H	H	H	L	5
8,9,10,11	H	H	H	L	H	4
12,13,14,15	H	H	H	L	L	4,5
16,17,18,19	H	H	L	H	H	3
20,21,22,23	H	H	L	H	L	3,5
24,25,26,27	H	H	L	L	H	3,4
28,29,30,31	H	H	L	L	L	3,4,5
32,33,34,35	H	L	H	H	H	2
36,37,38,39	H	L	H	H	L	2,5
40,41,42,43	H	L	H	L	H	2,4
44,45,46,47	H	L	H	L	L	2,4,5
48,49,50,51	H	L	L	H	H	2,3
52,53,54,55	H	L	L	H	L	2,3,5
56,57,58,59	H	L	L	L	H	2,3,4
60,61,62,63	H	L	L	L	L	2,3,4,5
64,65,66,67	L	H	H	H	H	1
68,69,70,71	L	H	H	H	L	1,5
72,73,74,75	L	H	H	L	H	1,4
76,77,78,79	L	H	H	L	L	1,4,5
80,81,82,83	L	H	L	H	H	1,3
84,85,86,87	L	H	L	H	L	1,3,5
88,89,90,91	L	H	L	L	H	1,3,4
92,93,94,95	L	H	L	L	L	1,3,4,5
96,97,98,99	L	L	H	H	H	1,2
100,101,102,103	L	L	H	H	L	1,2,5
104,105,106,107	L	L	H	L	H	1,2,4
108,109,110,111	L	L	H	L	L	1,2,4,5
112,113,114,115	L	L	L	H	H	1,2,3
116,117,118,119	L	L	L	H	L	1,2,3,5
120,121,122,123	L	L	L	L	H	1,2,3,4
124,125,126,127	L	L	L	L	L	1,2,3,4,5

\* EACH FIELD NO. REPRESENTS ONE 32K SEGMENT OF MEMORY (TO EXPAND BEYOND 15 FIELDS, IC 2X AND 2V, SHT.7, MUST BE ADDED)  
 \*\* ALL OTHER SWITCH CONTACTS ON SWITCH IV ARE OPEN

CONFIGURATION BLOCK G) 128K APORT/32K BPORT COMMON MEMORY

WITH JUMPERS JP10, JP12, JP14, INSERTED

BMC2	BMC3	COMMON SEGMENT OF APORT 128K MEMORY
H	H	1ST 32K
H	L	2ND 32K
L	H	3RD 32K
L	L	4TH 32K

- 2) TO FORCE COMMON APORT/BPORT MEMORY INDEPENDENT OF BMC2 AND BMC3

BMC2	BMC3	COMMON SEGMENT OF APORT 128K MEMORY	JUMPERS INSERTED
X	X	1ST 32K	JP10, JP15, JP18
X	X	2ND 32K	JP10, JP18
X	X	3RD 32K	JP10, JP15
X	X	4TH 32K	JP10

WHERE X = DONT CARE

CONFIGURATION BLOCK H) BPORT 128K ADDRESSING CONFIGURATION

- 1) INSERT JUMPERS JP10, JP12, JP14
- 2) BPORT 128K ADDRESSING CHART

BPORT FIELD NO.	BMAD0	BMAD1	BMAD2	BMC0	BMC1	**CLOSED CONTACTS ON SWITCH PACKS
						9C 12S
0,1,2,3	H	H	H	H	H	8
4,5,6,7	H	H	H	H	L	2,8
8,9,10,11	H	H	H	L	H	1,8
12,13,14,15	H	H	H	L	L	1,2,8
16,17,18,19	H	H	L	H	H	7,8
20,21,22,23	H	H	L	H	L	7,2,8
24,25,26,27	H	H	L	L	H	7,1,8
28,29,30,31	H	H	L	L	L	7,1,2,8
32,33,34,35	H	L	H	H	H	6,8
36,37,38,39	H	L	H	H	L	6,2,8
40,41,42,43	H	L	H	L	H	6,1,8
44,45,46,47	H	L	H	L	L	6,1,2,8
48,49,50,51	H	L	L	H	H	6,7,8
52,53,54,55	H	L	L	H	L	6,7,2,8
56,57,58,59	H	L	L	L	H	6,7,1,8
60,61,62,63	H	L	L	L	L	6,7,1,2,8
64,65,66,67	L	H	H	H	H	5,8
68,69,70,71	L	H	H	H	L	5,2,8
72,73,74,75	L	H	H	L	H	5,1,8
76,77,78,79	L	H	H	L	L	5,1,2,8
80,81,82,83	L	H	L	H	H	5,7,8
84,85,86,87	L	H	L	H	L	5,7,2,8
88,89,90,91	L	H	L	L	H	5,7,1,8
92,93,94,95	L	H	L	L	L	5,7,1,2,8
96,97,98,99	L	L	H	H	H	5,6,8
100,101,102,103	L	L	H	H	L	5,6,2,8
104,105,106,107	L	L	H	L	H	5,6,1,8
108,109,110,111	L	L	H	L	L	5,6,1,2,8
112,113,114,115	L	L	L	H	H	5,6,7,8
116,117,118,119	L	L	L	H	L	5,6,7,2,8
120,121,122,123	L	L	L	L	H	5,6,7,1,8
124,125,126,127	L	L	L	L	L	5,6,7,1,2,8

EACH FIELD NO. REPRESENTS ONE 32K SEGMENT OF MEMORY  
 ALL OTHER CONTACTS ON SWITCH PACK 12S AND 9C OPEN  
 (9C-2 MAY BE CLOSED TO DISABLE APORT)

CONFIGURATION BLOCK I) 32K SINGLE PORT CONFIGURATION (USING 16K RAMS)

- 1) DEPOPULATE BOARDS AS PER ASSEMBLY DA21E250-03

MISCELLANEOUS JUMPERS

- 1) FOR LDMAR STARTING APORT MEMORY CYCLE INSERT JP-2
- 2) FOR MEMREAD STARTING APORT MEMORY CYCLE INSERT JP-1
- 3) FOR GPU MODE REQUIRING DISABLED APORT, CLOSE SWITCH 9C-2
- 4) APORT MUC/NON MUC OPERATION

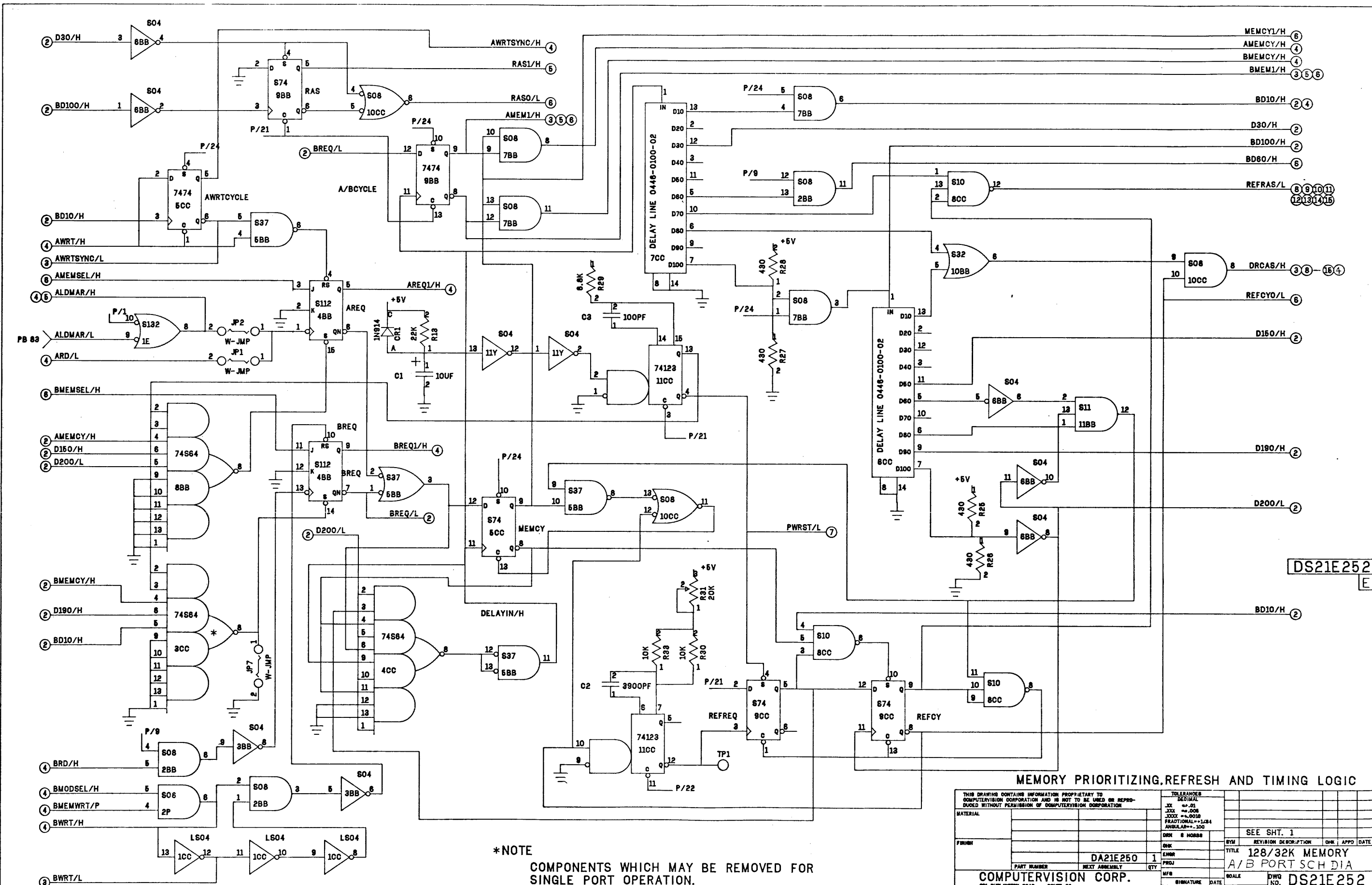
JUMPER PLUG 4D	
MUC OPERATION	1-16 2-15 3-14 4-13
NON MUC OPERATION	5-12 6-11 7-10 8-9

- 5) APORT I/O DEVICE CODE

- 1) STANDARD 24, INSERT JP8 FOR 25,

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MATERIAL		DNR 6 HOBBS		D ECO 33.8	
PART NO.		DA21E250		TITLE 128/32K MEMORY	
PART NUMBER		NEXT APPROVAL		REV. DESCRIPTION	
COMPUTERVERSION CORP.		SIGNATURE		DATE	
300 BURLINGTON ROAD		ROUTE 92		DWG NO. DS21E252	
BEDFORD, MASS. 01730		UNIT		SHT 1 OF 16 SHTS	

DS21E252  
E



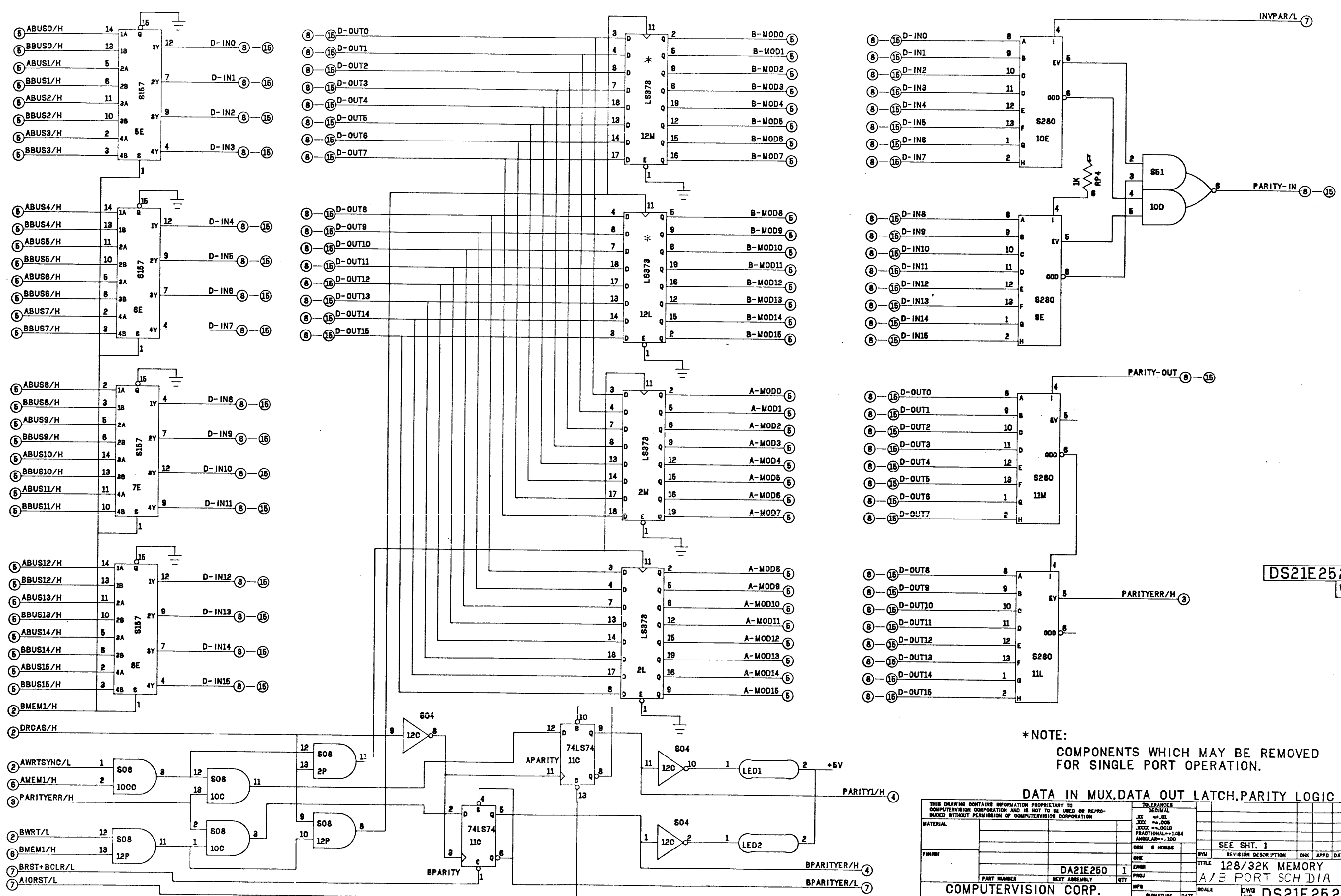
DS21E252  
E

\*NOTE  
COMPONENTS WHICH MAY BE REMOVED FOR  
SINGLE PORT OPERATION.

MEMORY PRIORITIZING, REFRESH AND TIMING LOGIC

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		XX .01			
		XXX .008			
		XXXX .0025			
		FRACTIONAL=1/64			
		ANGULAR=1.00			
		SEE SHT. 1			
PART NUMBER		DA21E250	1	REV. DESCRIPTION	CHK. / APPD. DATE
NEXT ASSEMBLY				TITLE	128/32K MEMORY
QTY				PROJECT	A/B PORT SCH DIA
COMPUTERVISION CORP.				SCALE	DWG NO. DS21E252
801 BURLINGTON ROAD ROUTE 62 BEDFORD, MASS. 01730				SIGNATURE DATE	UNIT WT.
				REMOVE ALL BUBBLES AND BLANK EDGES	SHT 2 OF 1+ SHTS

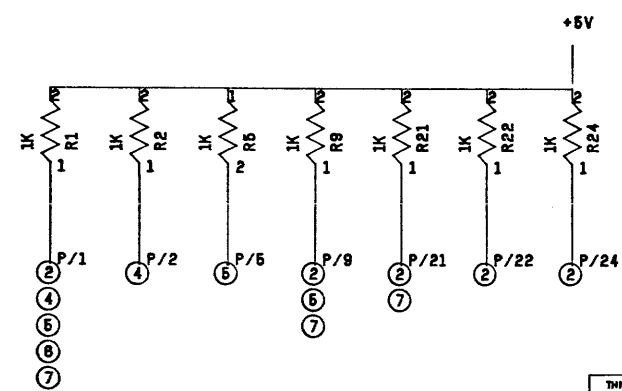
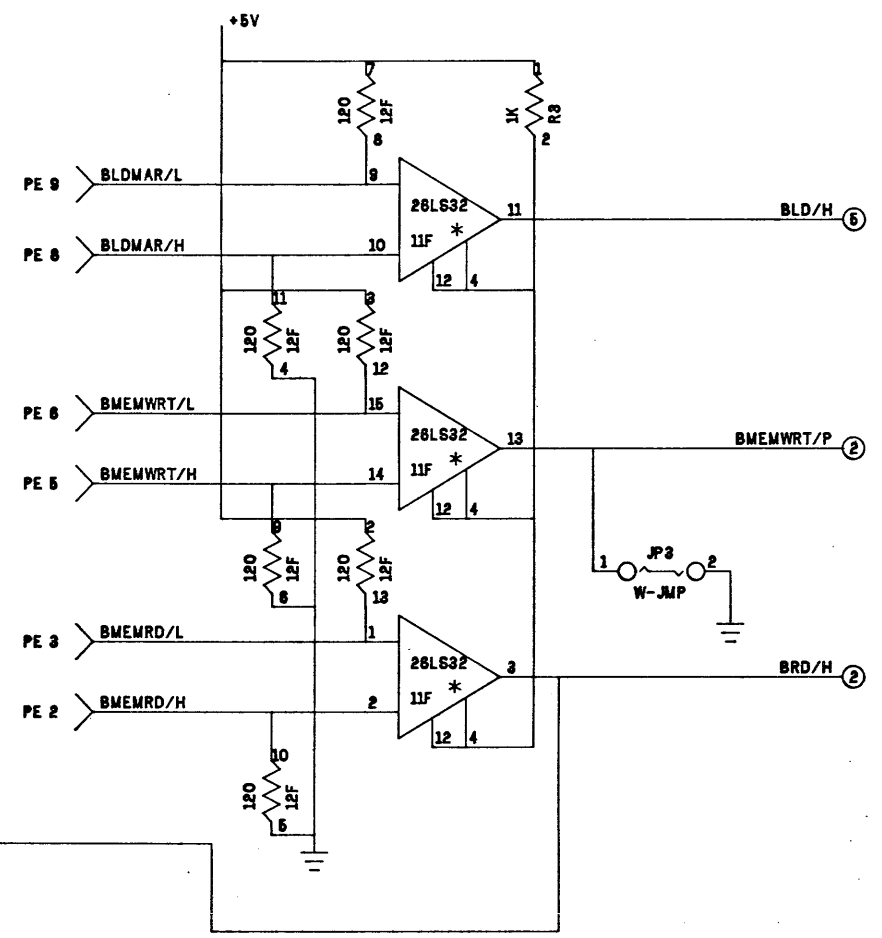
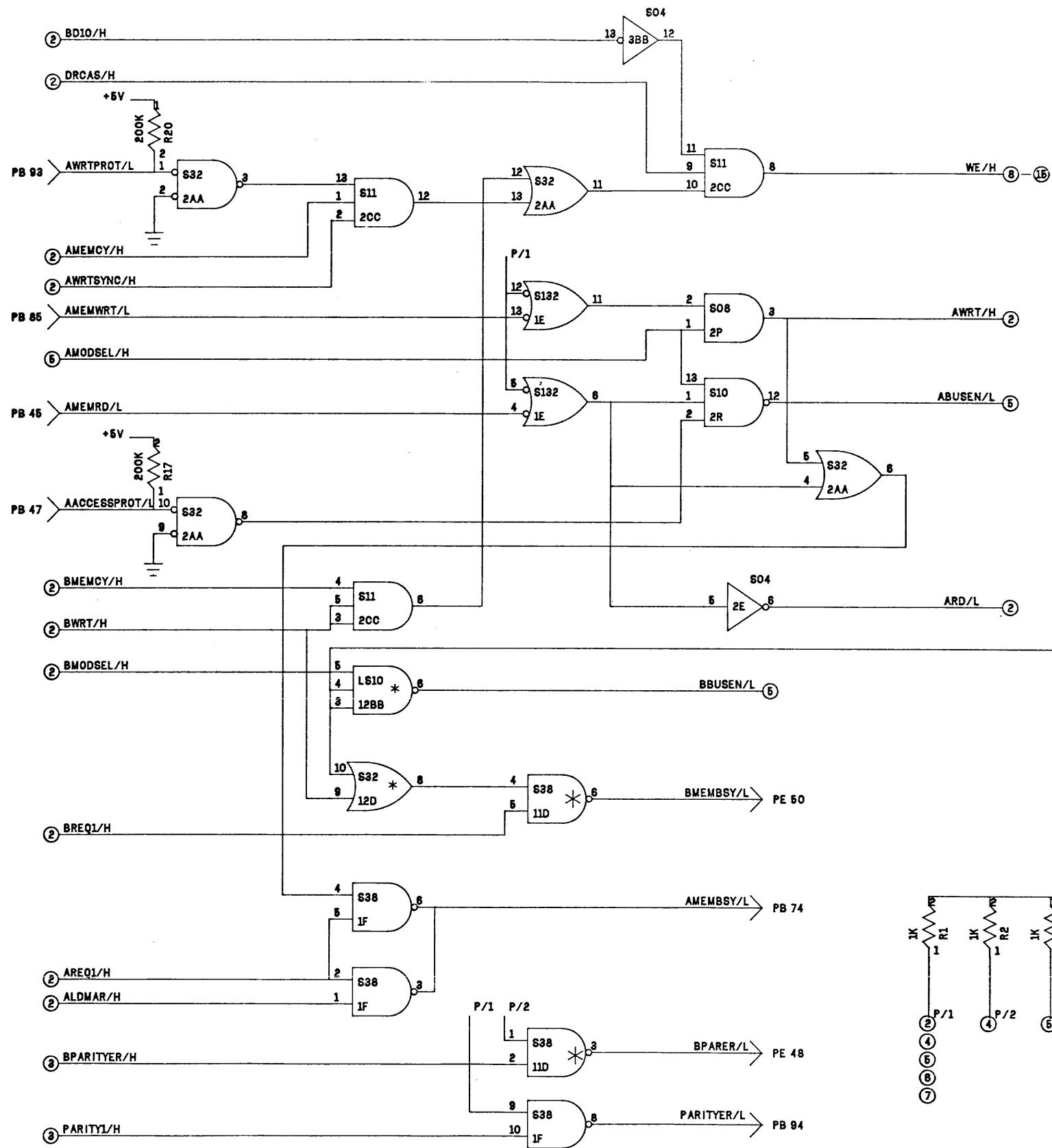




\* NOTE:  
COMPONENTS WHICH MAY BE REMOVED  
FOR SINGLE PORT OPERATION.

DATA IN MUX, DATA OUT LATCH, PARITY LOGIC

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTEVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTEVISION CORPORATION.		TOLERANCES UNLESS OTHERWISE SPECIFIED	
MATERIAL		XX .05 XXX .005 XXXX .0010 FRACTIONAL .001/64 ANGULAR .100	
FINISH		DRN 8 HOBBS	
PART NUMBER		DA21E250 1	
NEXT ASSEMBLY		QTY	
COMPUTEVISION CORP. 301 BURLINGTON ROAD ROUTE 62 BEDFORD, MASS. 01730		SIGNATURE DATE	
SCALE		DWG NO. DS21E252	
REMOVE ALL BURRS AND SHARP EDGES		UNIT WT.	
		SEE SHT. 1	
		TITLE 128/32K MEMORY A/B PORT SCH DIA	
		SHT 3 OF 16 SHTS	

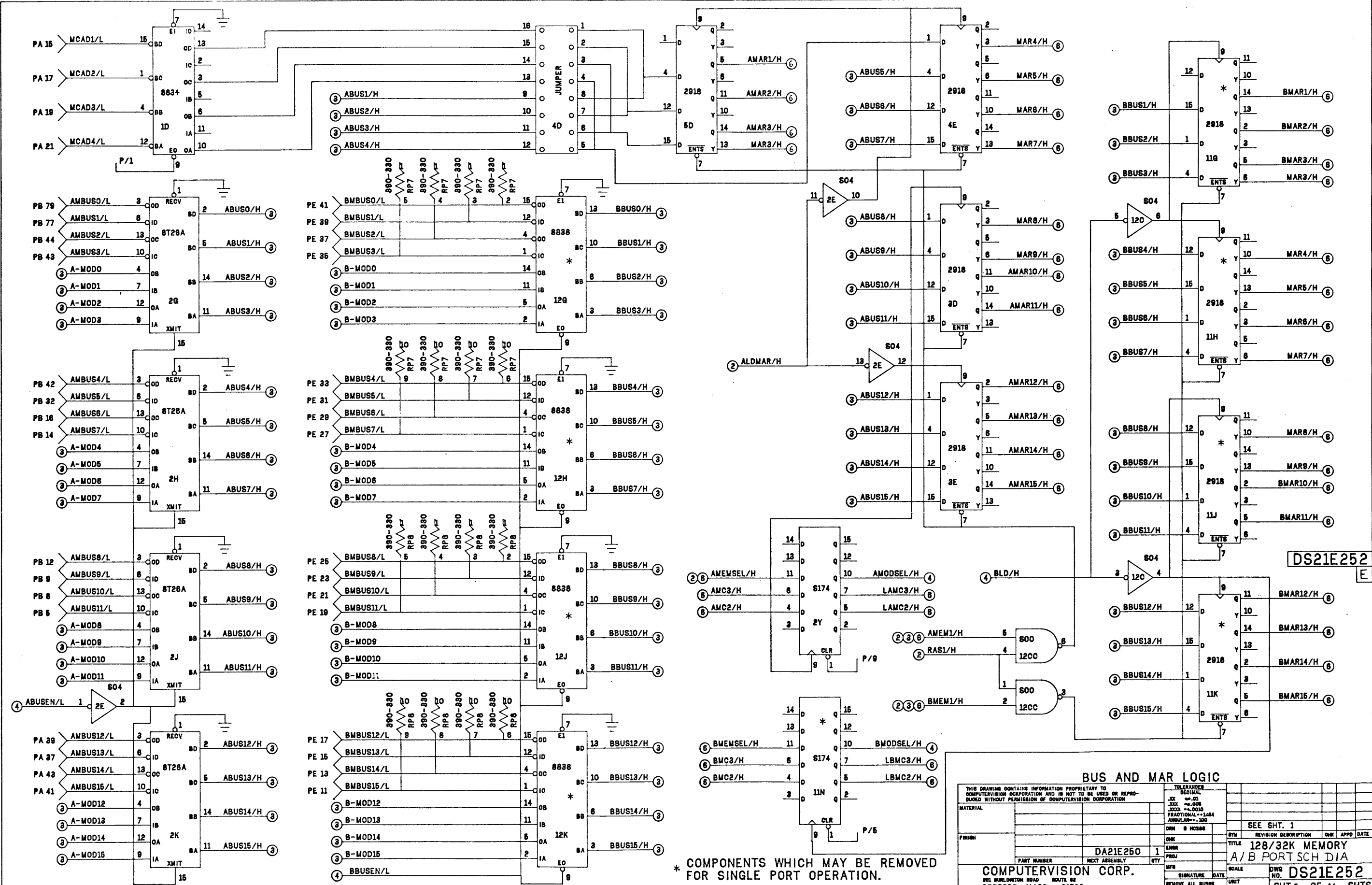


\*NOTE:  
COMPONENTS WHICH MAY BE REMOVED  
FOR SINGLE PORT OPERATION.

DS21E252  
E

BUS CONTROL LOGIC

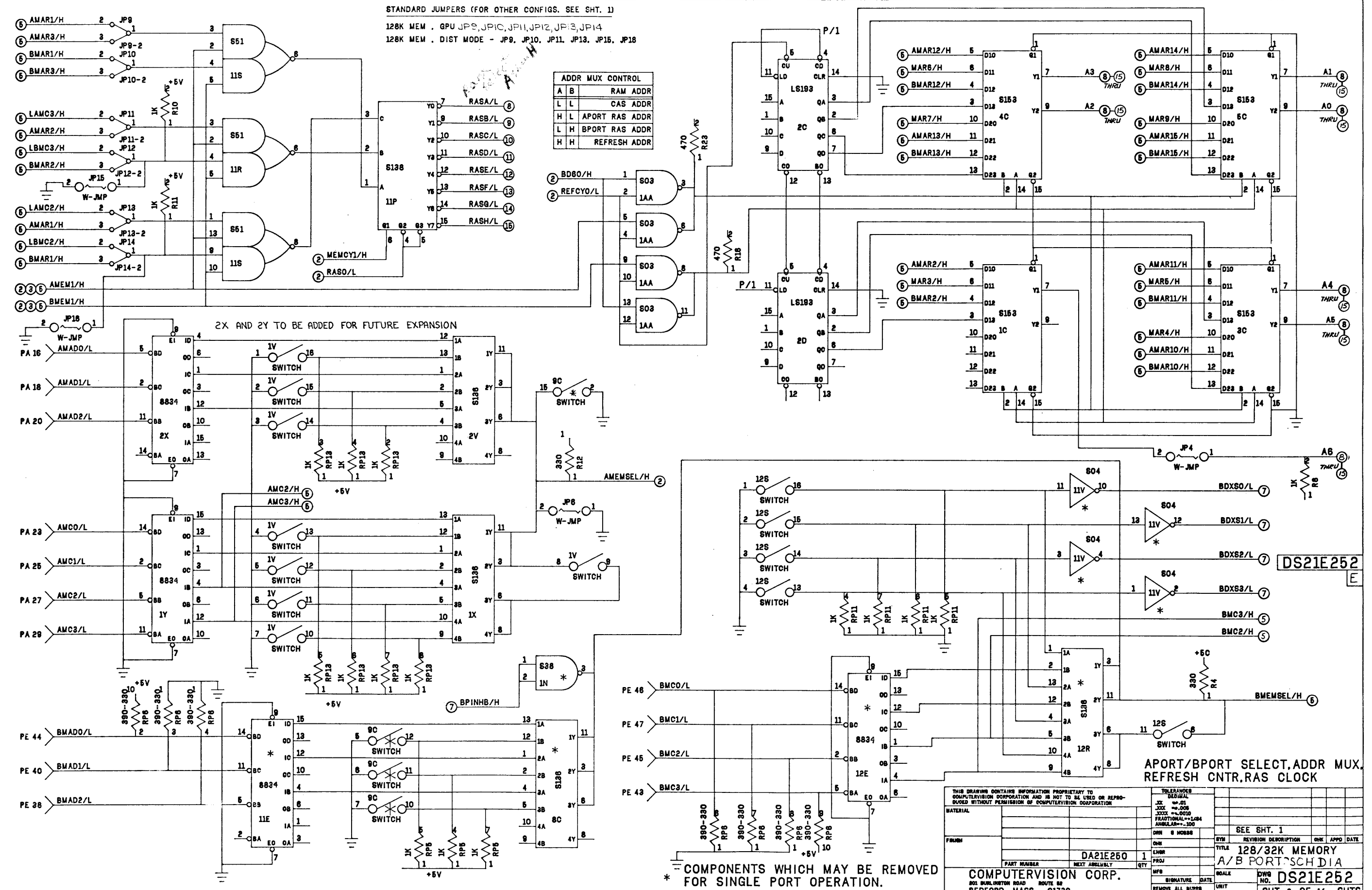
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES DECIMAL XX .01 XXX .005 XXXX .0010 FRACTIONAL--1/64 ANGULAR--100	
MATERIAL		DRN #	HOBS
FINISH		DRN	
PART NUMBER	DA21E250	ENGR	
	1	PROJ	
		QTY	
COMPUTERVISION CORP. 201 BURLINGTON ROAD ROUTE 62 BEDFORD, MASS. 01780		SCALE	DWG NO. DS21E252
		SIGNATURE	DATE
		UNIT	WT.
		SEE SHT. 1	
		TITLE 128/32K MEMORY A/B PORT SCH D1A	
		SHT 4 OF 16 SHTS	



\* COMPONENTS WHICH MAY BE REMOVED FOR SINGLE PORT OPERATION.

BUS AND MAR LOGIC			
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION			
TOLERANCES UNLESS OTHERWISE SPECIFIED		DIMENSIONS IN INCHES	
XXX	±.01	XXX	±.005
XXXX	±.005	XXXX	±.001
XXXXX	±.001	XXXXX	±.0005
FRACTIONAL--1/64		ANGULAR--1/32	
MATERIAL		FINISH	
DA21E250		SEE SHT. 1	
PART NUMBER		REV. NO.	
DA21E250		1	
NEXT ASSEMBLY		QTY	
COMPUTERVISION CORP.		TITLE	
801 BURLINGTON ROAD		128/32K MEMORY	
BEDFORD, MASS. 01730		A/B PORT SCH DIA	
SIGNATURE		DATE	
SCALE		DWG NO.	
REMOVE ALL BURRS AND SHARP EDGES		UNIT	
WT.		SHT 5 OF 16 SHTS	

DS21E252  
E



THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION

TOLERANCES	DECIMAL		
.XX	= .01		
.XXX	= .005		
.XXXX	= .0010		
FRACTIONAL	= 1/64		
ANGLES	= 1/32		
DWG NO.	DA21E250	REV	1
DATE		BY	
SIGNATURE		DATE	
REMOVE ALL DIMS AND SHARP EDGES		UNIT	

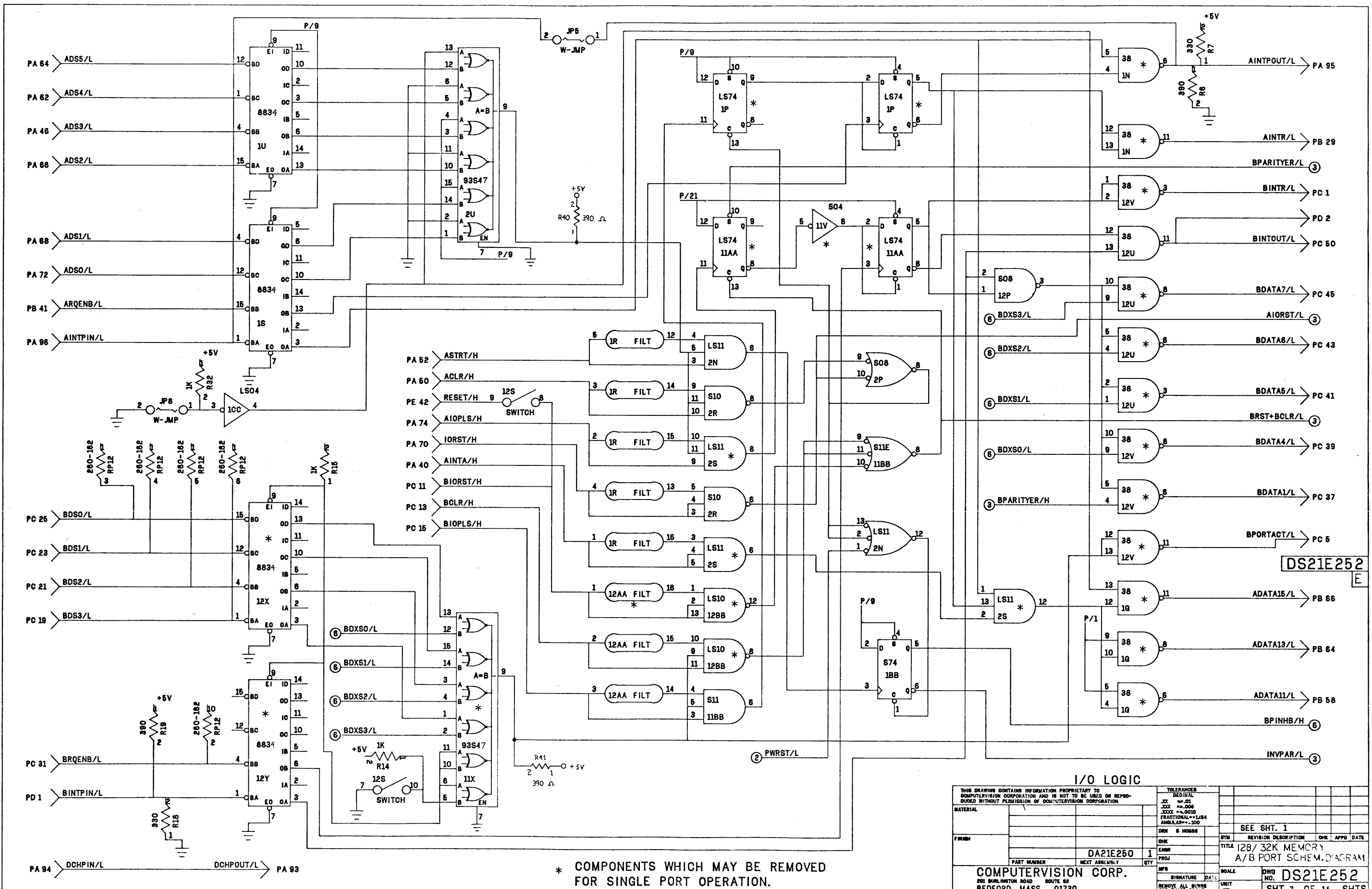
SEE SHT. 1

TITLE: 128/32K MEMORY A/B PORT SCHEDIA

SCALE: DS21E252

SHT 6 OF 16 SHTS

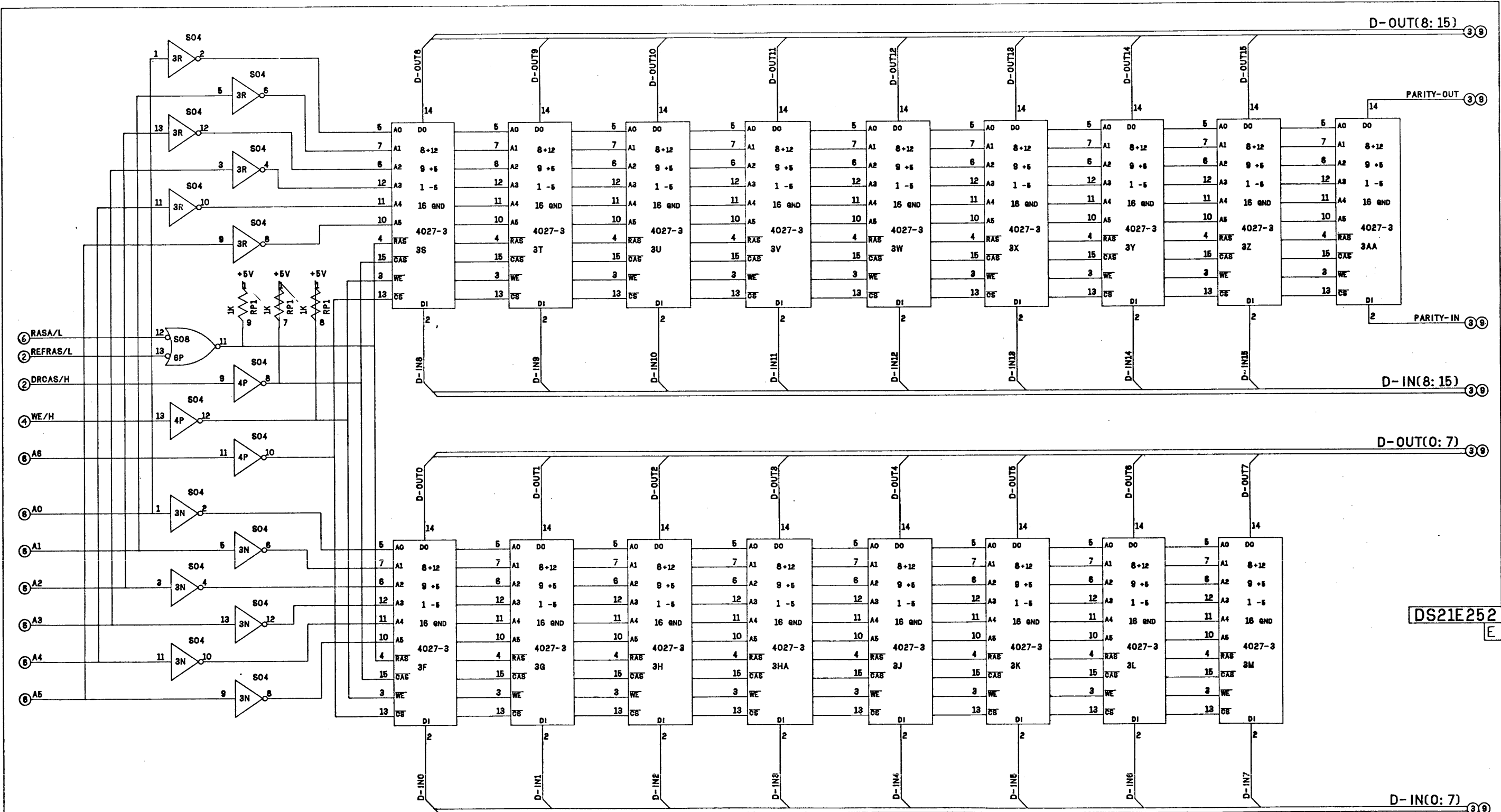
COMPUTERVISION CORP.  
 301 BURLINGTON ROAD ROUTE 88  
 BEDFORD, MASS. 01730



\* COMPONENTS WHICH MAY BE REMOVED FOR SINGLE PORT OPERATION.

I/O LOGIC

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES			
MATERIAL		DECIMAL			
		.XX		±.01	
		.XXX		±.005	
		FRACTIONAL		±.001	
		ANGULAR		±.100	
FINISH		CHK		DEN & HOBBS	
		CHK		BYN	
		ENGR		REV	
		PROJ		APP	
PART NUMBER		NEXT ASSEMBLY		QTY	
DA21E250				1	
COMPUTERVISION CORP.				SCALE	
201 BURLINGTON ROAD ROUTE 62				DWG NO.	
BEDFORD, MASS. 01730				DS21E252	
				UNIT	
				SHT 7 OF 14 SHTS	

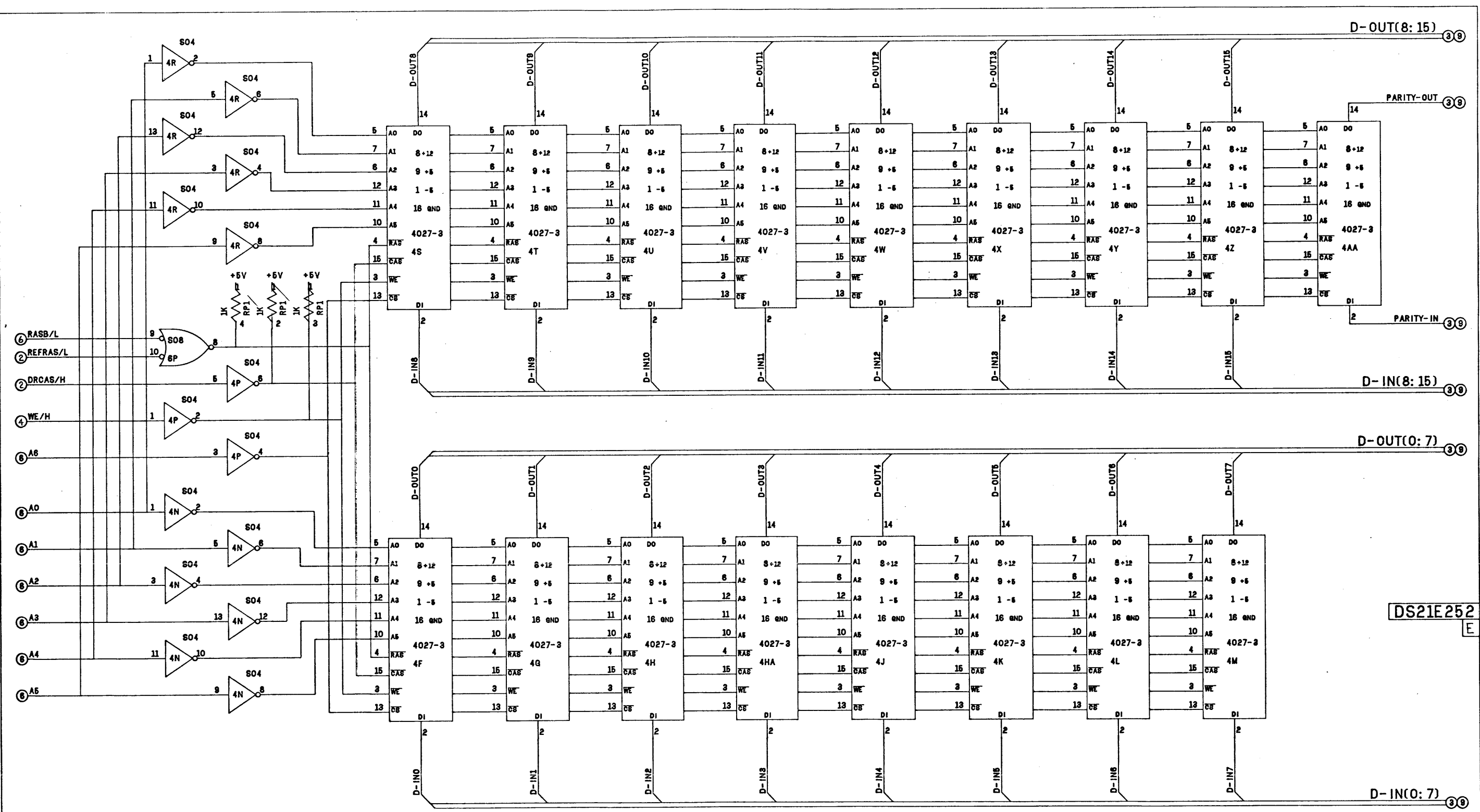


MEMORY CHIPS 3S THRU 3AA  
AND 3F THRU 3M MAY BE  
EITHER ALL 4027-3 OR  
4116-3 PARTS

*01 125 1000*  
*10/24/78*

DS21E252  
E

COMPUTERVISION CORP.				MEMORY ROW A			
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION				TOLERANCES DECIMAL XX .XX XXX .XXX XXXX .XXXX FRACTIONAL=1/64 ANGLES=30			
MATERIAL				DEN	8 HOBBS	BY	REVISION DESCRIPTION
FINISH				ENGR		DATE	APPRO DATE
PART NUMBER	DA21E250	1		PROJ			
COMPUTERVISION CORP.				DWG NO. DS21E252			
201 BURLINGTON ROAD ROUTE 88 BEDFORD, MASS. 01730				REMOVE ALL BURRS AND SHARP EDGES			
				UNIT WT.			
				SHT 8 OF 16 SHTS			



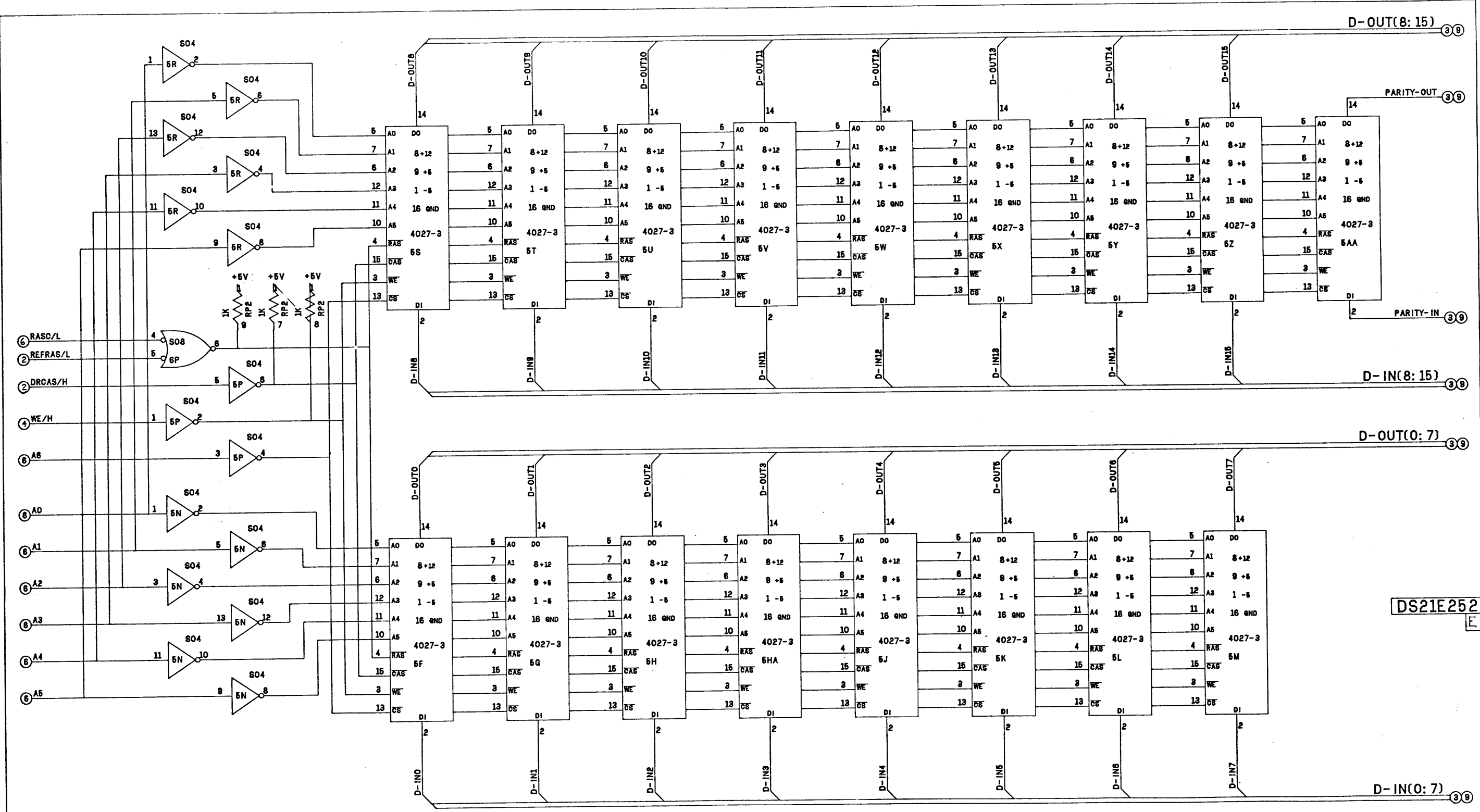
- ⑥ RASB/L
- ② REFRAS/L
- ② DRCS/H
- ④ WE/H
- ⑥ A6
- ⑥ A0
- ⑥ A1
- ⑥ A2
- ⑥ A3
- ⑥ A4
- ⑥ A5

MEMORY CHIPS 4S THRU 4A  
AND 4F THRU 4M MAY BE  
EITHER ALL 4027-3 OR  
4116-3 PARTS

DS21E252  
E

MEMORY ROW B

<small>THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION</small>		<small>TOLERANCES UNLESS OTHERWISE SPECIFIED: XX .XX .XX XXX .XXX FRACTIONAL - .125 ANGLES - .100</small>	
MATERIAL		SEE SHT. 1	
FINISH		REV. 1	DATE
PART NUMBER	DA21E250	REV. 1	DATE
<b>COMPUTERVISION CORP.</b> <small>305 BURLINGTON ROAD ROUTE 88          BEDFORD, MASS. 01730</small>		<small>SCALE</small> DWG. NO. <b>DS21E252</b> <small>REMOVE ALL DIMS AND SHAD' EDGES</small>	<small>UNIT</small> SHT 9 OF 16 SHTS

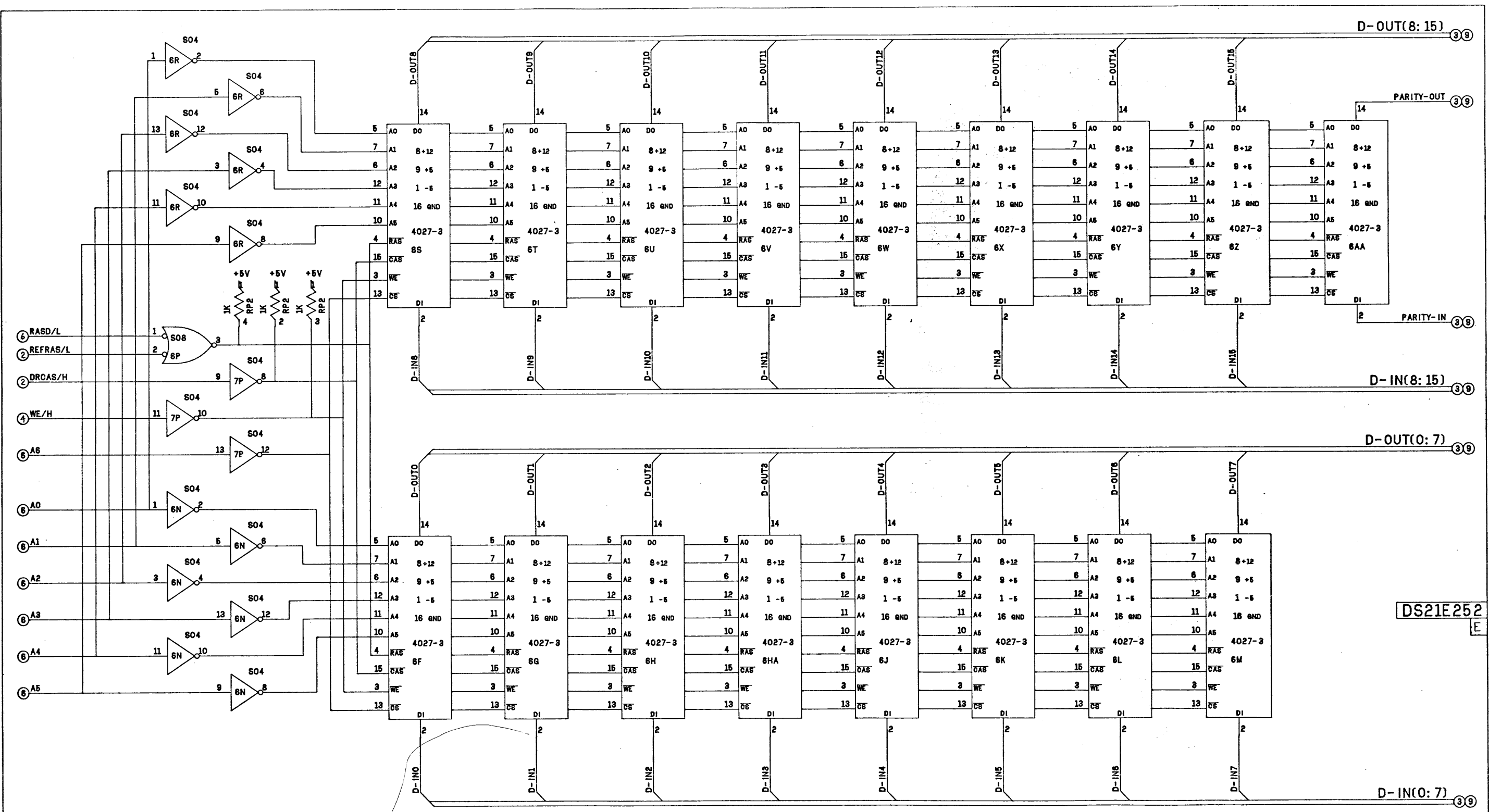


MEMORY CHIPS 5S THRU 5AA  
AND 5F THRU 5M MAY BE  
EITHER ALL 4027-3 OR  
4116-3 PARTS

DS21E252  
E

COMPUTERVISION CORP.				MEMORY ROW C			
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION				TOLERANCES DECIMAL XX .05 XXX .005 XXXX .0010 FRACTIONAL--1/64 ANGULAR--.100			
MATERIAL				DRN	B	HOBSB	
FINISH				ONE			
PART NUMBER	DA21E250	1		ENBR			
NEXT ASSEMBLY				PROJ			
COMPUTERVISION CORP. 201 BURLINGTON ROAD BEDFORD, MASS. 01730				SIGNATURE DATE SCALE DWG NO. DS21E252 UNIT WT. SHT 10 OF 16 SHTS			



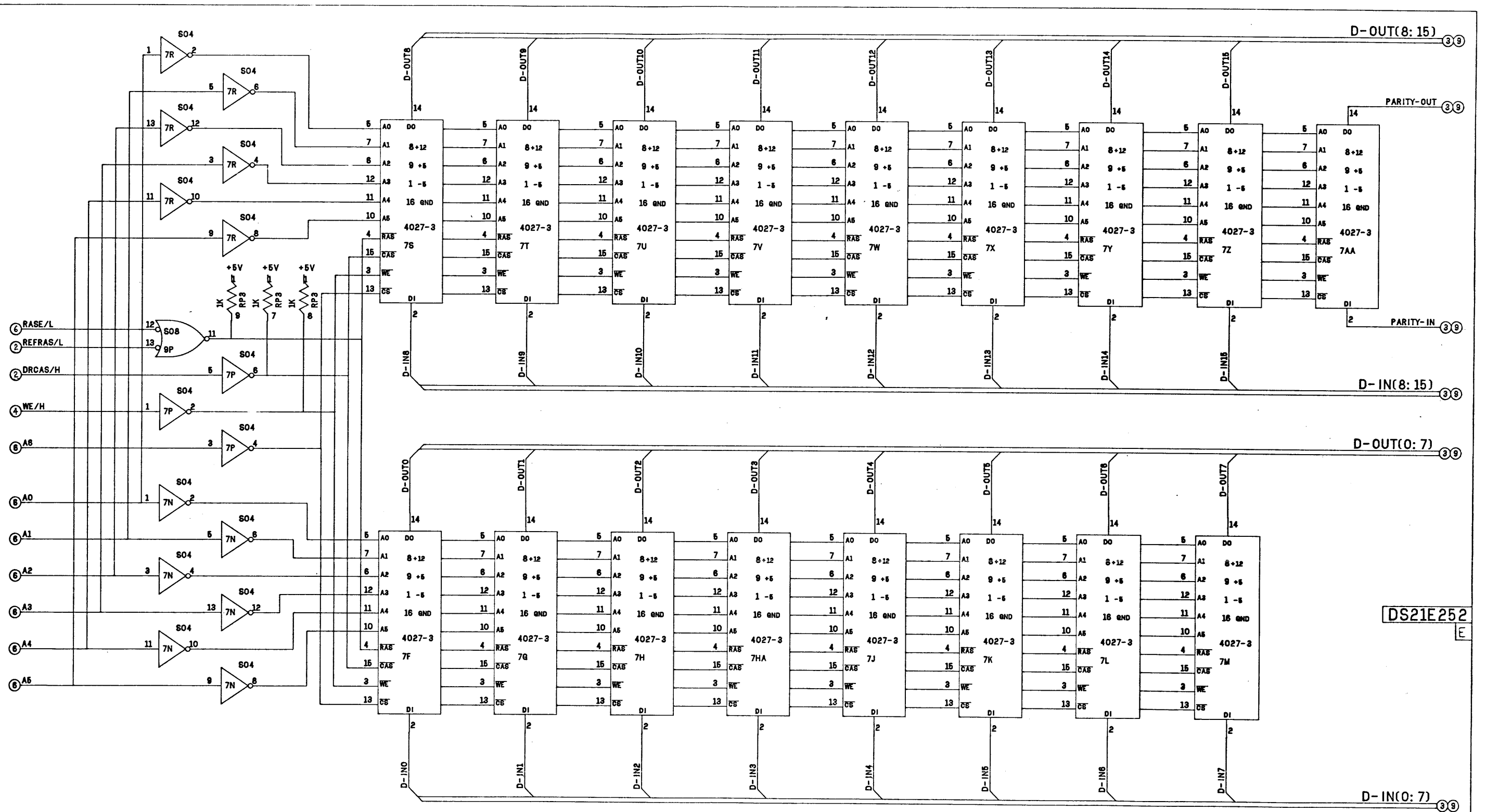


MEMORY CHIPS 6S THRU 6A  
AND 6F THRU 6M MAY BE  
EITHER ALL 4027-3 OR  
4116-3 PARTS

DS21E252  
E

MEMORY ROW D

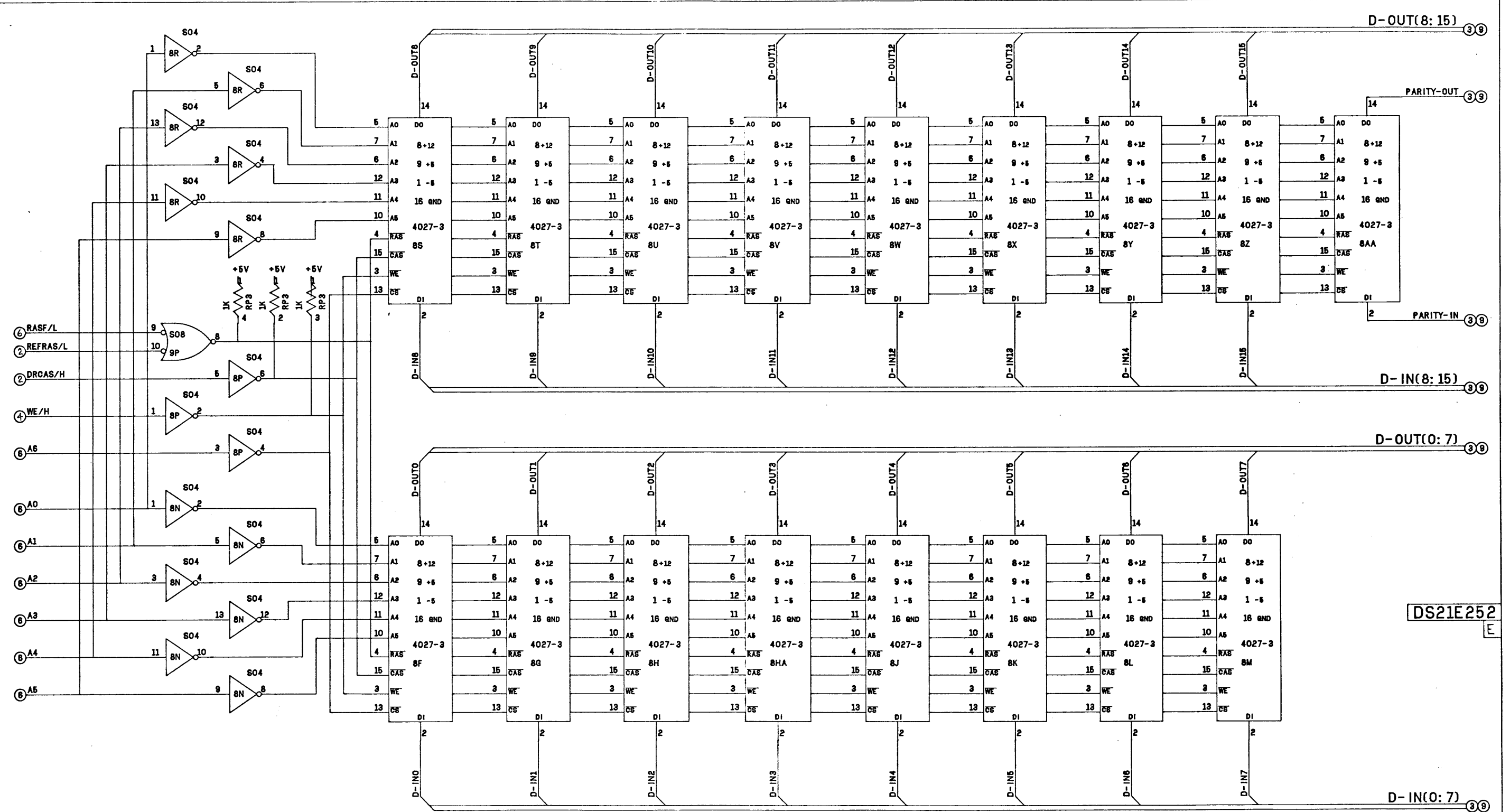
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES DECIMAL XX .XX XXX .XXX XXXX .XXXX FRACTIONAL--1/64 ANGLES--100		SEE SHT. 1	
MATERIAL		CHK	8 NOV88	SYM	REVISION DESCRIPTION
FINISH		CYK		ENR	DATE
PART NUMBER	DA21E250	PREJ		UNIT	128/32K MEMORY A/B PORT SCHEM. DIAGRAM
COMPUTERVISION CORP. 301 BURLINGTON ROAD BEDFORD, MASS. 01730		QTY	1	SCALE	DWG NO. DS21E252
		SIGNATURE	DATE	UNIT	SHT 11 OF 16 SHTS



MEMORY CHIPS 7S THRU 7AA  
AND 7F THRU 7M MAY BE  
EITHER ALL 4027-3 OR  
4116-3 PARTS

DS21E252  
E

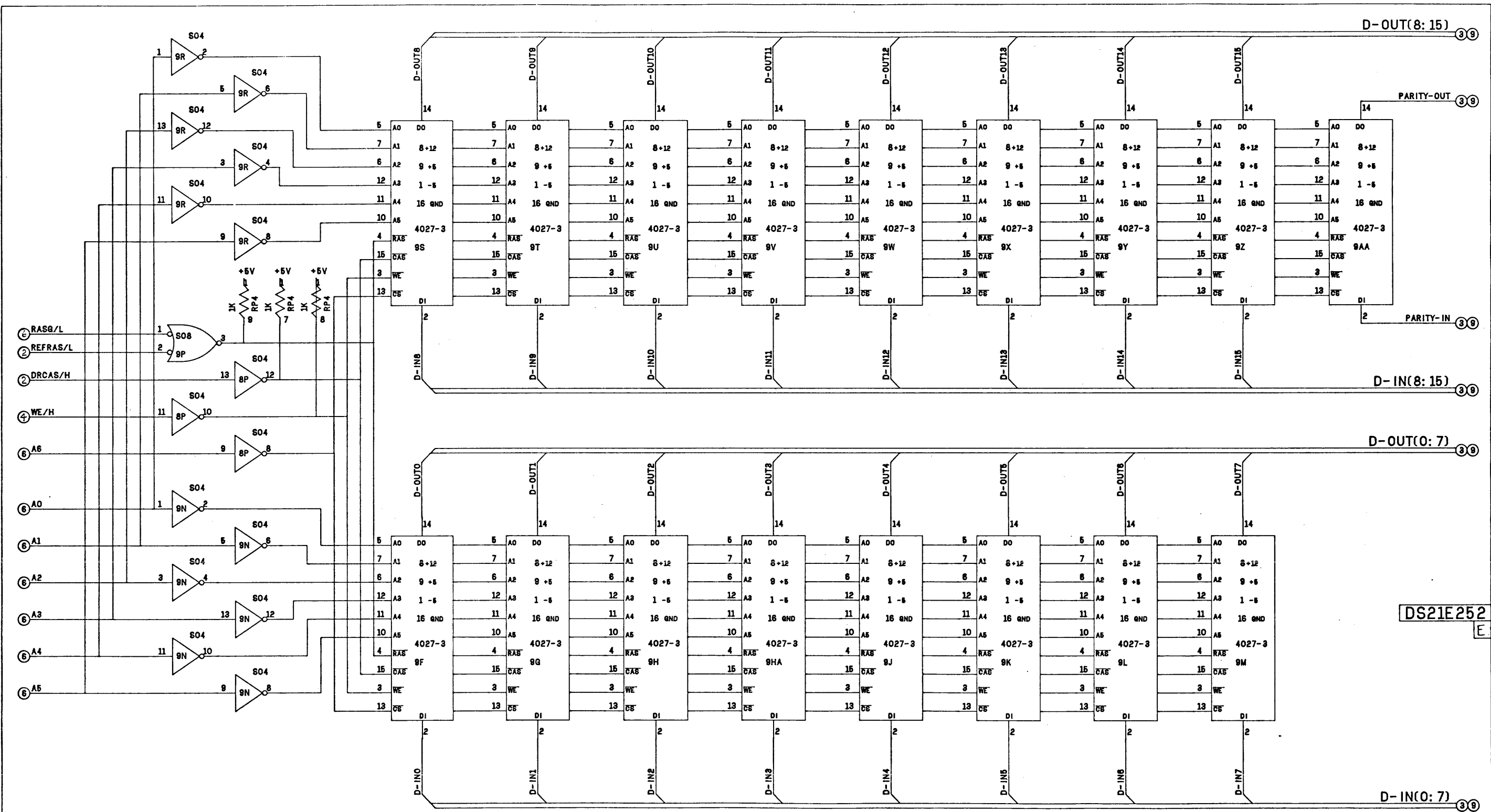
TOLERANCES		MEMORY ROW E	
DECIMAL	XXX	SEE SHT. 1	
FRACTIONAL	XXX/1000		
ANGULAR	XXX		
MATERIAL		SIGNATURE DATE	
FINISH		NO. DS21E252	
PART NUMBER		REV. NO. 1	
NEXT ASSEMBLY		QTY 1	
COMPUTERVISION CORP.		DWG NO. DS21E252	
205 BURLINGTON ROAD, SUITE 82		SHT 12 OF 16 SHTS	
BEDFORD, MASS. 01730		REMOVE ALL BURRS AND SHARP EDGES	



MEMORY CHIPS 8S THRU 8AA  
AND 8F THRU 8M MAY BE  
EITHER ALL 4027-3 OR  
4116-3 PARTS

DS21E252  
E

COMPUTERVISION CORP.				MEMORY ROW F			
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION				TOLERANCES DECIMAL			
				XX .01			
				XXX .005			
				XXXX .0025			
				FRACTIONAL**1/64			
				ANGULAR**-.100			
MATERIAL				DRN S HOBBS			
FINISH				BYN			
PART NUMBER				REVISION DESCRIPTION			
DA21E250				1			
NEXT ASSEMBLY				CHK APPD DATE			
COMPUTERVISION CORP.				TITLE			
801 BURLINGTON RD. ROUTE 62				128/32K MEMORY			
BEDFORD, MASS. 01730				A/B PORT SCH DIA			
SIGNATURE DATE				SCALE			
DWG NO.				DS21E252			
REWORK ALL SURFACES AND SHARP EDGES				UNIT			
				SHT 13 OF 16 SHTS			

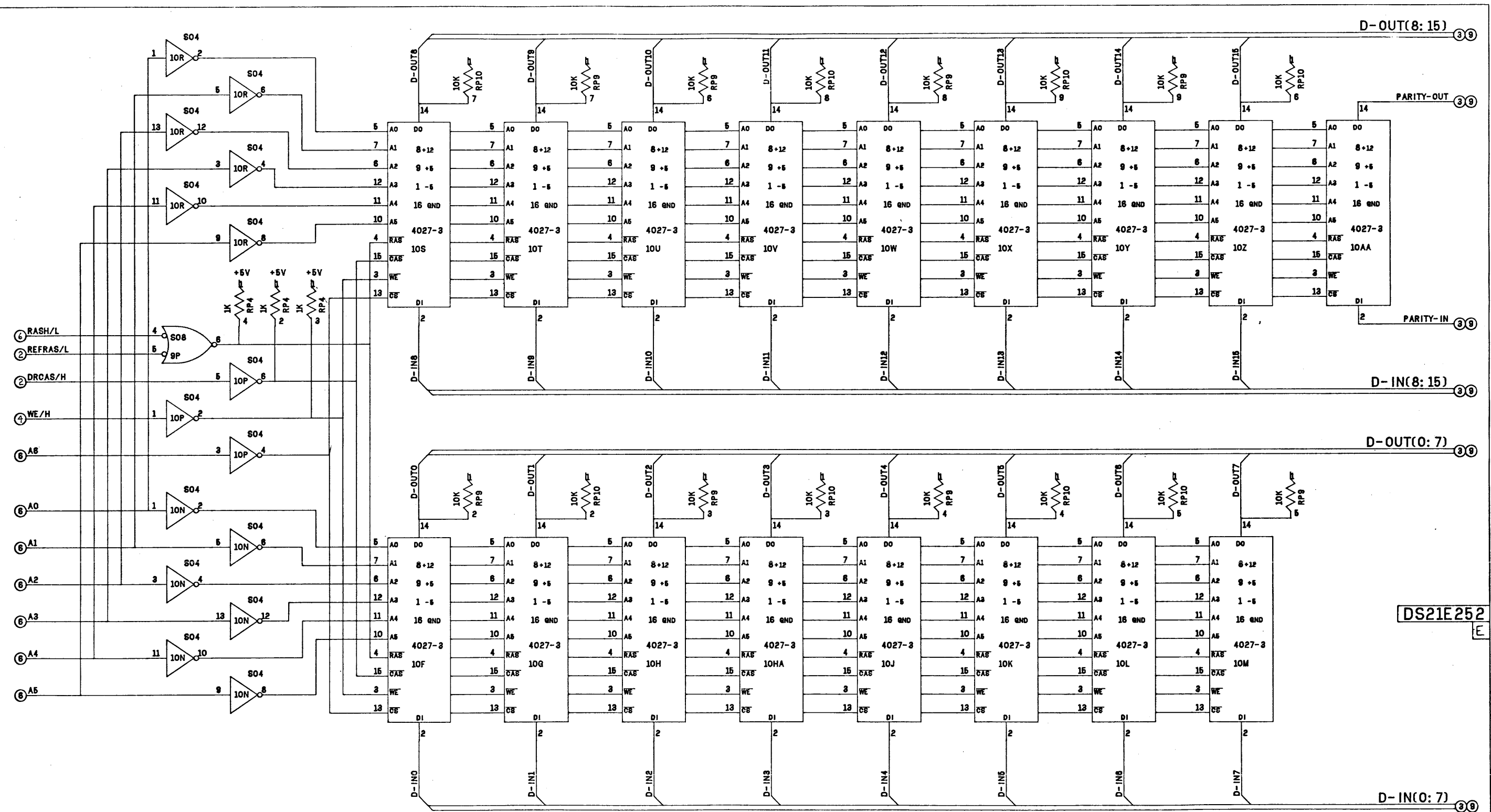


MEMORY CHIPS 9S THRU 9AA  
AND 9F THRU 9M MAY BE  
EITHER ALL 4027-3 OR  
4116-3 PARTS

DS21E252  
E

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRO- DUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES DECIMAL .XX ±.01 .XXX ±.005 .XXXX ±.0010 FRACTIONAL → L/64 ANGULAR → .100	
MATERIAL		DRN	8 NOV88
FINISH		CHK	
		ENGR	
		PROJ	
PART NUMBER	DA21E250	QTY	1
COMPUTERVISION CORP. 801 BURLINGTON ROAD ROUTE 22 BEDFORD, MASS. 01730		TITLE 128/32K MEMORY A/B PORTSCH.DIA...	DWN NO. DS21E252 UNIT SHT 14 OF 16 SHTS

MEMORY ROW G



MEMORY CHIPS 10S THRU 10AA  
AND 10F THRU 10M MAY BE  
EITHER ALL 4027-3 OR  
4116-3 PARTS

DS21E252  
E

TOLERANCES		
DECIMAL		
XX	±0.01	
XXX	±0.005	
XXXX	±0.0025	
FRACTIONAL	±1/100	
ANGULAR	±0.100	
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVERSION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVERSION CORPORATION		
MATERIAL		
FINISH		
PART NUMBER	DA21E250	1
NEXT ASSEMBLY		
QTY		
COMPUTERVISION CORP. 401 BEDFORD ROAD BEDFORD, MASS. 01730		
DATE		
SIGNATURE		
SCALE		
DWG NO.	DS21E252	
UNIT WT.		
SEE SHT. 1		
TITLE 128/32K MEMORY A/B PORT SCH DIA		
SHT 15 OF 16 SHTS		

B PORT CONNECTORS

CONN C

1	BINTR	2
3		4
5	BPORTACT	6
7		8
9		10
11	BIRST	12
13	BCLR	14
15	BIOPLS	16
17		18
19	BDS 3	20
21	BDS 2	22
23	BDS 1	24
25	BDS 0	26
27		28
29		30
31	BRQENB	32
33		34
35	BDATA 10	36
37	BDATA 1	38
39	BDATA 4	40
41	BDATA 6	42
43	BDATA 6	44
45	BDATA 7	46
47	FREE	48
49		50
	BINTPOUT	

CONN E

1		B MEM RD	2
3	B MEM RD		4
5	B MEMWRT	B MEMWRT	6
7		BLDMAR	8
9	BLDMAR		10
11	B MEM BUS 15		12
13	B MEM BUS 14		14
15	B MEM BUS 13		16
17	B MEM BUS 12		18
19	B MEM BUS 11		20
21	B MEM BUS 10		22
23	B MEM BUS 9		24
25	B MEM BUS 8		26
27	B MEM BUS 7		28
29	B MEM BUS 6		30
31	B MEM BUS 5		32
33	B MEM BUS 4		34
35	B MEM BUS 3		36
37	B MEM BUS 2	BWAD2	38
39	B MEM BUS 1	BWAD1	40
41	B MEM BUS 0	RESET	42
43	BMC 3	BWAD0	44
45	BMC 2	BWCO	46
47	BMC 1	BPARER	48
49		B MEM BUSY	50

ALL UNUSED PINS GROUNDED

VOLTAGE FEEDS FOR CONNECTORS PA,PB	
+12 VOLTS	B46,A7,A8
-5 VOLTS	B81
-12 VOLTS	B71,B72
+5 VOLTS	A/B3.A/B4.A/B97.A/B98
GND	A/B1.A/B2.A/B99.A/B100

DS21E252  
E

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES DECIMAL XX .XX XXX .XXX FRACTIONAL--1/64 ANGULAR--.100			
MATERIAL				SEE SHT. 1	
FINISH		DRAWN BY DPR B HOBBS	DATE	BY REV	REVISION DESCRIPTION
		ENGR		DATE	CHK APPD DATE
PART NUMBER	DA21E250	QTY	1	TITLE	128/32K MEMORY
				PROJ	A/B PORT SCH DIA
COMPUTERVISION CORP.		SIGNATURE	DATE	SCALE	DWG NO.
301 BURLINGTON ROAD ROUTE 42 BEDFORD, MASS. 01730				UNIT	DS21E252
		REMOVE ALL DIMENSIONS AND HOLE LOCUS		WT.	SHT 18 OF 16 SHTS

**32K/128K Memory Unit  
DS21E227 (Obsolete)**

	<u>Sheet No.</u>
Block Diagram	
Address Selection	1
B Port Connections	1
Data Input/Output	2
Bus and MAR Logic	3
Cycle Timing Logic	4
Refresh Logic	4
Bus Control Logic	5
I/O Logic	6
Typical Rank	7
Memory Address Logic	8
Array	9

128K BOARD (DA21E225-01)

I. JUMPER INFO.  
(CONNECTIONS NORMALLY MADE IN ETCH)

1. JP3
2. JP5
3. JP7
4. JPI

II. ADDRESS SELECT CHART

* FIELD #	MC0	MC1	CLOSED CONTACTS SWITCH PACK 1T
0,1,2,3	H	H	2,4**
4,5,6,7	H	L	2,3**
8,9,10,11	L	H	1,4**
12,13,14,15	L	L	1,3**

\* NOTE: EACH FIELD # REPRESENTS ONE 32K SEGMENT OF MEMORY.

\*\* NOTE: ALL OTHER CONTACTS OPEN.

III. HARDWARE CONFIGURATION INFO.

1. MEMORY CHIPS ARE MK4116-3.
2. RESISTORS R2 & R3 ARE BOTH INSERTED.
3. ADJUST POT1 (R138) SUCH THAT TP4H-4 HAS A REPETITION RATE OF 14.5  $\mu$ S.

GENERAL NOTES :

1. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS,  $\pm 5\%$
- CAPACITOR VALUES ARE IN MICROFARADS

32K BOARD (DA21E225-02)

I. JUMPER INFO.

1. CUT CONNECTIONS JP3, JP5, JP7, JPI
2. MAKE CONNECTIONS JP2, JP4, JP6,

II. ADDRESS SELECT CHART

* FIELD #	MC0	MC1	MC2	MC3	CLOSED CONTACTS SWITCH PACK 1T
0	H	H	H	H	2,4,6,8**
1	H	H	H	L	2,4,6,7**
2	H	H	L	H	2,4,5,8**
3	H	H	L	L	2,4,5,7
4	H	L	H	H	2,3,6,8
5	H	L	H	L	2,3,6,7
6	H	L	L	H	2,3,5,8
7	H	L	L	L	2,3,5,7
8	L	H	H	H	1,4,6,8
9	L	H	H	L	1,4,6,7
10	L	H	L	H	1,4,5,8
11	L	H	L	L	1,4,5,7
12	L	L	H	H	1,3,6,8
13	L	L	H	L	1,3,6,7**
14	L	L	L	H	1,3,5,8**
15	L	L	L	L	1,3,5,7**

\* NOTE: EACH FIELD # REPRESENTS ONE 32K SEGMENT OF MEMORY.

\*\* NOTE: ALL OTHER CONTACTS OPEN

III. HARDWARE CONFIGURATION INFO.

1. MEMORY CHIPS ARE MK4027-3.
2. REMOVE RESISTOR R2.
3. ADJUST POT1 (R138) SUCH THAT TP4H-4 HAS REPETITION RATE OF 29  $\mu$ S.

DS21E227

B PORT CONNECTORS

CONN D

1	BINTPOUT
11	BIORST
21	BDS4
31	BRQENB
41	BDATA10
49	BINTR

CONN E

1	B MEM RD
11	B MEM WRT
21	B MEM BUS 15
31	B MEM BUS 0
41	B MC3
49	B MC0

ALL UNUSED PINS GROUNDED

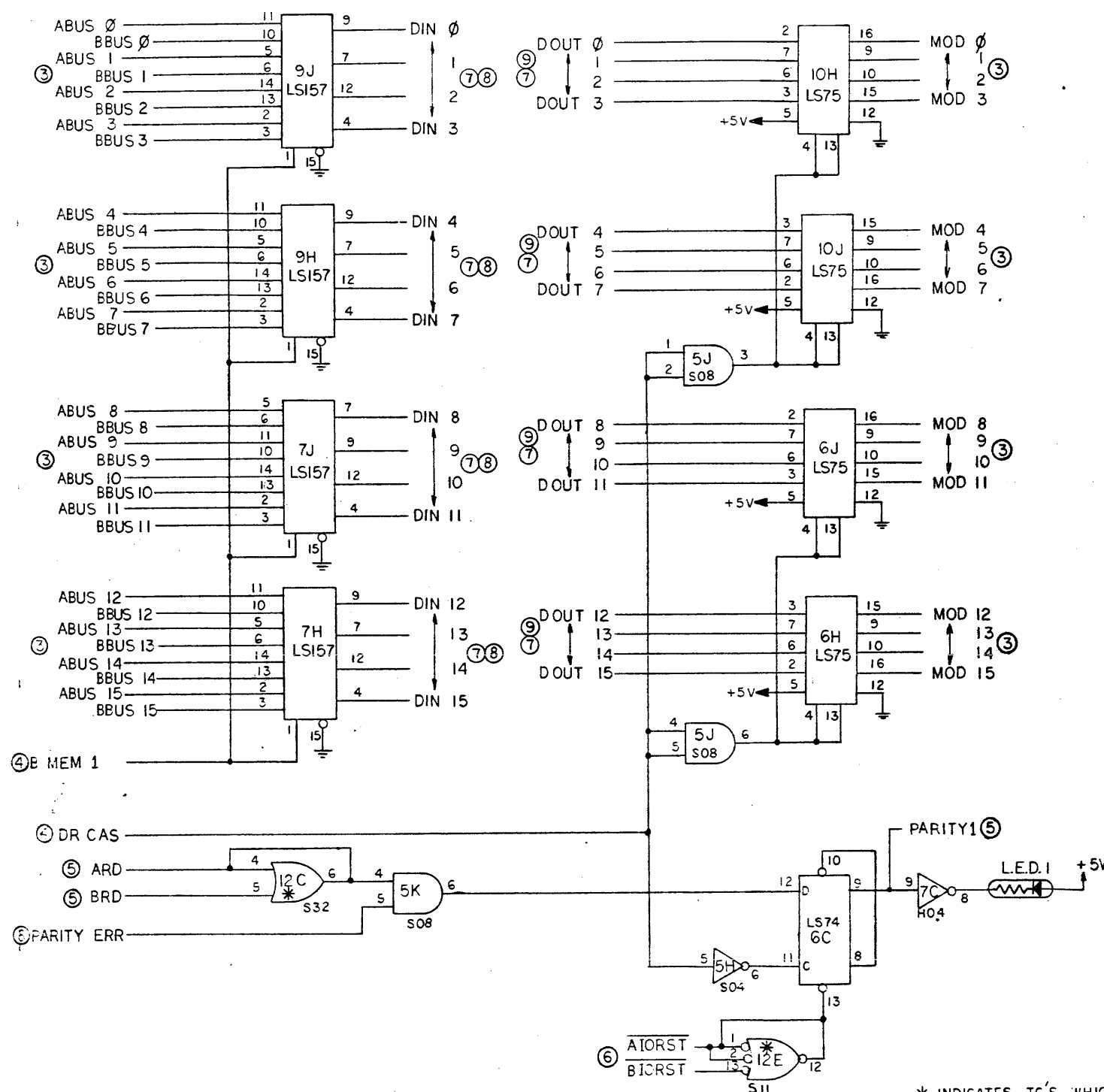
VOLTAGE FEEDS FOR CONNECTORS PA, PB	
+12 VOLTS	B46, A7, A8
-5 VOLTS	B81 A5, A6
-12 VOLTS	B71, B72
+5 VOLTS	A/B3, A/B4, A/B97, A/B98
GND	A/B1, A/B2, A/B99, A/B100

DS21E227

**OBsolete** see drawing DA 21E2250

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MATERIAL		DRN		B ECO # 2935	
FRONT		CHK		A REL ECO 2848	
PART NUMBER		NEXT ASSEMBLY		TITLE	
DA21E225				128K/32K MEMORY SCHEMATIC	
COMPUTERVISION CORP.		SCALE		PART NO.	
201 Burlington Road		DS21E227		DS21E227	
Bedford, Massachusetts 01730		REMOVE ALL BURRS AND SHARP EDGES		SHEET 1 OF 9 SHEETS	



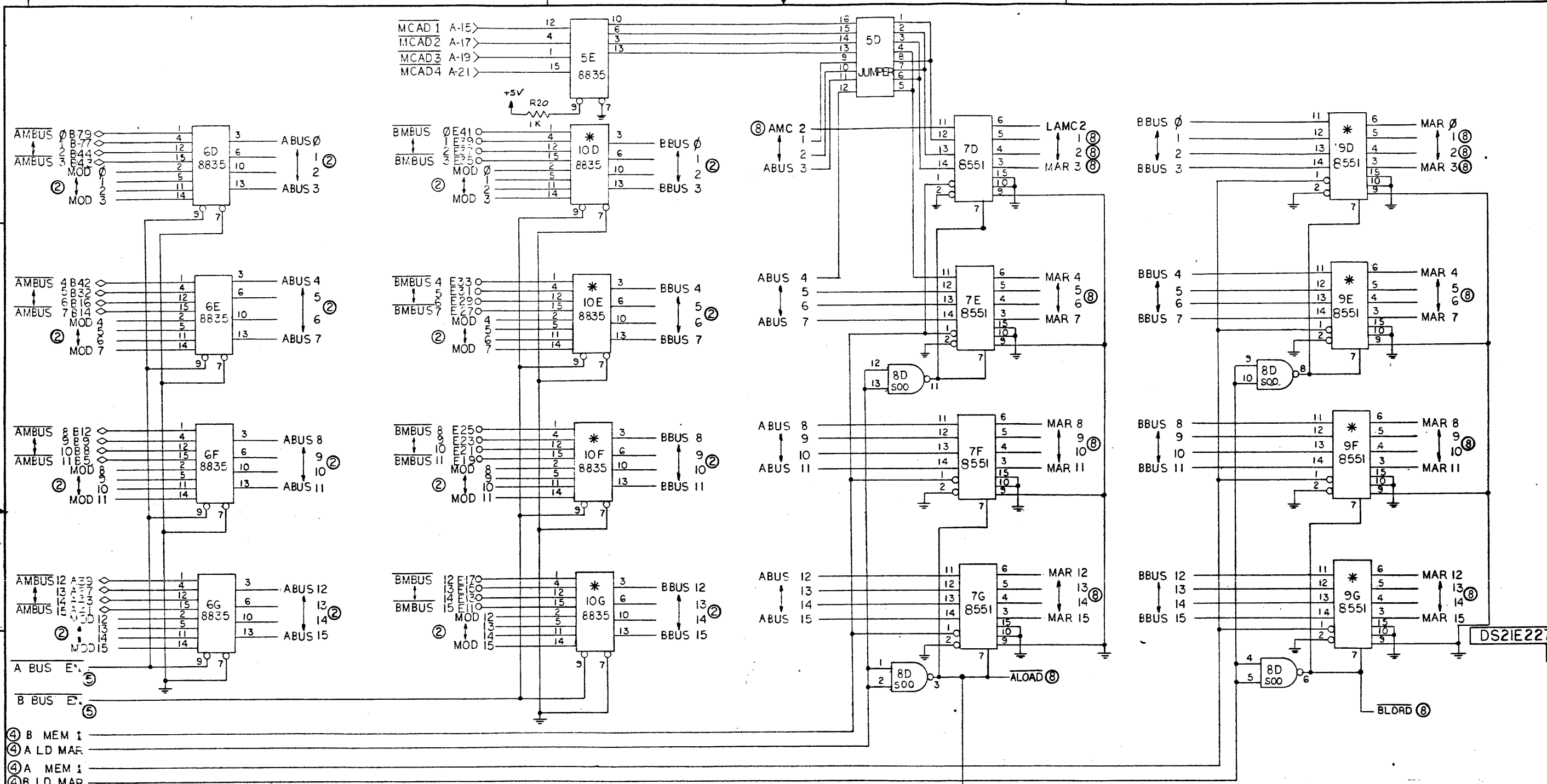


DS2IE227  
C

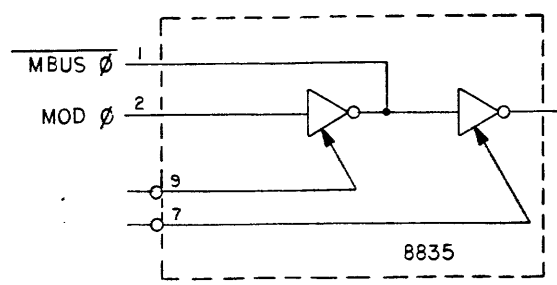
DATA INPUT/OUTPUT LOGIC

\* INDICATES IC'S WHICH CAN BE REMOVED TO DISABLE B PORT LOGIC.

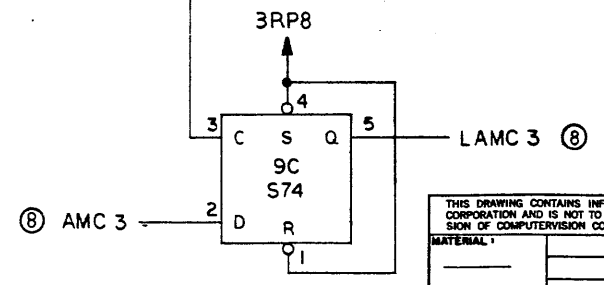
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.				TOLERANCES			
				DECIMAL			
				XXX ± 0.01			
				XXXX ± 0.010			
				FRACTIONAL ± 0.004			
				ANGULAR ± 0.004			
				HOLE ± 0.004			
				DRILL ± 0.004			
				SYN		SEE SH. 1	
				REV		REVISION DESCRIPTION	APPRO DATE
				ENGR		128K/32K	
				PROJ		MEMORY SCHEMATIC	
				PART NUMBER		SCALE	DWG NO.
				NEXT ASSEMBLY		UNT	DS2IE227
				QTY		WT.	SHEET 2 OF 9
				SIGNATURE			
				DATE			
				REMOVE ALL BURRS AND SHARP EDGES			



- ④ B MEM 1
- ④ A LD MAR
- ④ A MEM 1
- ④ B LD MAR



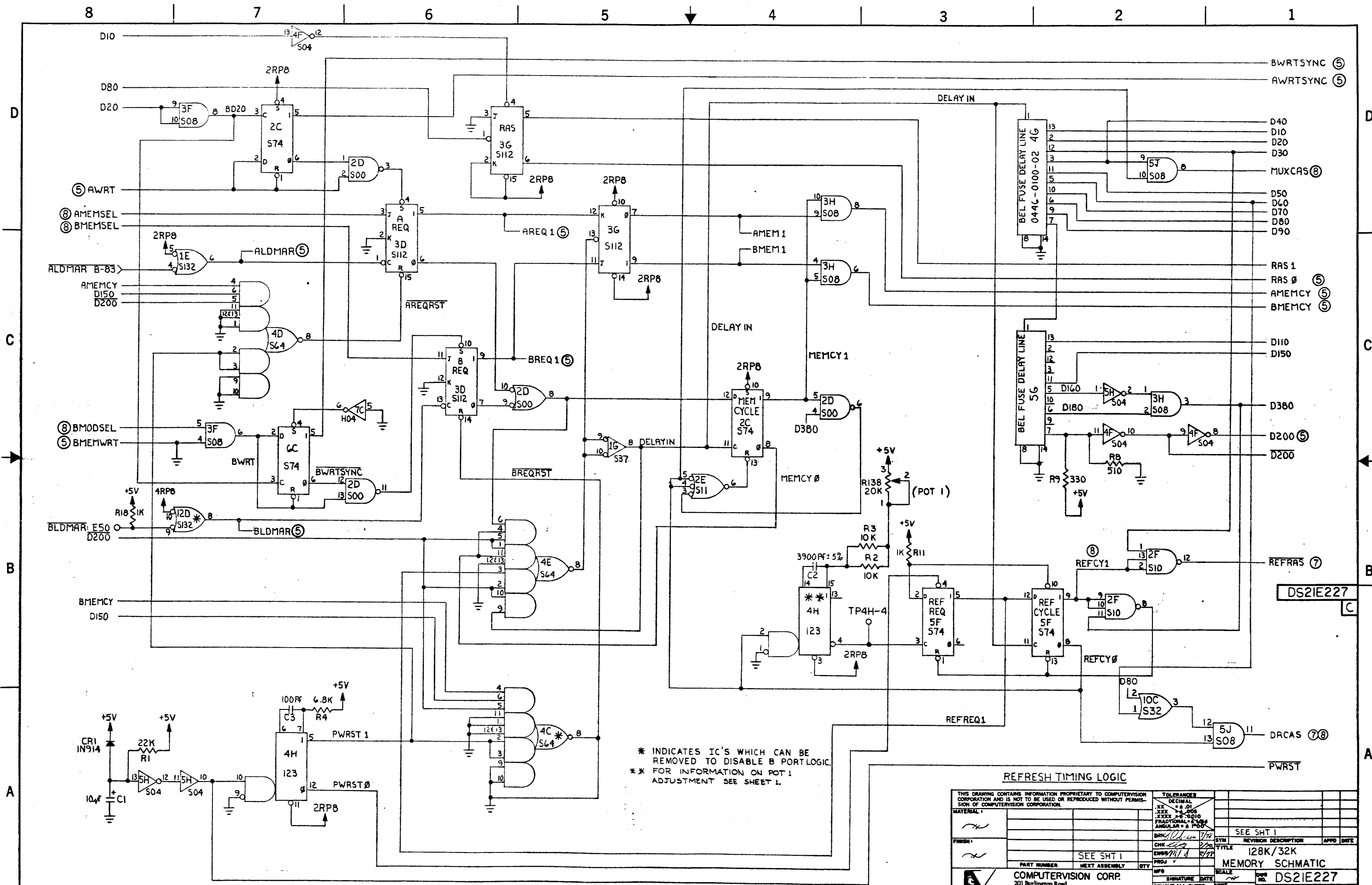
5D JUMPER PLUG	
MUC OPERATION	1, 16 2, 15 3, 14 4, 13
NON MUC OPERATION	5, 12 6, 11 7, 10 8, 9



\* INDICATES IC'S WHICH CAN BE REMOVED TO DISABLE B PORT LOGIC.

BUS & MAR LOGIC

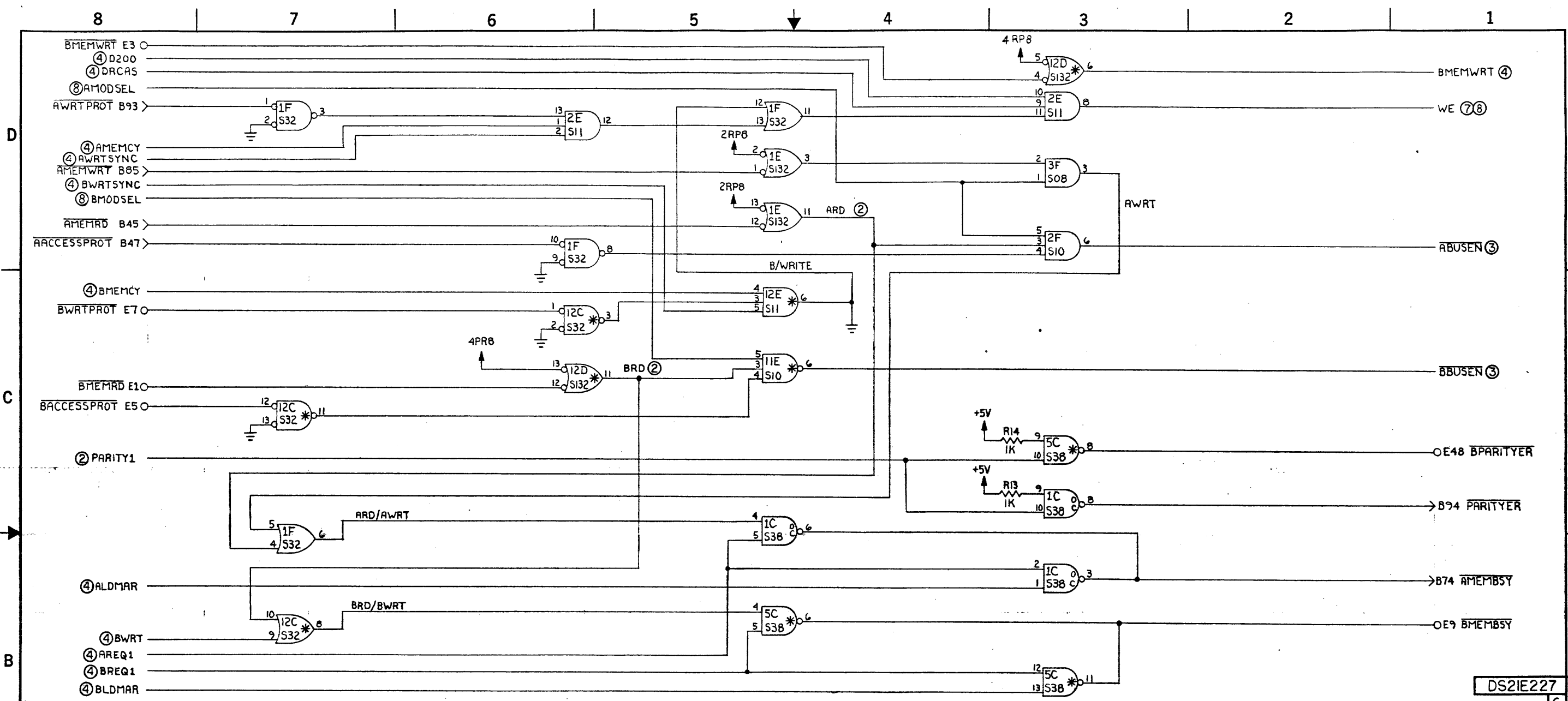
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX ±.01 .XXX ±.005 XXX ±.010 FRACTIONAL ±.005 ANGULAR ± .004	
MATERIAL	DRN	SYN	REVISION DESCRIPTION
FINISH	CHK	APPD	DATE
SEE SHT 1		TITLE 128K/32K	
PART NUMBER		QTY	
NEXT ASSEMBLY		SCALE	
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SIGNATURE DATE	
REMOVE ALL BURRS AND SHARP EDGES		DWS NO. DS21E227	
SHEET 3 OF 9 SHEETS			



\* INDICATES IC'S WHICH CAN BE REMOVED TO DISABLE B PORT LOGIC.  
 \*\* FOR INFORMATION ON POT 1 ADJUSTMENT SEE SHEET 1.

**REFRESH TIMING LOGIC**

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVERSION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVERSION CORPORATION.		TOLERANCES DECIMAL .XX = ±.01 .XXX = ±.005 FRACTIONAL = ±.005 ANGULAR = ±.005	
MATERIAL		DATE	7/76
DESIGNED BY		CHK	SEE SHT 1
ENGR	7/14	APPD	DATE
PROJ		SYN	REVISION DESCRIPTION
PART NUMBER	SEE SHT 1	QTY	128K/32K
NEXT ASSEMBLY			MEMORY SCHMATIC
COMPUTERVERSION CORP.			DS21E227
201 Burlington Road			
Bedford, Massachusetts 01730			
SIGNATURE DATE		SCALE	PART WGT.
REMOVE ALL BURRS AND SHARP EDGES			
			SHEET 4 of 9 SHEETS

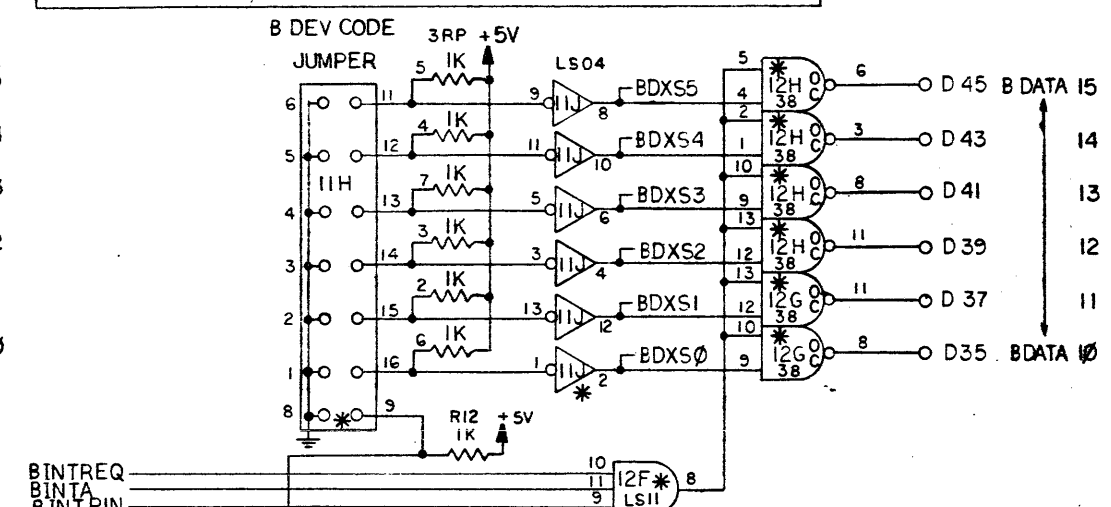
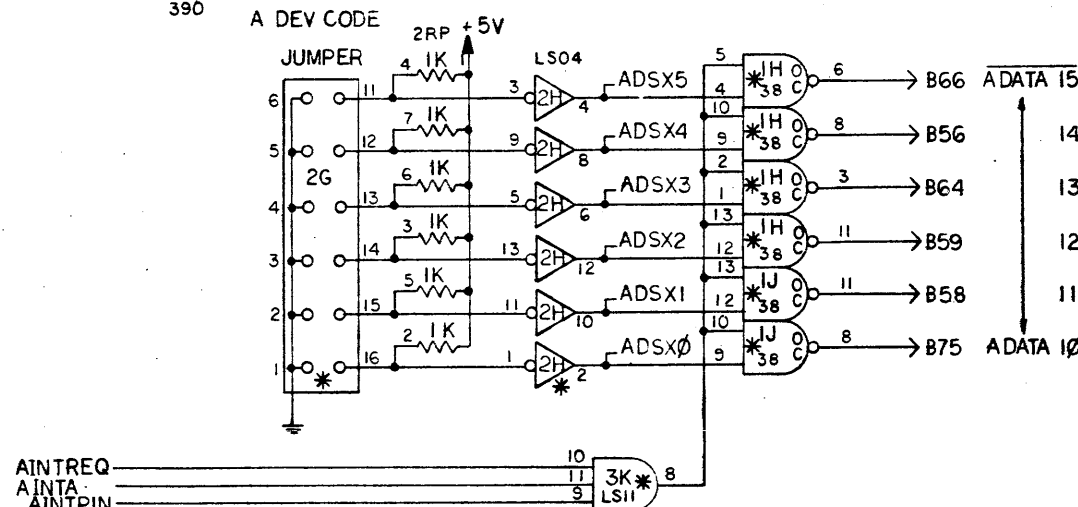
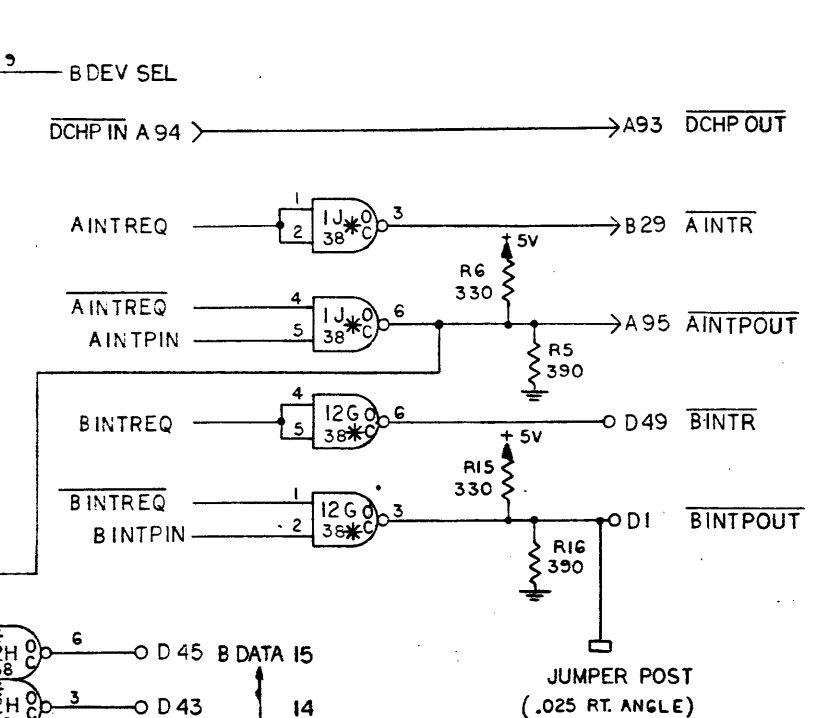
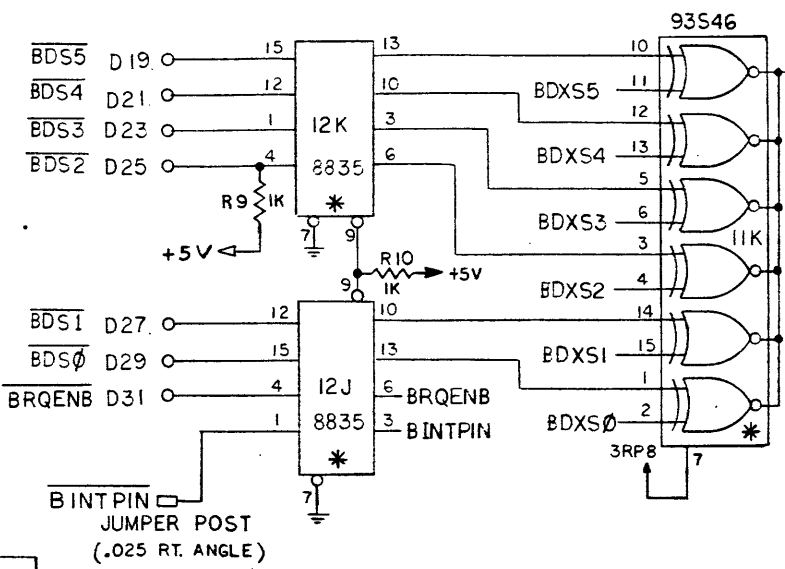
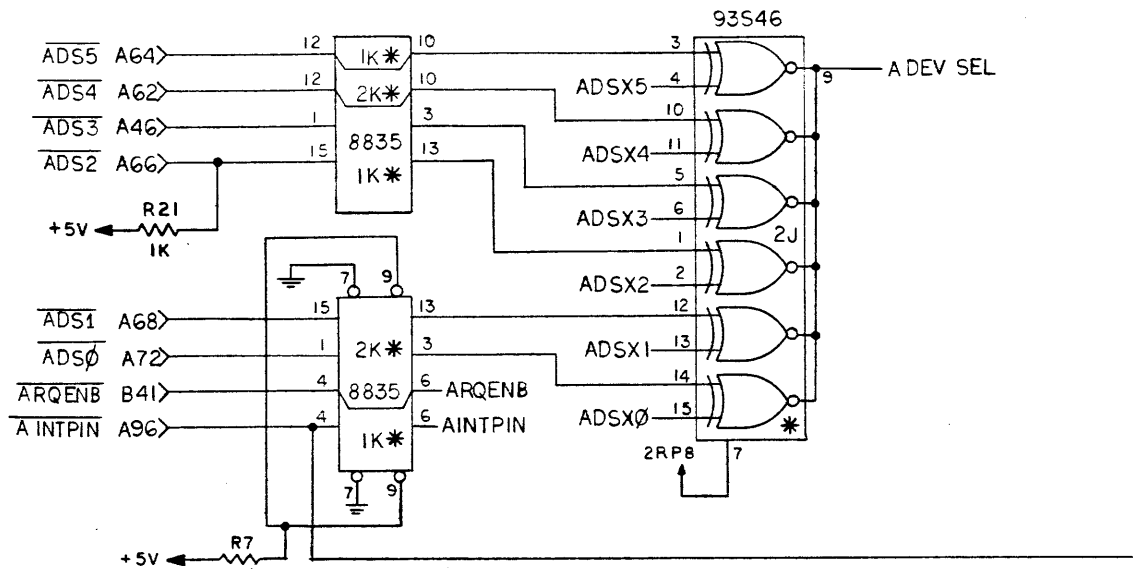


DS2IE227

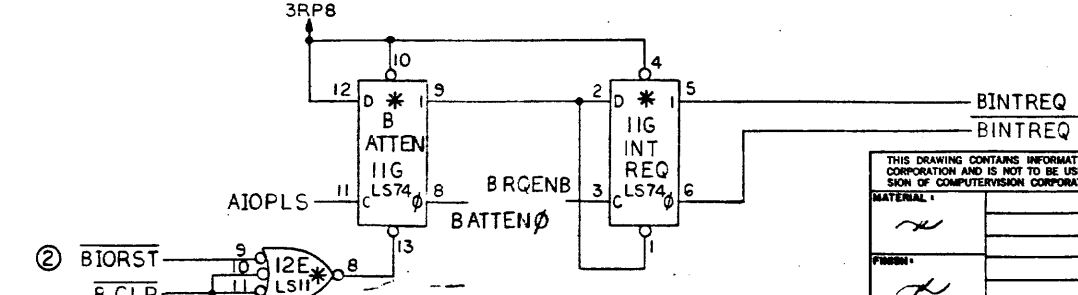
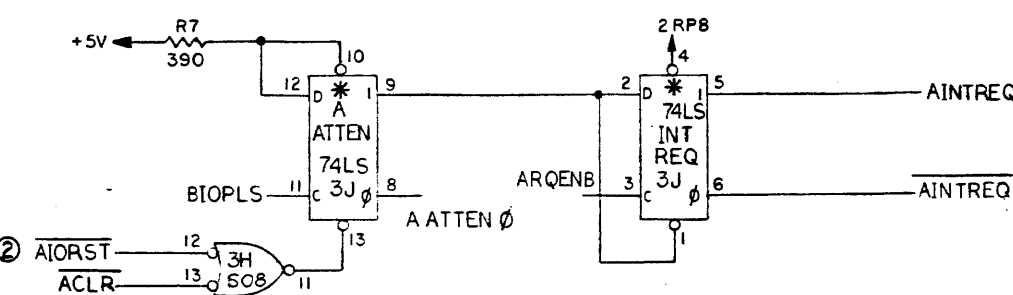
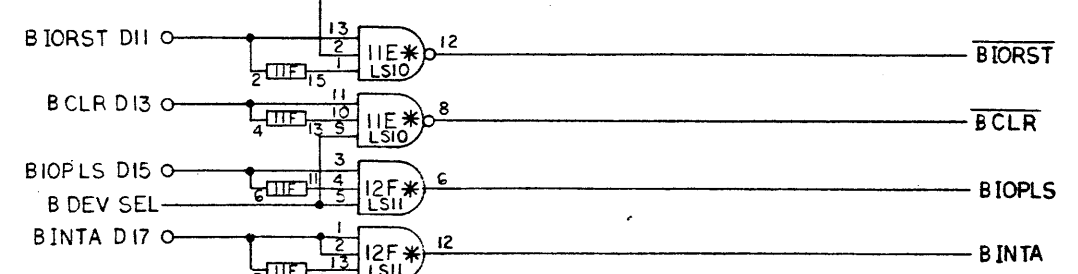
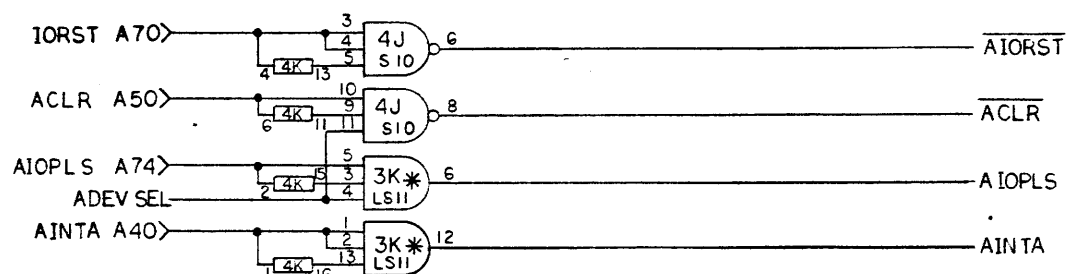
\* INDICATES IC'S WHICH CAN BE REMOVED TO DISABLE B PORT LOGIC.

BUS CONTROL LOGIC

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL = .01 .XX = .05 .XXX = .010 FRACTIONAL = 1/32 ANGULAR = 30°		
MATERIAL:		DRN	7/78	SYM
FINISH:		CHK	2/21	STY
	SEE SHT 1	ENR	8/10	REV
PART NUMBER	NEXT ASSEMBLY	QTY	SCALE	DATE
			NONE	
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE	DATE	DRW NO.
		REMOVE ALL BURNS AND SHARP EDGES	UNIT	DS2IE227
			WT.	SHEET 5 of 9 SHEETS



**NOTE:**  
 INSERT ALL JUMPERS IN "A DEV CODE JUMPER BLOCK" AND "B DEV CODE JUMPER BLOCK" WHEN NOT USING B PORT.  
 \* INDICATES IC'S WHICH CAN BE REMOVED TO DISABLE B PORT LOGIC.  
 4K & 11FARE RC FILTERS CONNECTED AS FOLLOWS: **DS21E227**

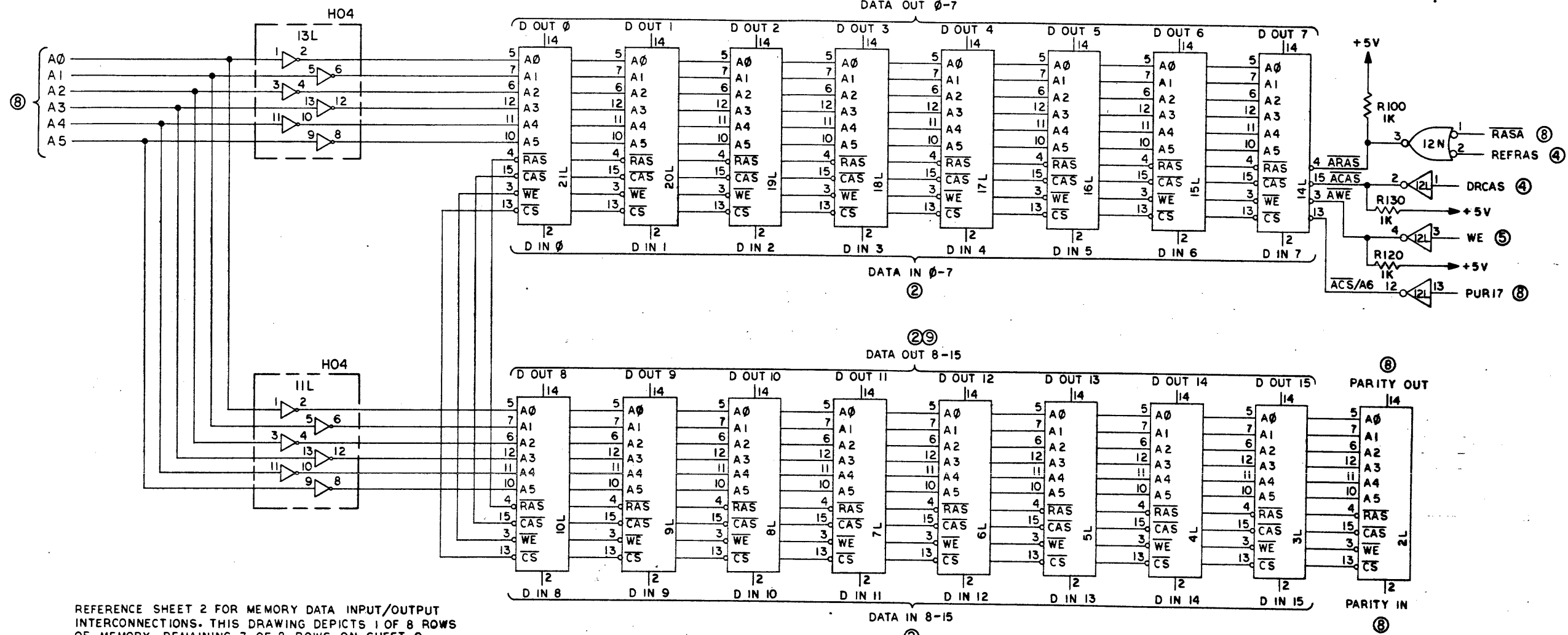


**I/O LOGIC**

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX ± .01 .XXX ± .005 FRACTIONAL 1/16" ± .004 ANGULAR ± .004	REV. NO. 1	DATE
MATERIAL			SEE SHT 1	
FINISH			TITLE 128K/32K MEMORY SCHEMATIC	APPD. DATE
PART NUMBER	SEE SHT 1	QTY	SCALE NONE	DWG. NO. DS21E227
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			SHEET NO. NONE	SHEET 6 OF 9 SHEETS

D

D



REFERENCE SHEET 2 FOR MEMORY DATA INPUT/OUTPUT INTERCONNECTIONS. THIS DRAWING DEPICTS 1 OF 8 ROWS OF MEMORY. REMAINING 7 OF 8 ROWS ON SHEET 9. MEMORY CHIPS 2L THRU 10L & 14L THRU 21L MAY BE 4027-3 OR 4116-3

DS2IE227

B

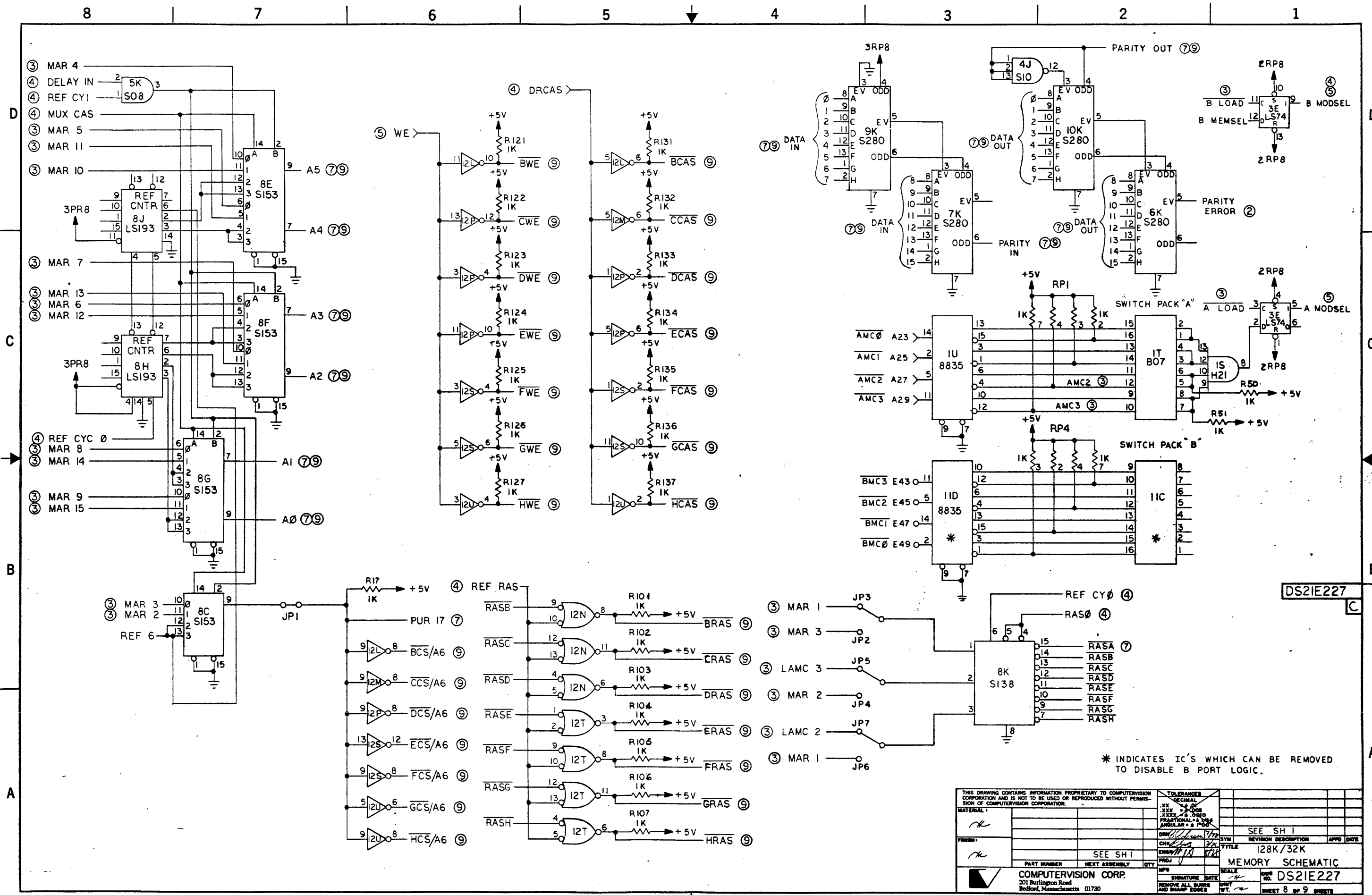
B

A

A

TYPICAL MEMORY ROW

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		<b>TOLERANCES</b> DECIMAL .XX ±.005 .XXX ±.010 .XXX ±.010 ANGLES ±.005					
MATERIAL: <i>K</i>		FINISH: <i>K</i>		SEE SH. 1 SEE SH. 1 SEE SH. 1		TITLE <b>MEMORY SCHEMATIC</b>	
PART NUMBER <b>DS2IE227</b>		NEXT ASSEMBLY QTY		SCALE <b>1:1</b>		PART NO. <b>DS2IE227</b>	
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE DATE <i>[Signature]</i>		REMOVE ALL BURS AND SHARP EDGES WRT.		SHEET 7 OF 9 SHEETS	



\* INDICATES IC'S WHICH CAN BE REMOVED TO DISABLE B PORT LOGIC.

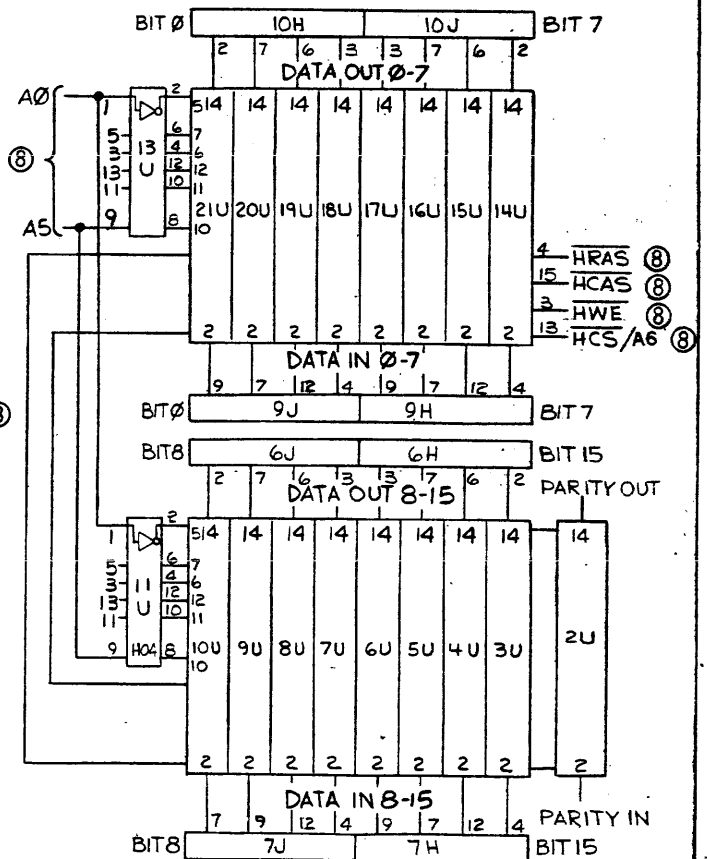
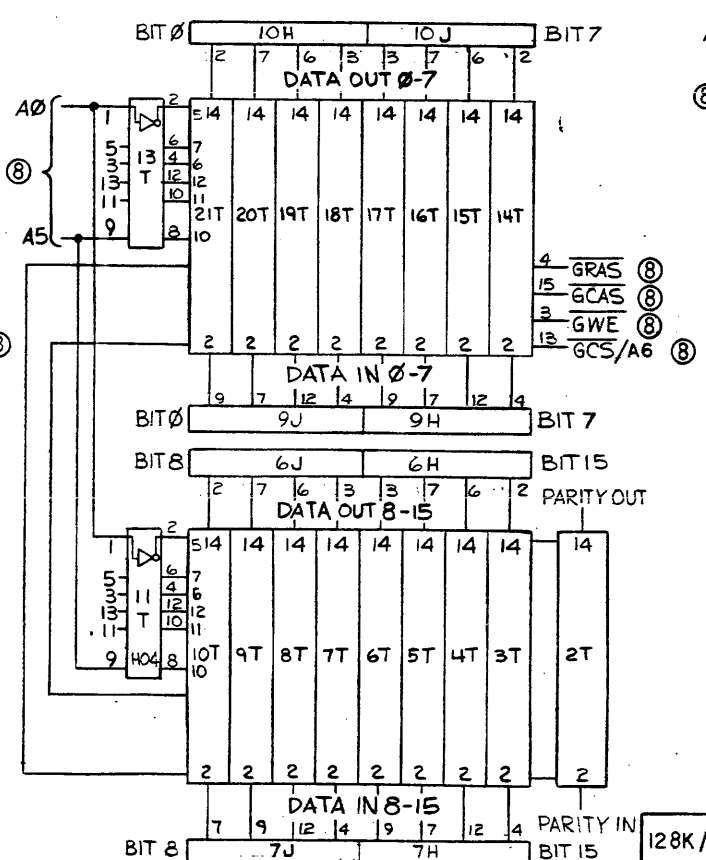
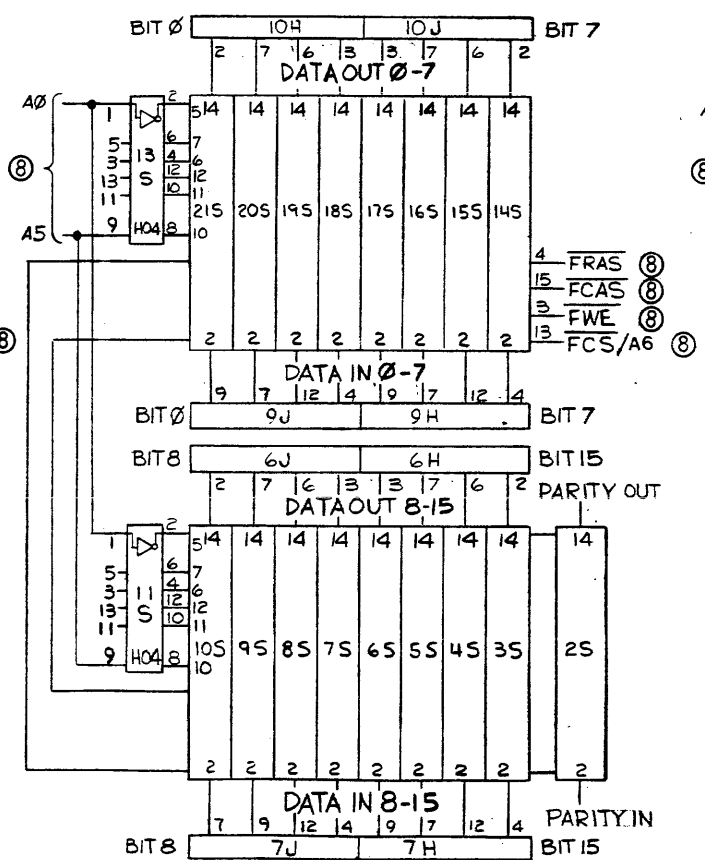
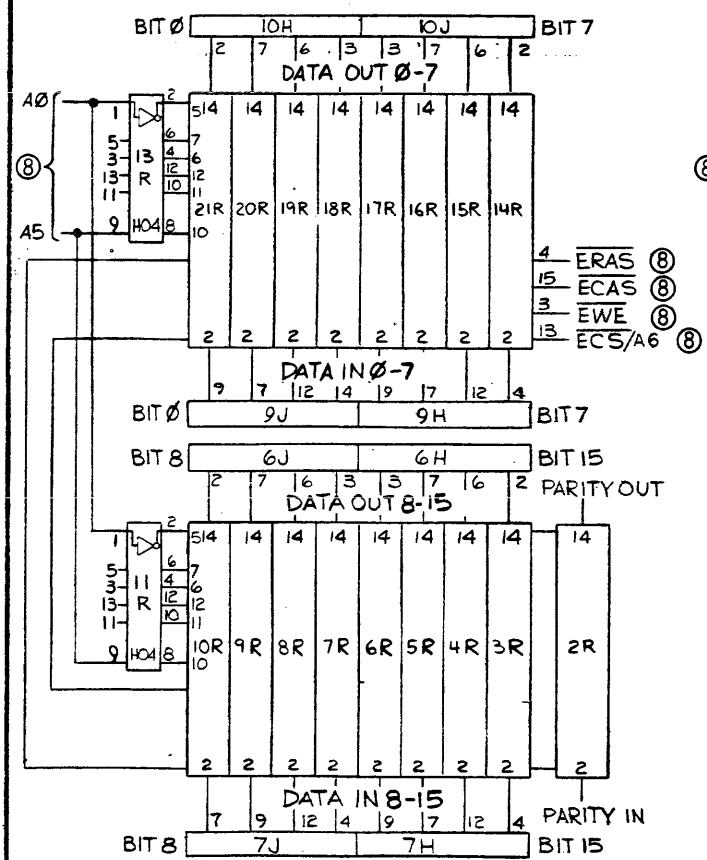
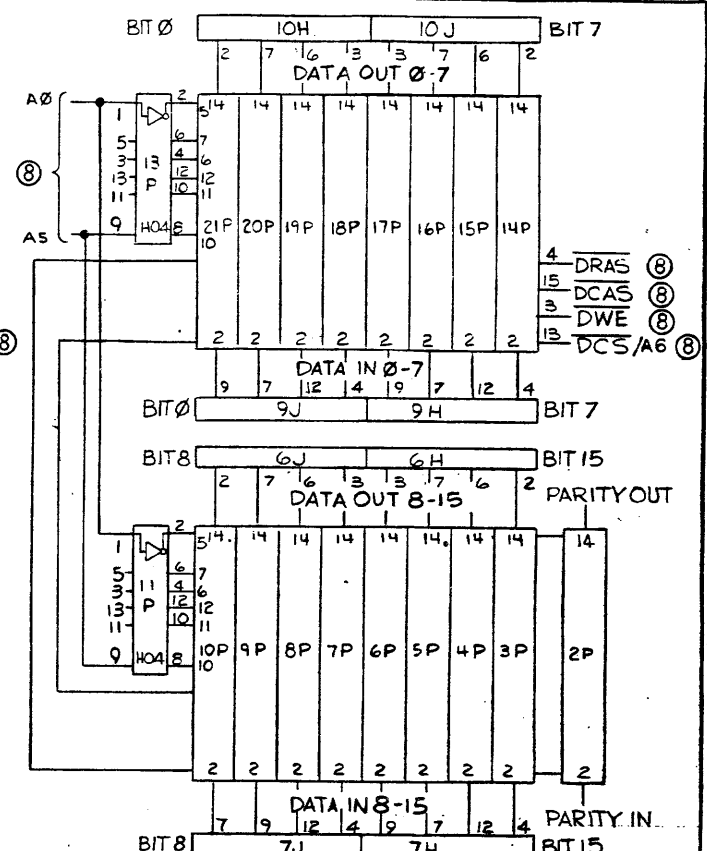
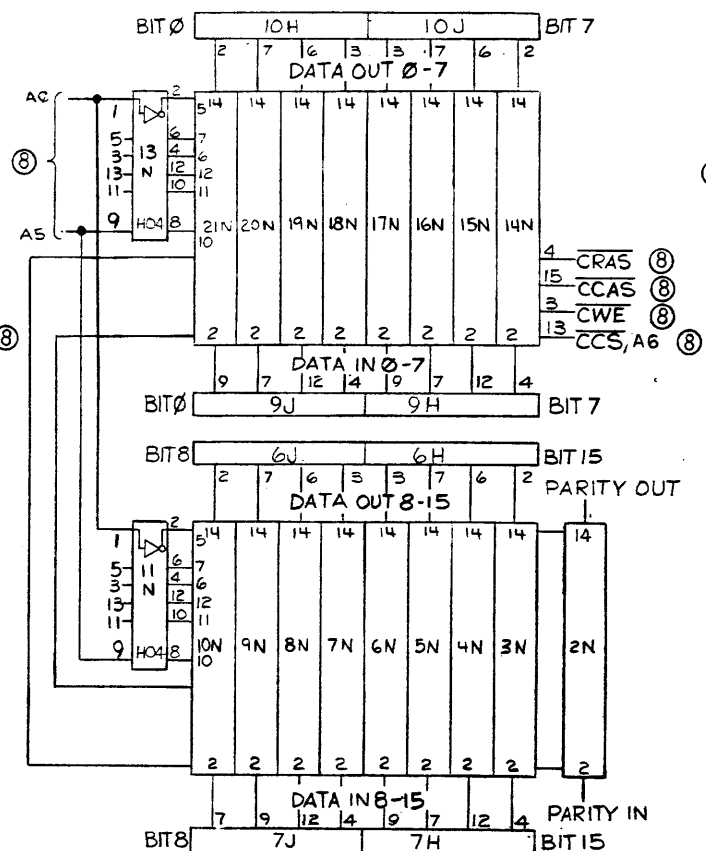
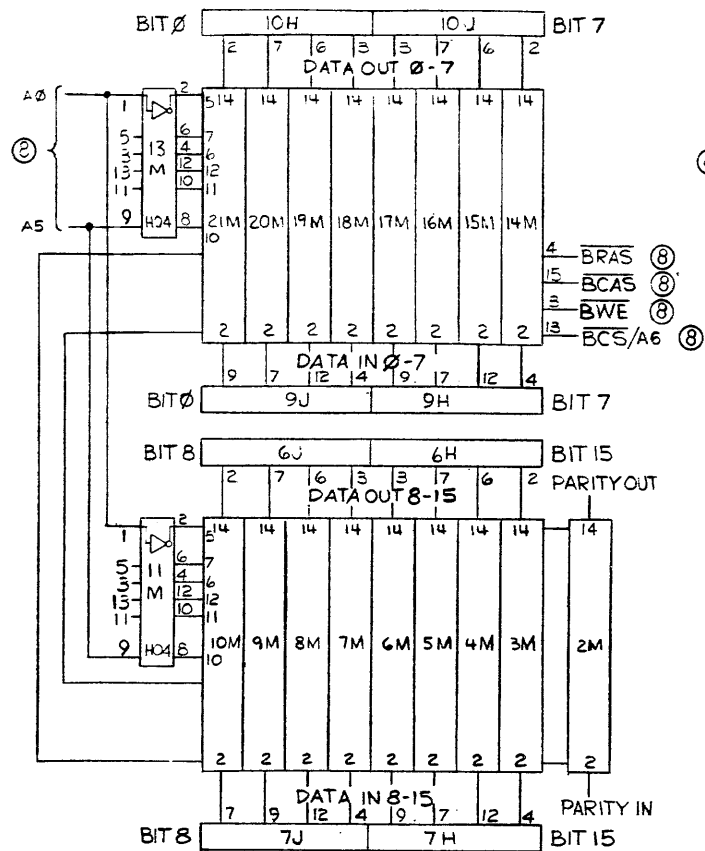
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES UNLESS OTHERWISE SPECIFIED	
MATERIAL:		.XX - DECIMAL	
FRACTIONS:		.XXX - THOUSANDS	
DIMENSIONS:		.XXX - THOUSANDS	
FRACTIONS:		.XXX - THOUSANDS	
ANGLES:		.XXX - DEGREES	
PROJ:		SYN	
CHK:		REV	
APP:		DATE	
PART NUMBER		NEXT ASSEMBLY	
QTY		SCALE	
COMPUTERVISION CORP.		SIGNATURE	
201 Burlington Road		DATE	
Bedford, Massachusetts 01730		DWT	
SEE SH 1		TITLE	
SEE SH 1		128K/32K	
MEMORY SCHEMATIC		DWT	
DS21E227		SHEET 8 OF 9 SHEETS	

**MEMORY ARRAY**

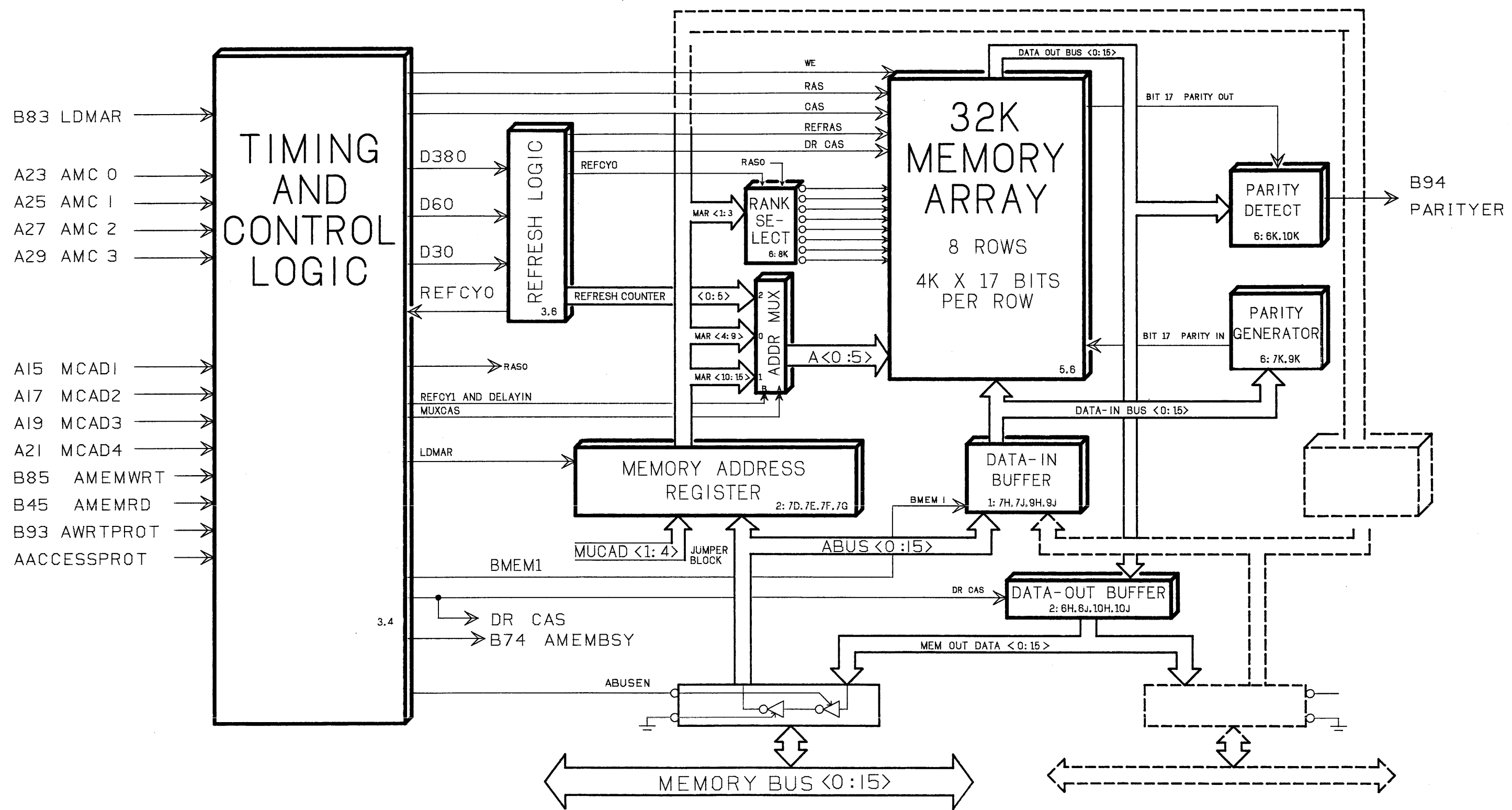
FOR MORE DETAIL OF TYPICAL MEMORY SEE SHEET 7  
FOR MEMORY DATA INPUT/OUTPUT INTERCONNECTIONS, SEE SHEET 2

**NOTE:**

ALL PWR. PINS ON 4027-3 OR 4116-3 ARE:  
+5V PIN 9  
-5V PIN 1  
GND PIN 16  
+12V PIN 8







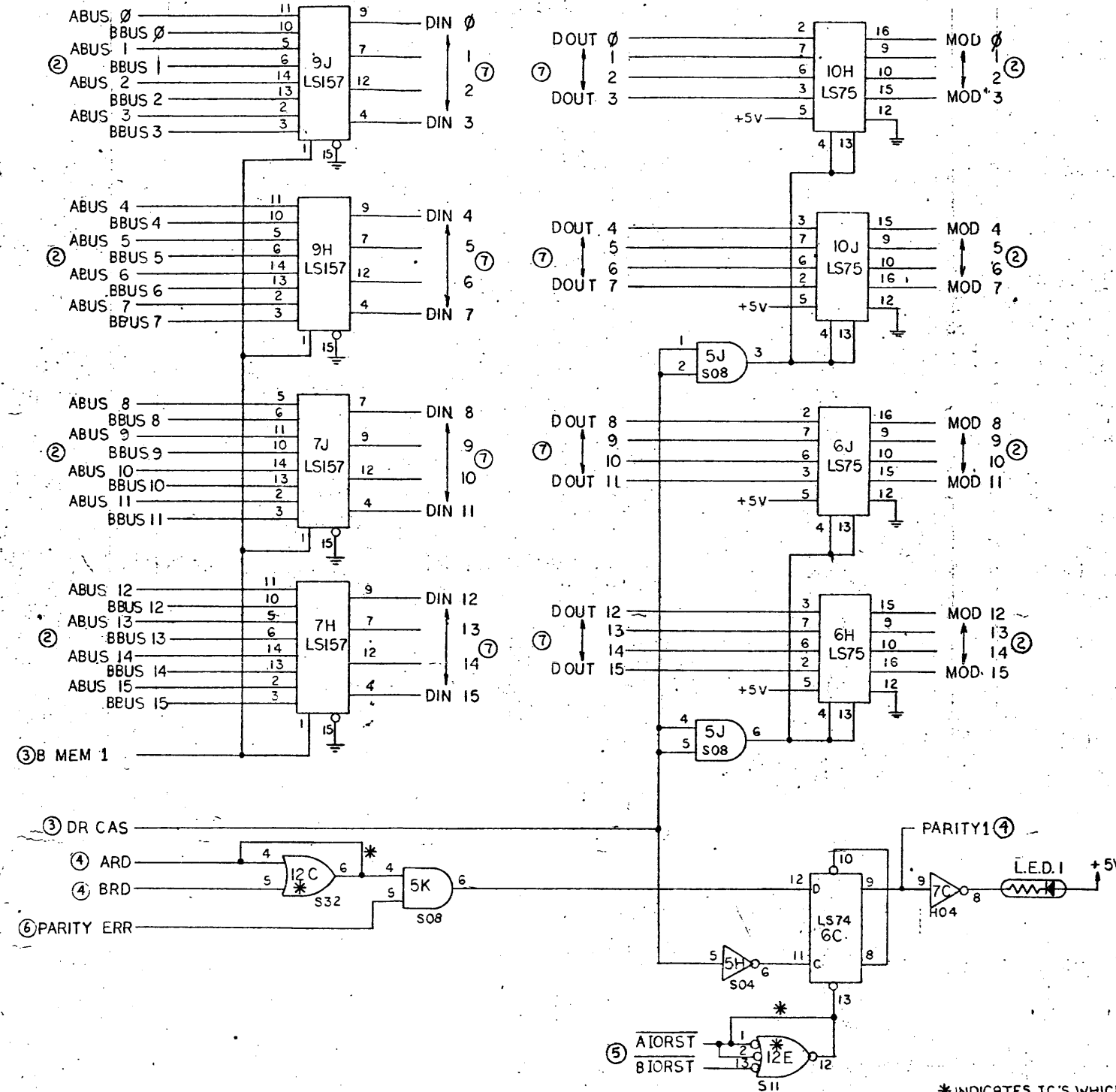
\* ABUS <0.5:15> IF MAPPED; ABUS <0:15> IF UNMAPPED

DASHED LINES INDICATE B PORT

**32K Memory Unit (Single Port)**  
**DS21E102 (Obsolete)**

	<u>Sheet No.</u>
Block Diagram	
Data Input/Output Logic	1
Bus and Memory Address Logic	2
Refresh Timing Logic	3
Bus Control Logic	4
I/O Logic	5
Typical Memory Rank	6
Parity Logic	6
Memory Array	7

# B PORT CONNECTORS



CONN D		CONN E	
1	BINTPOUT	1	B MEM RD
			B MEM WRT
			B ACCESS PROT
			B WRT PROT
			B MEM BUSY
11	BIORST	11	B MEM BUS 15
	BCLR		14
	BIOPLS		13
	BINTA		12
	BDS5		11
21	BDS4	21	10
	BDS3		9
	BDS2		8
	BDS1		7
	BDS0		6
31	BRQENB	31	5
			4
	BDATA10		3
	BDATA11		2
41	BDATA12	41	1
	BDATA13		
	BDATA14		
	BDATA15		
49	BINTR	49	B MEM BUS 0
			BMC3
			BMC2
			BMC1
			B PARITY ER
			BLD MAR
50		50	

ALL UNUSED PINS GATED

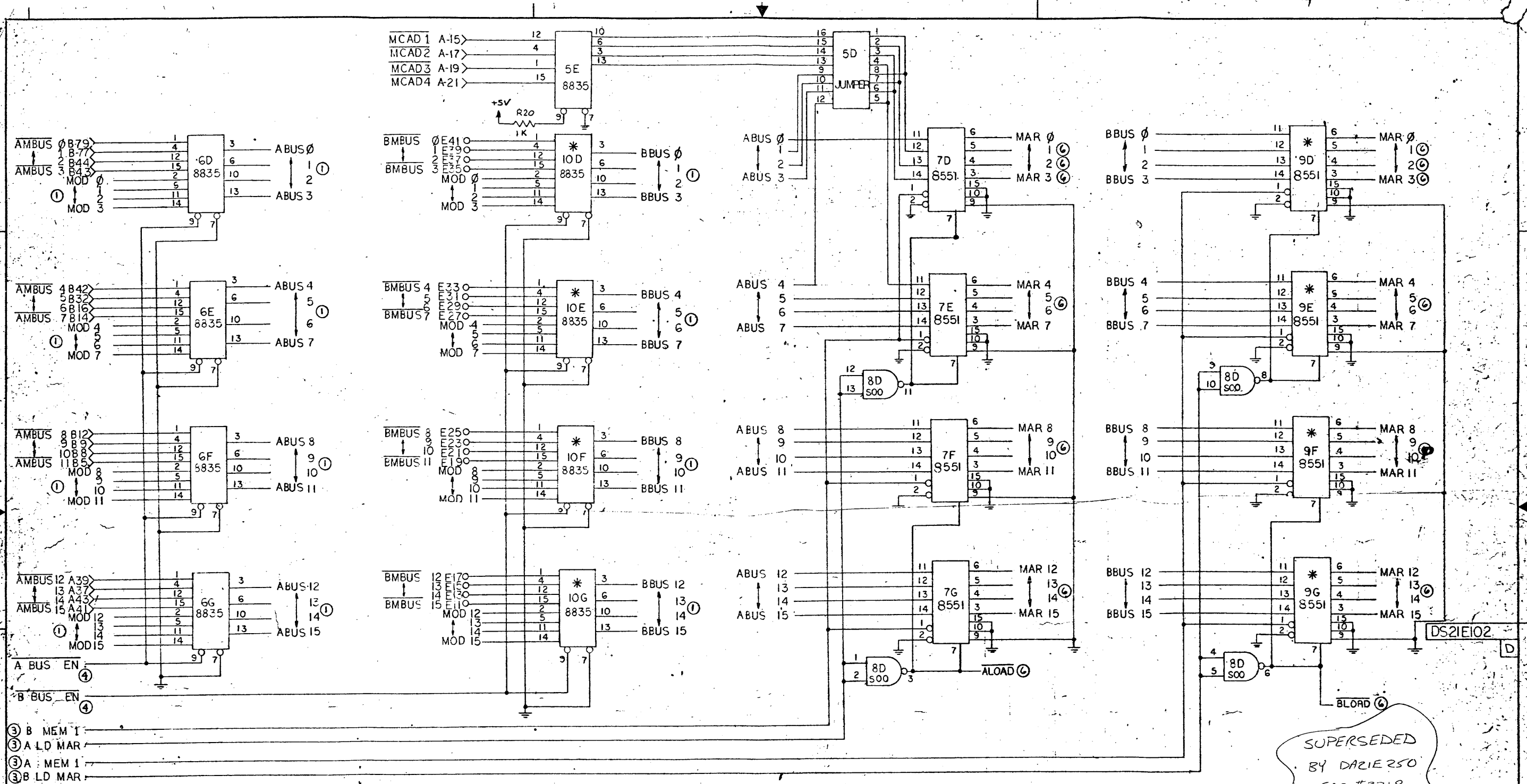
VOLTAGE FEEDS FOR CONNECTORS PA, PB	
+12 VOLTS	B46, A7, A8
-5 VOLTS	B18
-12 VOLTS	B71, B72
+5 VOLTS	A/B3, A/B4, A/B97, A/B98
GND	A/B1, A/B2, A/B99, A/B100

DS21E102

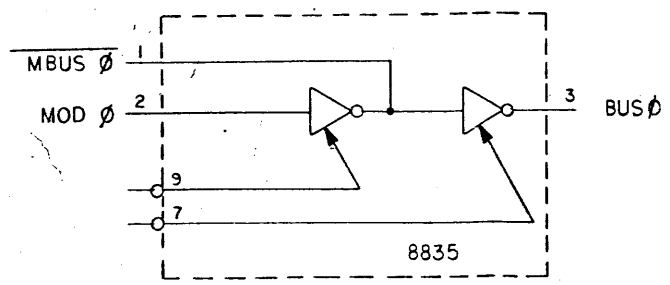
*Handwritten:* SUPERSEDED BY DAZ1E250 ECO #3318 1/9/80 D. Stewart

\* INDICATES IC'S WHICH CAN BE REMOVED AND CONNECTIONS WHICH CAN BE ADDED TO DISABLE B PORT LOGIC.

TOLERANCES		DECIMAL	
.XX	± 0.01	D	ECO # 2934
.XXX	± 0.005	C/E	ECO # 2729
.XXXX	± 0.001	B2	ECO # 2682
FRACTIONAL	± 1/100	1/2	REL ECO # 2595
ANGULAR	± 1°00'	SYM	REVISION DESCRIPTION
DRN	T. R. Bono	APPD	DATE
CHK	L. J. ...		
ENGR	R. E. ...		
PROJ	L. J. ...		
MFG	...		
SIGNATURE	DATE	SCALE	DWG NO.
		NONE	DS21E102
		REMOVE ALL BURRS AND SHARP EDGES	SHEET 1 OF 1



- ③ B MEM 1
- ③ A LD MAR
- ③ A MEM 1
- ③ B LD MAR



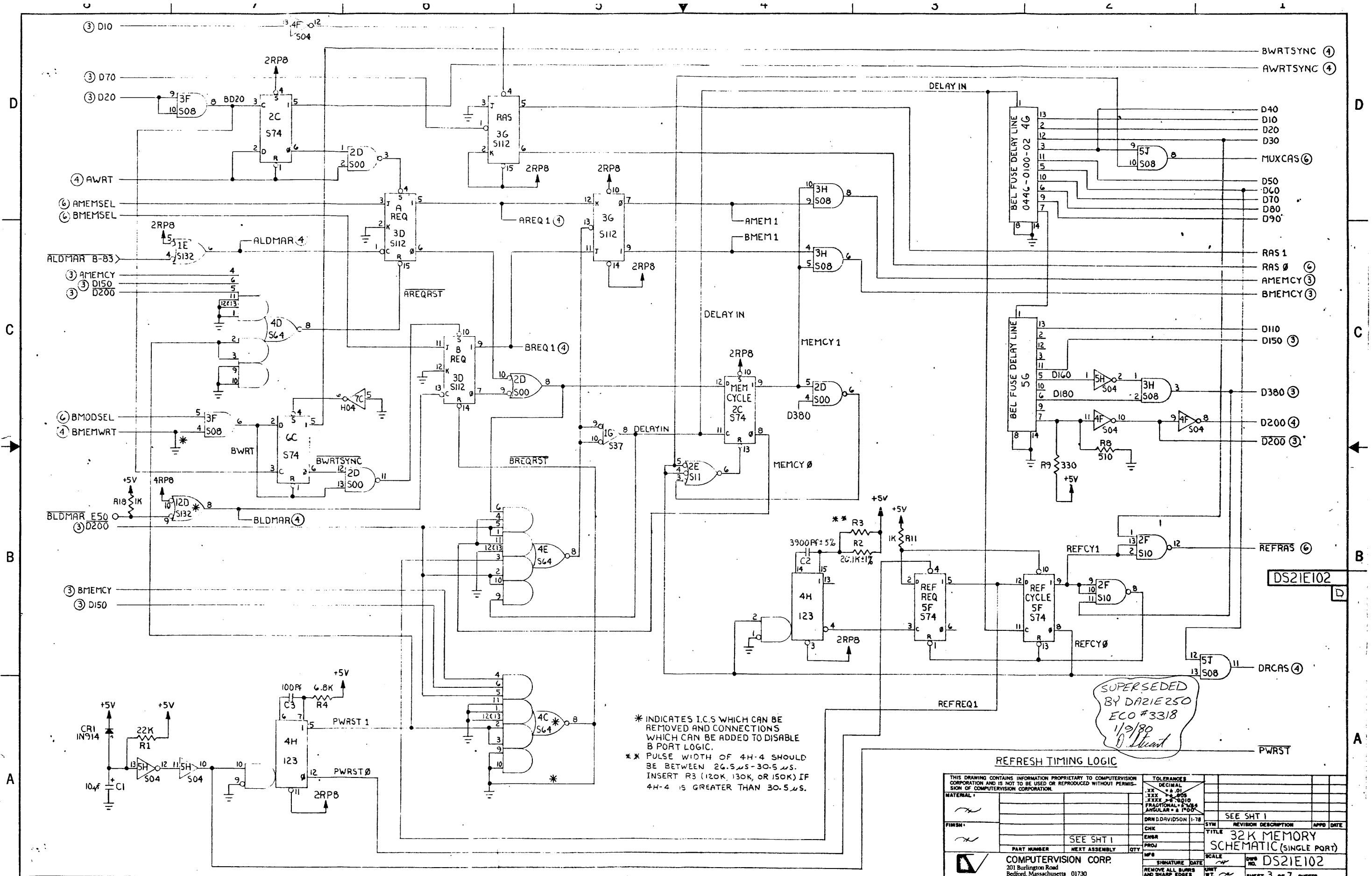
5D JUMPER PLUG	
MUC OPERATION	1, 16
	2, 15
	3, 14
	4, 13
NON MUC OPERATION	5, 12
	6, 11
	7, 10
	8, 9

\* INDICATES IC'S WHICH CAN BE REMOVED AND CONNECTIONS WHICH CAN BE ADDED TO DISABLE B PORT LOGIC.

SUPERSEDED  
BY DAZIER250  
ECO #3318  
1/9/80  
*D. Stuart*

BUS & MAR LOGIC

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES XX ± .01 XXX ± .005 XXXX ± .001 FRACTIONAL ± .001 ANGULAR ± 1°		DECIMAL	
MATERIAL		DRN	TRAIL	1/76	SEE SHT. 1
FINISH		CHK			
	SEE SHT 1	ENGR			
		PROJ			
PART NUMBER	NEXT ASSEMBLY	QTY			
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			SIGNATURE	DATE	SCALE NONE
			REMOVE ALL BURNS AND SHARP EDGES	UNIT	DWG NO. DS21E102
					SHEET 2 OF 7 SHEETS



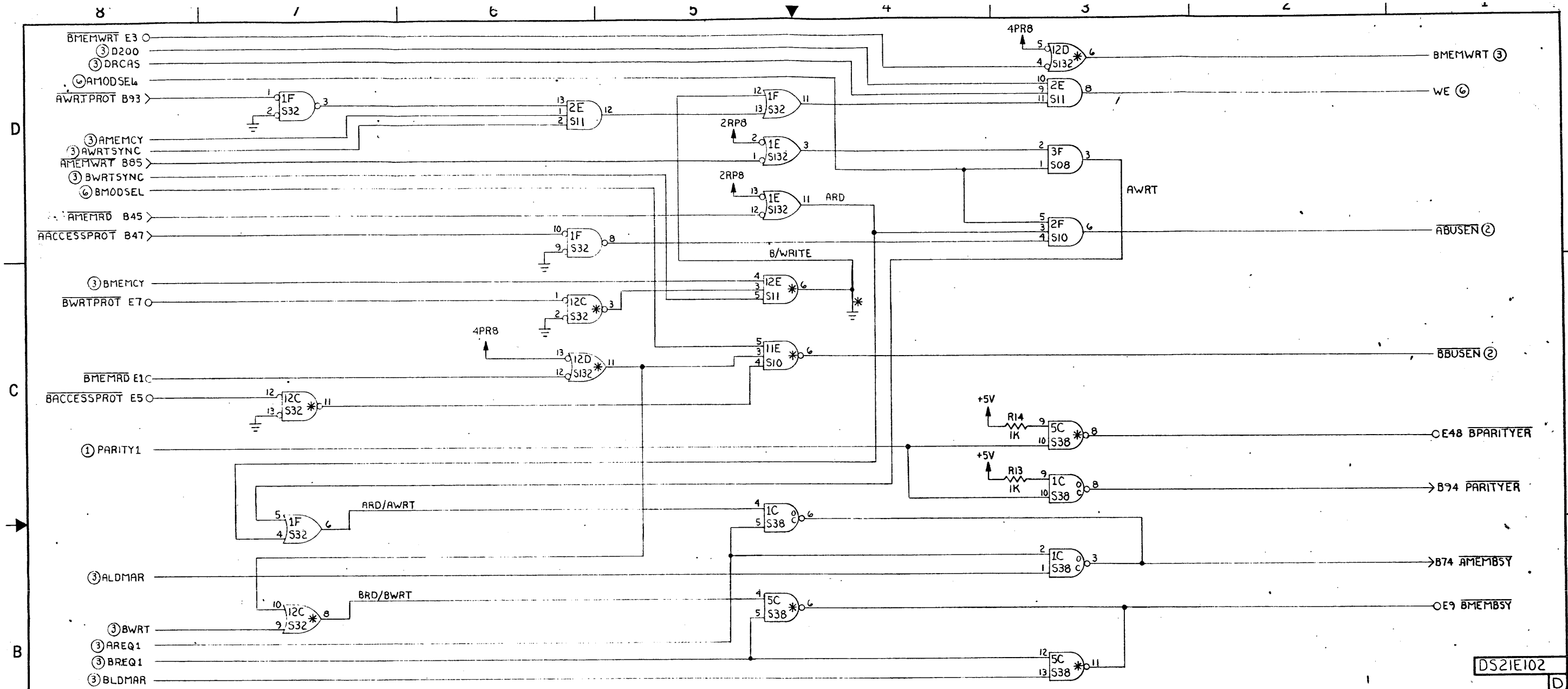
\* INDICATES I.C.S WHICH CAN BE REMOVED AND CONNECTIONS WHICH CAN BE ADDED TO DISABLE B PORT LOGIC.  
 \*\* PULSE WIDTH OF 4H-4 SHOULD BE BETWEEN 26.5μs-30.5μs. INSERT R3 (120K, 130K, OR 150K) IF 4H-4 IS GREATER THAN 30.5μs.

SUPERSEDED BY DAZIER250 ECO #3318 1/9/80 D. Stuart

REFRESH TIMING LOGIC

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES DECIMAL .XX = ±.01 .XXX = ±.005 .XXXX = ±.0010 FRACTIONAL = ±.005 ANGULAR = ±.008	SEE SHT 1
MATERIAL		DRN D DAVIDSON 11-78	SEE SHT 1
FINISH		CHK	SYN
	SEE SHT 1	ENBR	REVISION DESCRIPTION
PART NUMBER	NEXT ASSEMBLY	QTY	APPR DATE
			TITLE
			32K MEMORY
			SCHEMATIC (SINGLE PORT)
			SCALE
			DWG NO. DS21E102
			SHEET 3 OF 7 SHEETS

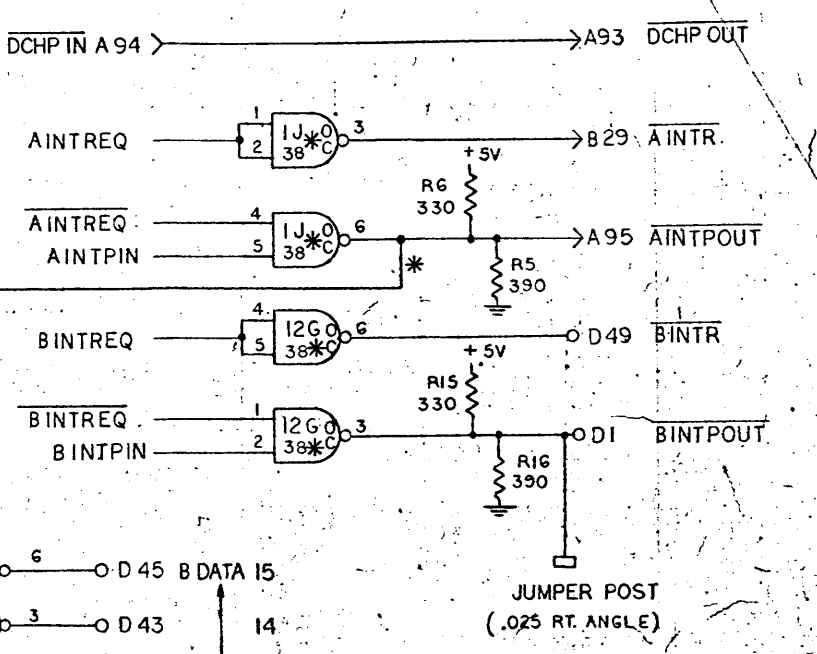
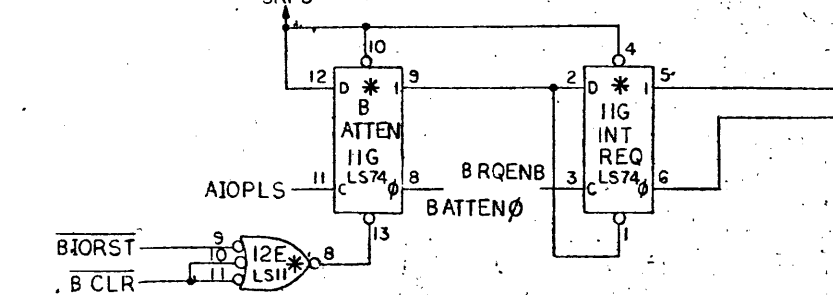
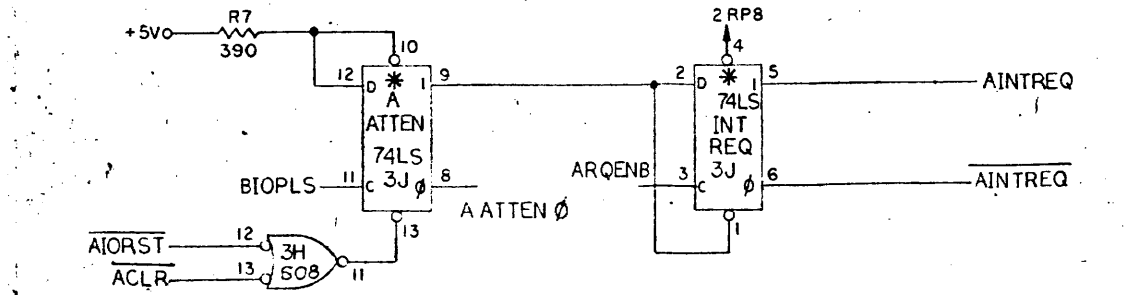
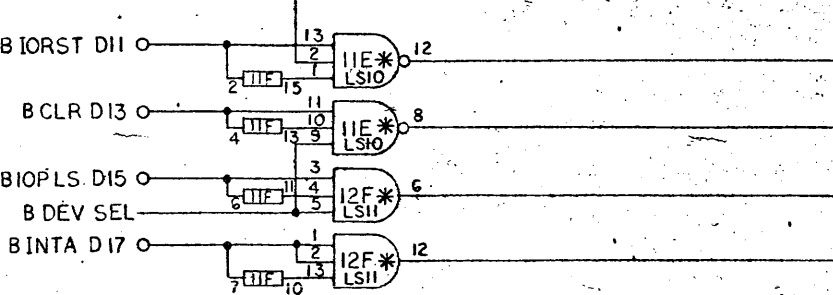
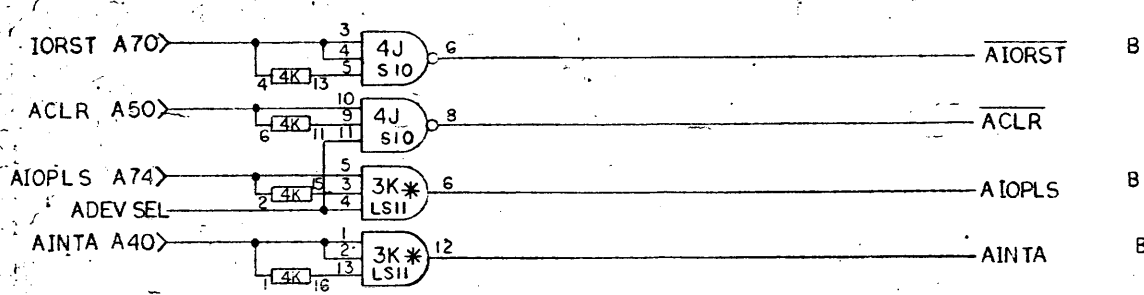
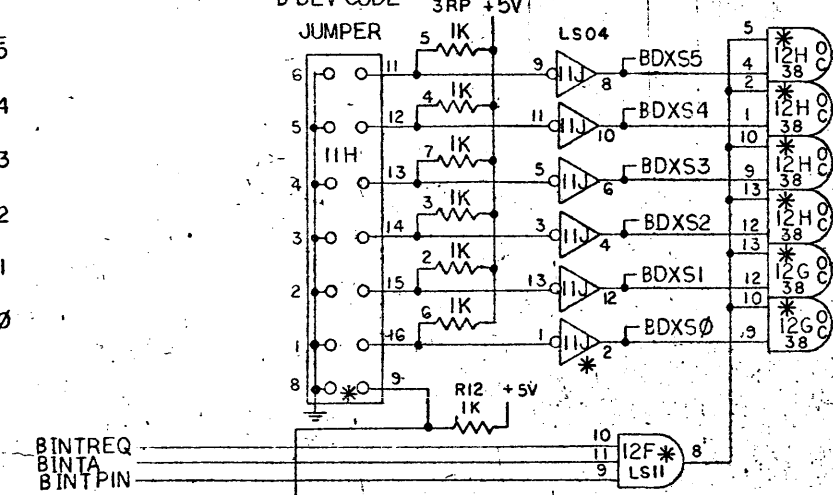
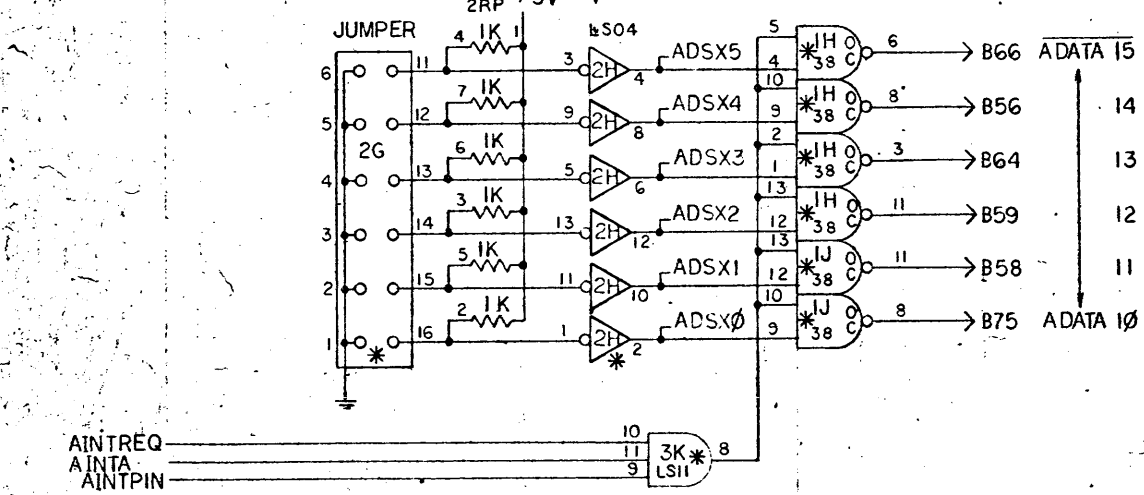
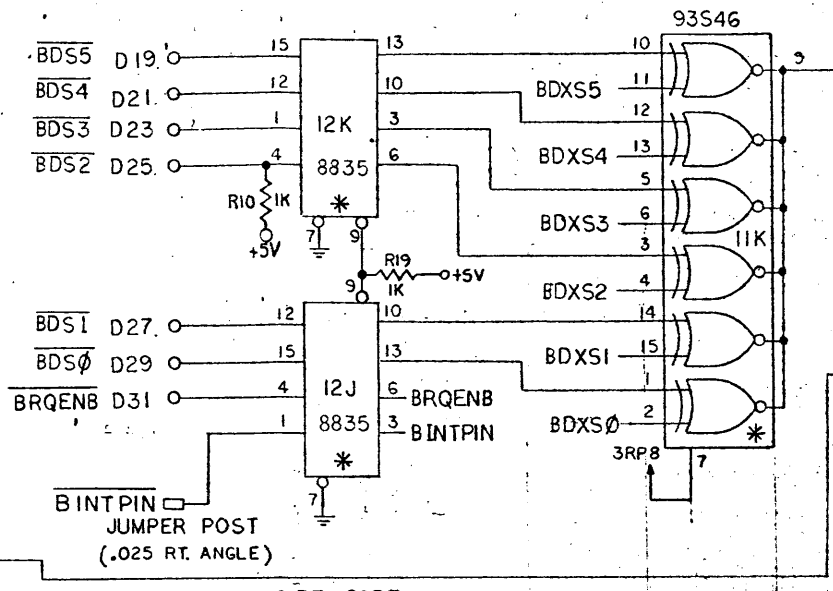
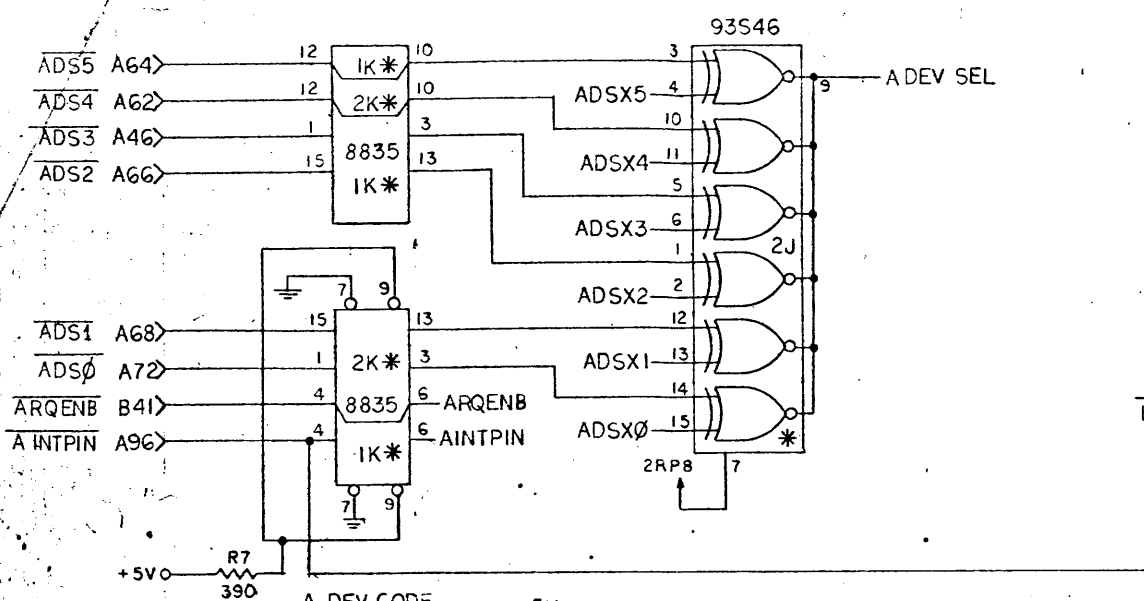
COMPUTERVISION CORP.  
 201 Burlington Road  
 Bedford, Massachusetts 01730



SUPERCEDED  
BY DAZI250  
ECO #3318  
1/9/80  
D. Stuart

BUS CONTROL LOGIC

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MATERIAL:		CHK	SYN	SEE SHT 1
FINISH:		ENGR	REV	32K MEMORY SCHEMATIC(SINGLE PORT)
	SEE SHT 1	PROJ	DATE	DS21E102
PART NUMBER	NEXT ASSEMBLY	QTY	SCALE	NO. 4 OF 7 SHEETS
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE	DATE	
REMOVE ALL BURRS AND SHARP EDGES		WGT.		

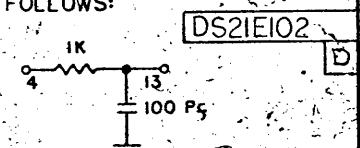


**NOTE:**

INSERT ALL JUMPERS IN "A DEV CODE JUMPER BLOCK" AND "B DEV CODE JUMPER BLOCK" WHEN NOT USING B PORT.

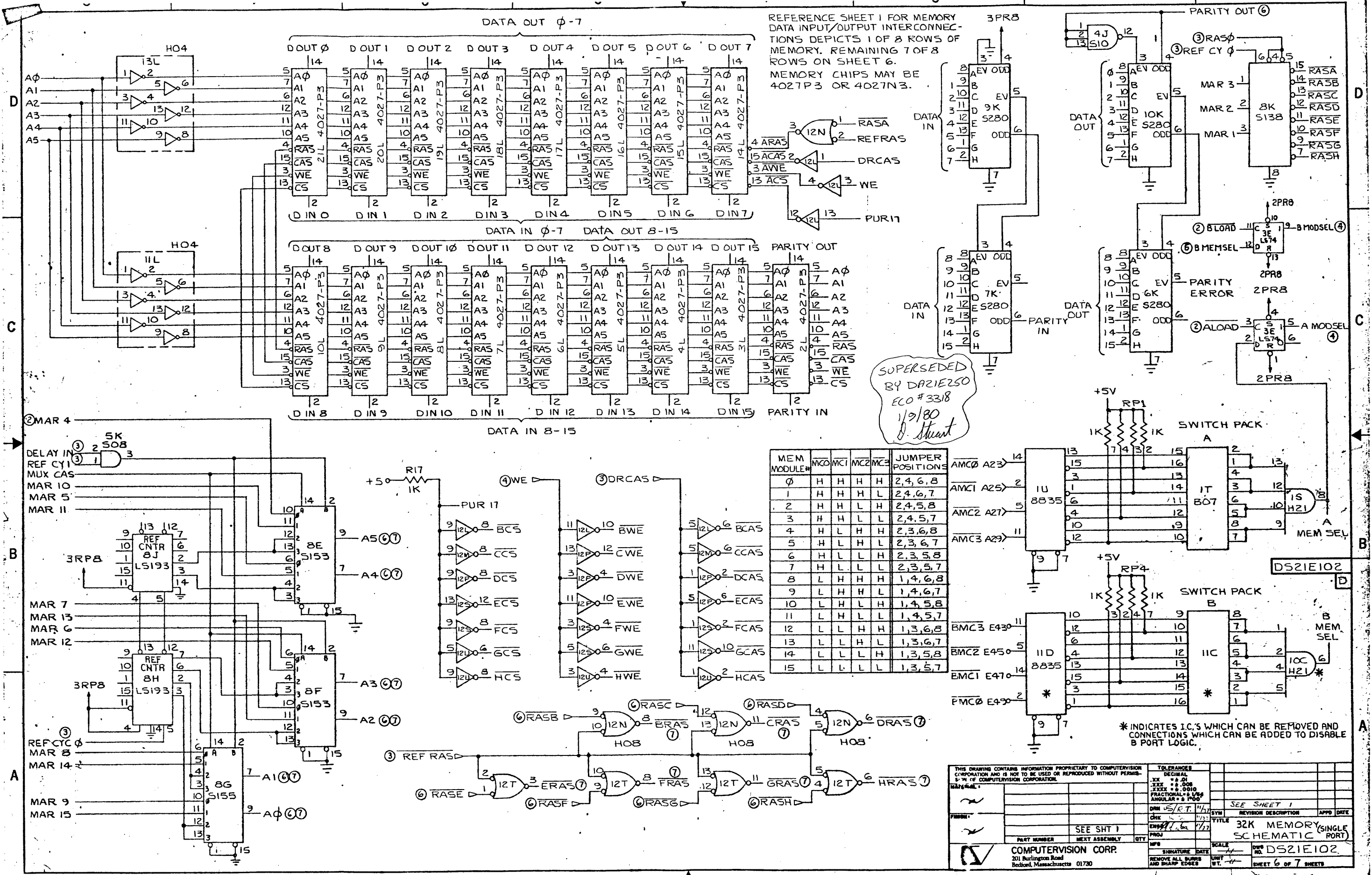
\* INDICATES I.C.'S WHICH CAN BE REMOVED AND CONNECTIONS WHICH CAN BE ADDED TO DISABLE B PORT LOGIC.

4K&1F ARE RC FILTERS CONNECTED AS FOLLOWS:



*SUPERSEDED BY DAZIERSC ECO #3318 1/9/80 J. Hunt*

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MATERIAL:		XX ± .01		
		XXX ± .05		
		FRACTIONAL ± USA		
		ANGULAR ± 1° 10'		
DRN: T. Brown	CHK: [Signature]	SYN: [Signature]	REVISION DESCRIPTION	APPD DATE
ENGR: [Signature]	PROJ: [Signature]	SEE SHT 1		
PART NUMBER	NEXT ASSEMBLY	QTY	TITLE	
COMPUTERVISION CORP.			32K MEMORY (SINGLE SCHEMATIC PART)	
SOUTH AVENUE			SCALE: NONE	OWN: DS21E102
BURLINGTON, MASS. 01803			REMOVE ALL BURRS AND SHARP EDGES	UNIT: [Blank]
			WT: [Blank]	SHEET 5 OF 7 SHEETS



SUPERSEDED BY DAZIELSO  
ECO #3318  
1/9/80  
J. Stuart

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISS-  
ION OF COMPUTERVISION CORPORATION.

REV	DESCRIPTION	DATE
1	ISSUED FOR FABRICATION	11/17/77
2	REVISED TO ADD B PORT LOGIC	1/17/78
3	REVISED TO ADD B PORT LOGIC	1/17/78
4	REVISED TO ADD B PORT LOGIC	1/17/78
5	REVISED TO ADD B PORT LOGIC	1/17/78
6	REVISED TO ADD B PORT LOGIC	1/17/78
7	REVISED TO ADD B PORT LOGIC	1/17/78
8	REVISED TO ADD B PORT LOGIC	1/17/78
9	REVISED TO ADD B PORT LOGIC	1/17/78
10	REVISED TO ADD B PORT LOGIC	1/17/78
11	REVISED TO ADD B PORT LOGIC	1/17/78
12	REVISED TO ADD B PORT LOGIC	1/17/78
13	REVISED TO ADD B PORT LOGIC	1/17/78
14	REVISED TO ADD B PORT LOGIC	1/17/78
15	REVISED TO ADD B PORT LOGIC	1/17/78
16	REVISED TO ADD B PORT LOGIC	1/17/78
17	REVISED TO ADD B PORT LOGIC	1/17/78
18	REVISED TO ADD B PORT LOGIC	1/17/78
19	REVISED TO ADD B PORT LOGIC	1/17/78
20	REVISED TO ADD B PORT LOGIC	1/17/78

COMPUTERVISION CORP.  
201 Burlington Road  
Bedford, Massachusetts 01730

TOLERANCES  
DECIMAL  
XX = ±.01  
XXX = ±.005  
XXXX = ±.0010  
FRACTIONAL = ± 1/100  
ANGULAR = ± 1°00'

SEE SHEET 1

REVISION DESCRIPTION

DATE

APPRO

TITLE  
32K MEMORY (SINGLE PORT)  
SCHEMATIC

PROJ

SCALE

DWG NO. DS21E102

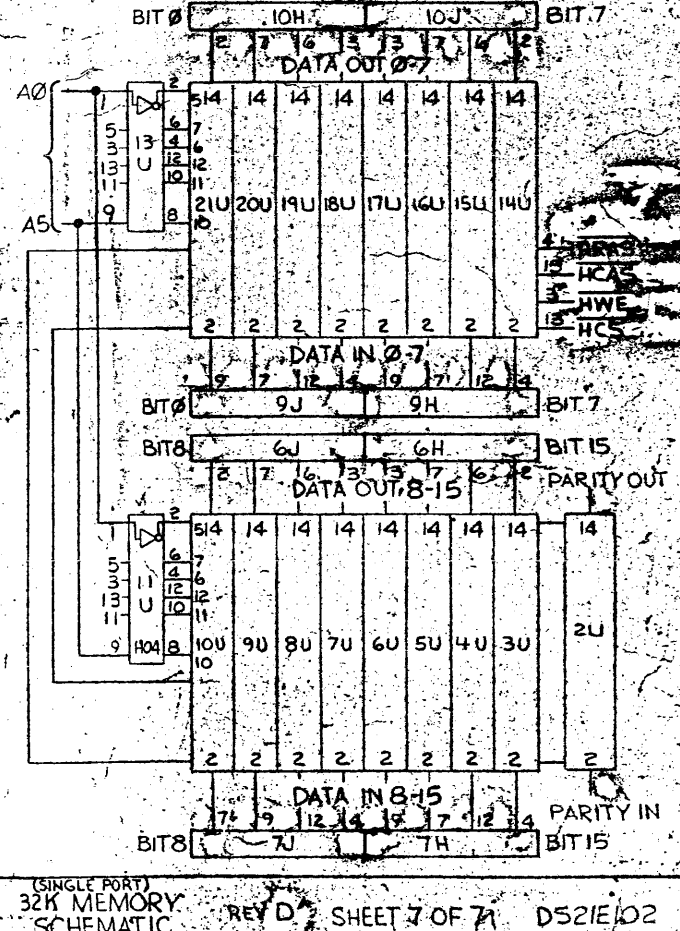
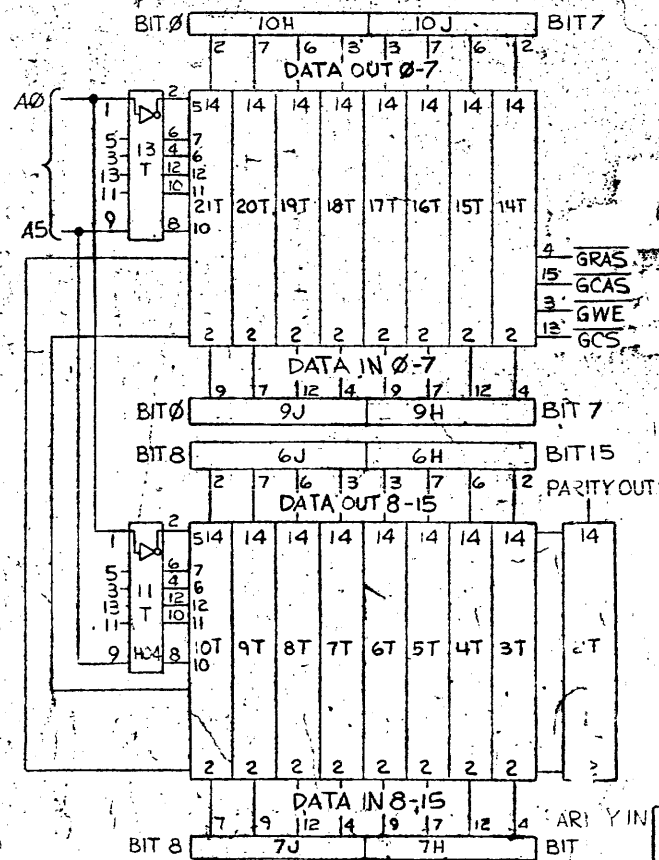
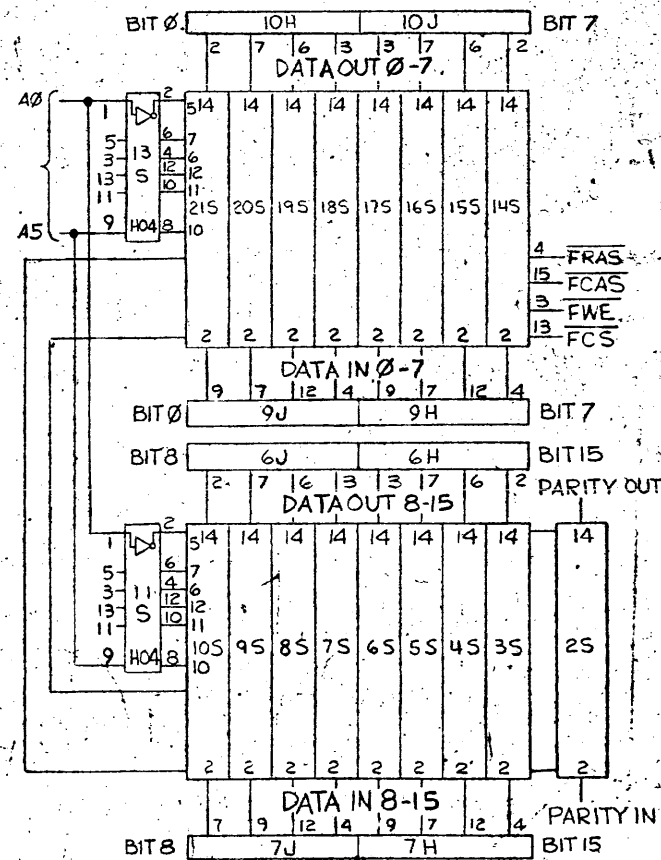
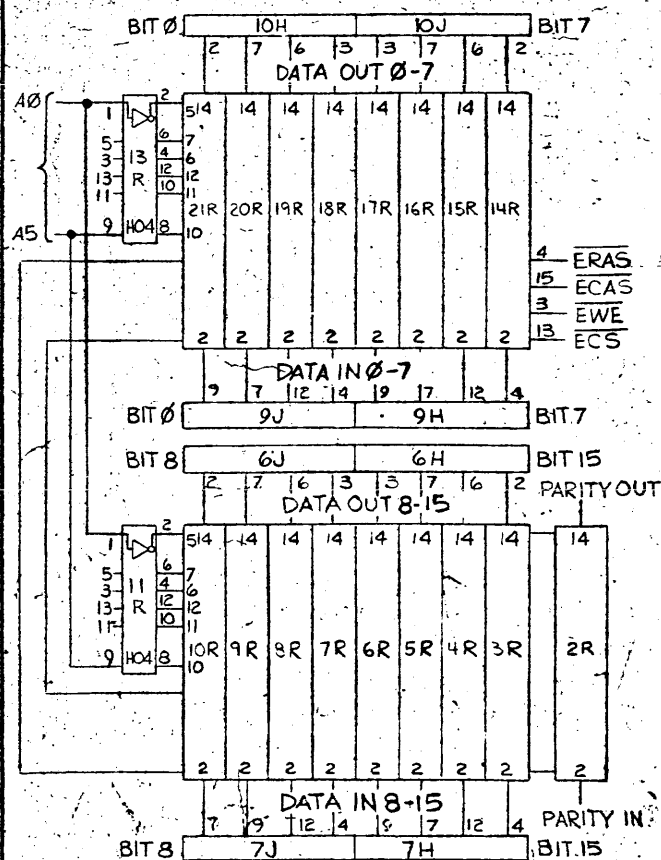
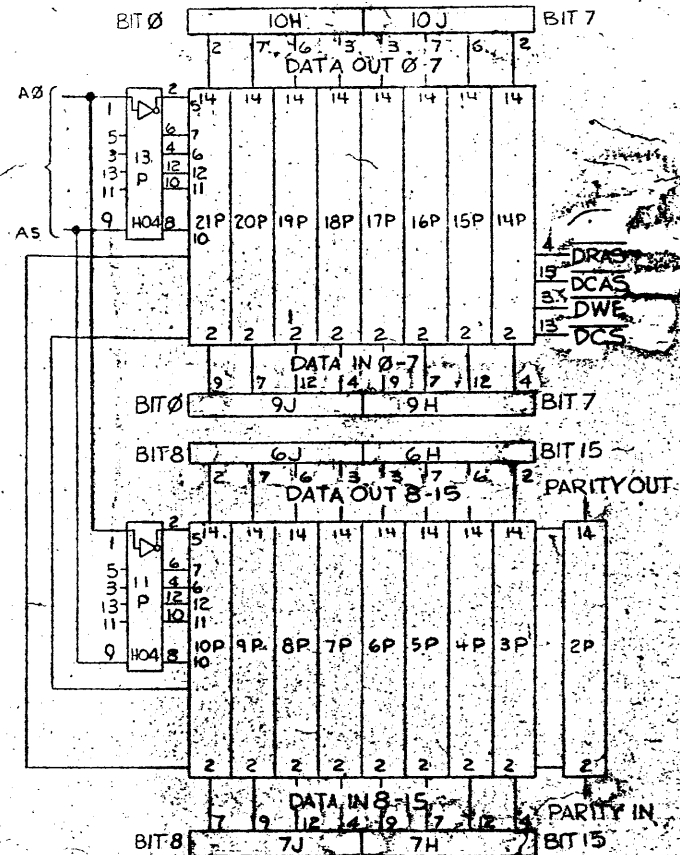
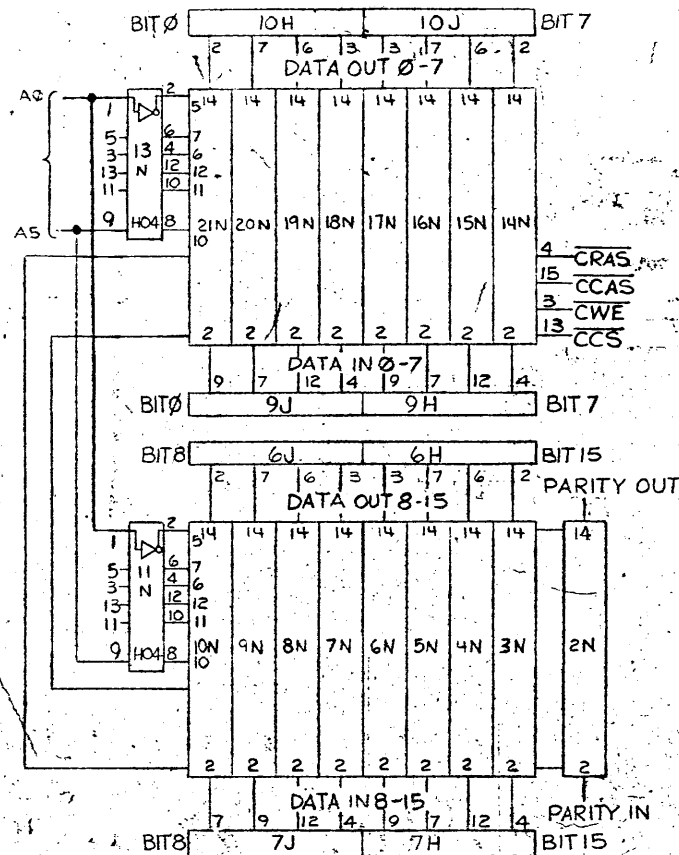
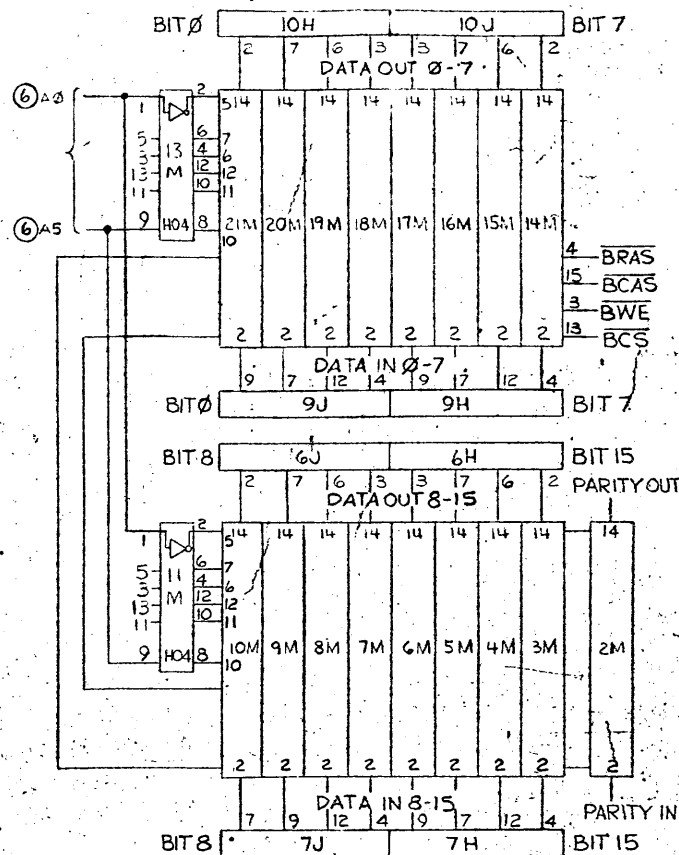
SHEET 6 OF 7 SHEETS



### MEMORY ARRAY

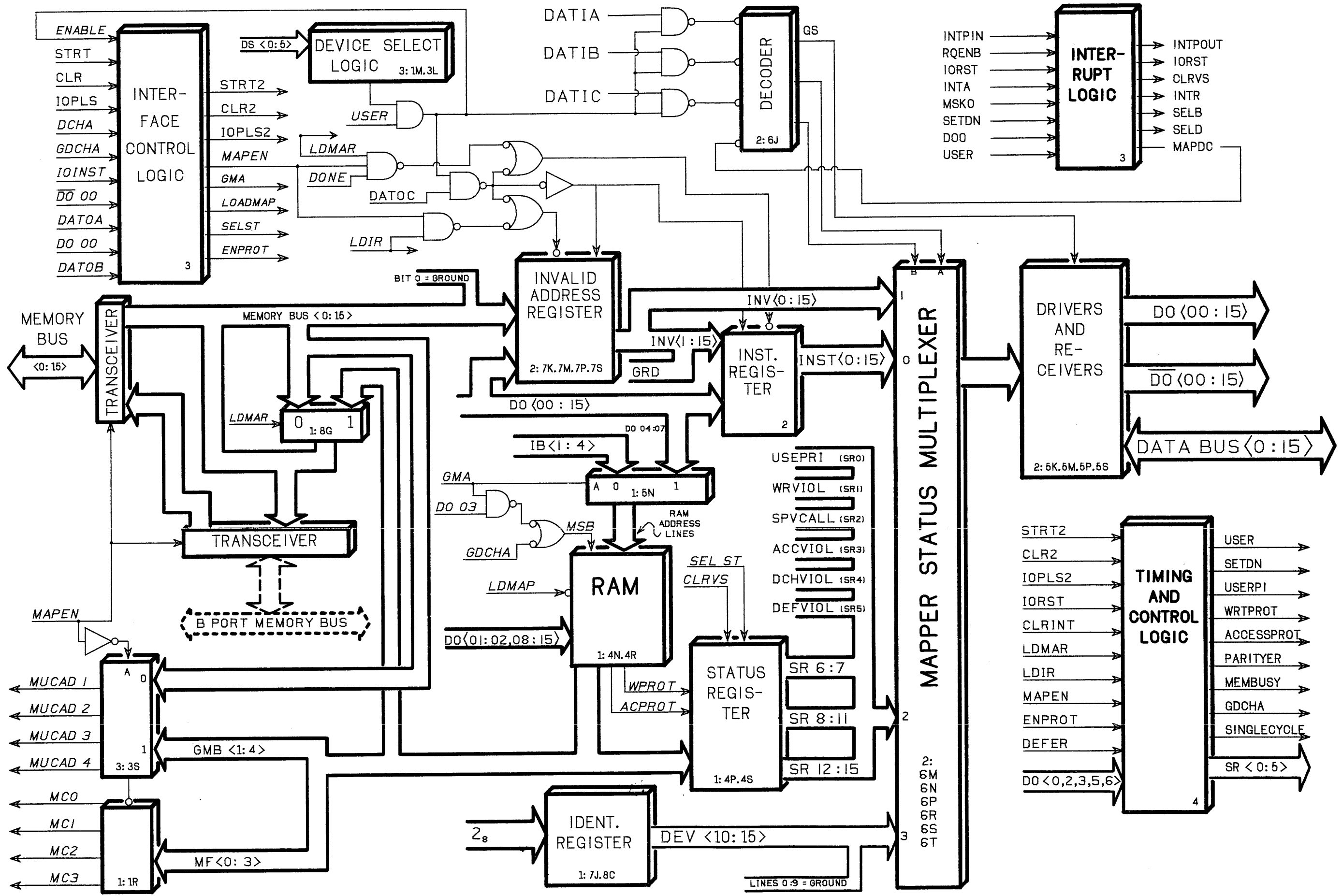
FOR MORE DETAIL OF TYPICAL  
4K MEMORY SEE SHEET 5.  
FOR MEMORY DATA INPUT/OUTPUT  
INTERCONNECTIONS, SEE SHEET 1.

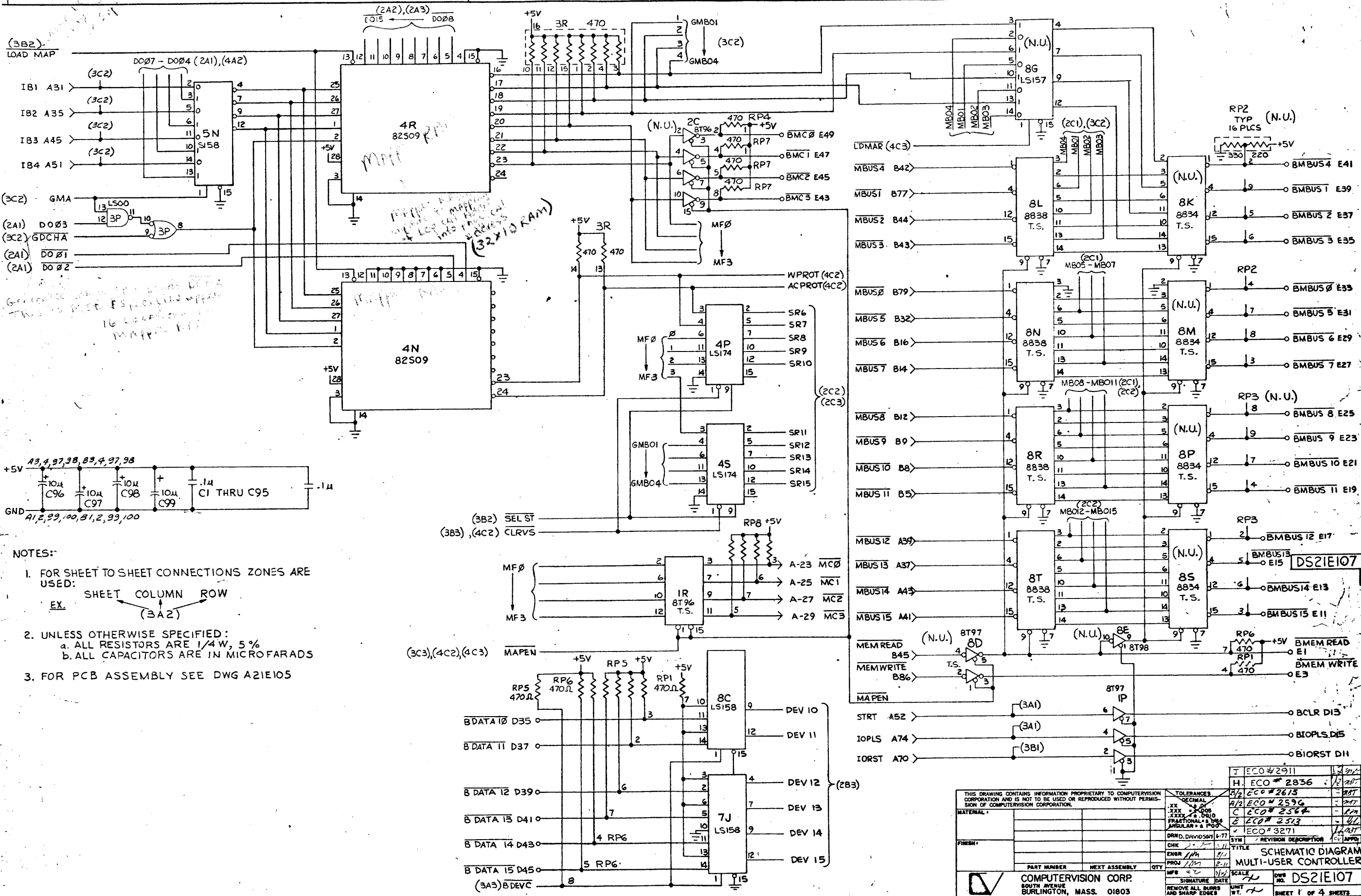
NOTE:  
ALL PWR. PINS ON 4027-P3 OR N3 ARE:  
+5V PIN 9  
-5V PIN 1  
GND PIN 16  
+12V PIN 8



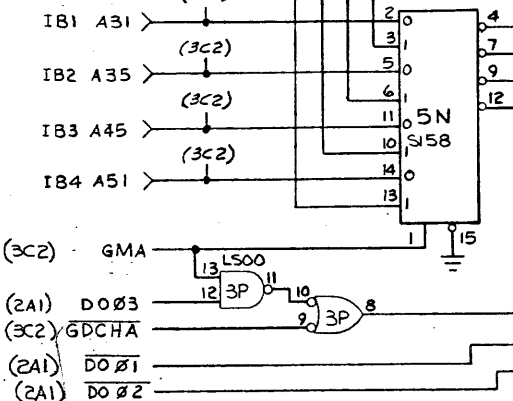
## Memory Management and Protection Unit

	<u>Sheet No.</u>
Block Diagram	
Mapper RAM	1
Bus Logic	1
Mapper Status	2
I/O Logic	3
Timing Logic	4
Protection Logic	4

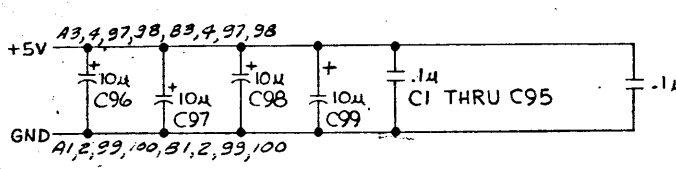




(3B2) LOAD MAP

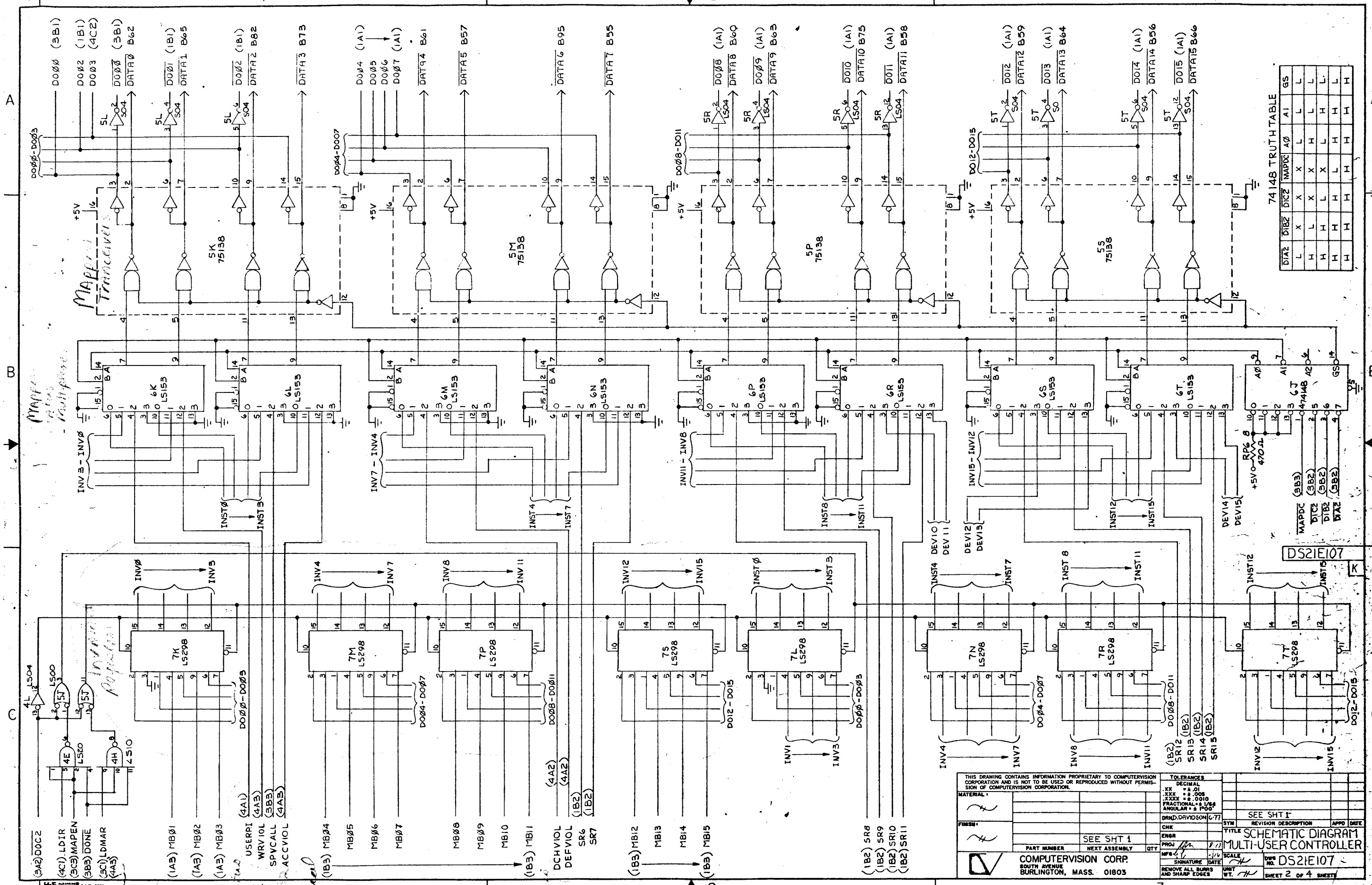


DO07 - DO04 (2A1), (4A2)  
DO03 (2A1)  
GDCHA (3C2)  
DO01 (2A1)  
DO02 (2A1)



- NOTES:
- FOR SHEET TO SHEET CONNECTIONS ZONES ARE USED:  
SHEET COLUMN ROW  
EX. (3A2)
  - UNLESS OTHERWISE SPECIFIED:  
a. ALL RESISTORS ARE 1/4W, 5%  
b. ALL CAPACITORS ARE IN MICROFARADS
  - FOR PCB ASSEMBLY SEE DWG A21E105

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MATERIAL:	DRND. DRVIDSON 8-77	CHK 2-11-78	ENGR 1/11/78
FINISH:	PROJ 1/11/78	MFG 2/11/78	SCALE 1/2"
PART NUMBER	NEXT ASSEMBLY	QTY	TITLE
COMPUTERVERSION CORP.	SOUTH AVENUE	BURLINGTON, MASS. 01803	SHEET 1 OF 4 SHEETS



74148 TRUTH TABLE

DATA2	DIB2	DIC2	MAPDC A0	A1	GS
L	X	X	X	L	L
L	X	X	X	H	L
L	X	X	X	L	H
L	X	X	X	H	H
H	X	X	X	L	L
H	X	X	X	L	H
H	X	X	X	H	L
H	X	X	X	H	H

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TOLERANCES  
 DECIMAL  
 .XX = ± .05  
 .XXX = ± .005  
 .XXXX = ± .0010  
 FRACTIONAL = ± 1/16  
 ANGULAR = ± 1°00'

DRND. DAVIDSON/G-77

SEE SHT 1

REVISION DESCRIPTION

APPD DATE

SYM

ENGR

PROJ

DATE

SCALE

SIGNATURE DATE

REMOVE ALL BURRS AND SHARP EDGES

UNIT WT.

COMPUTERVISION CORP.  
 80TH AVENUE  
 BURLINGTON, MASS. 01803

TITLE  
 SCHEMATIC DIAGRAM  
 MULTI-USER CONTROLLER

PART NUMBER  
 NEXT ASSEMBLY  
 QTY

NEW NO. 100

DATE

DRW NO. DS2IE107

SHEET 2 OF 4 SHEETS

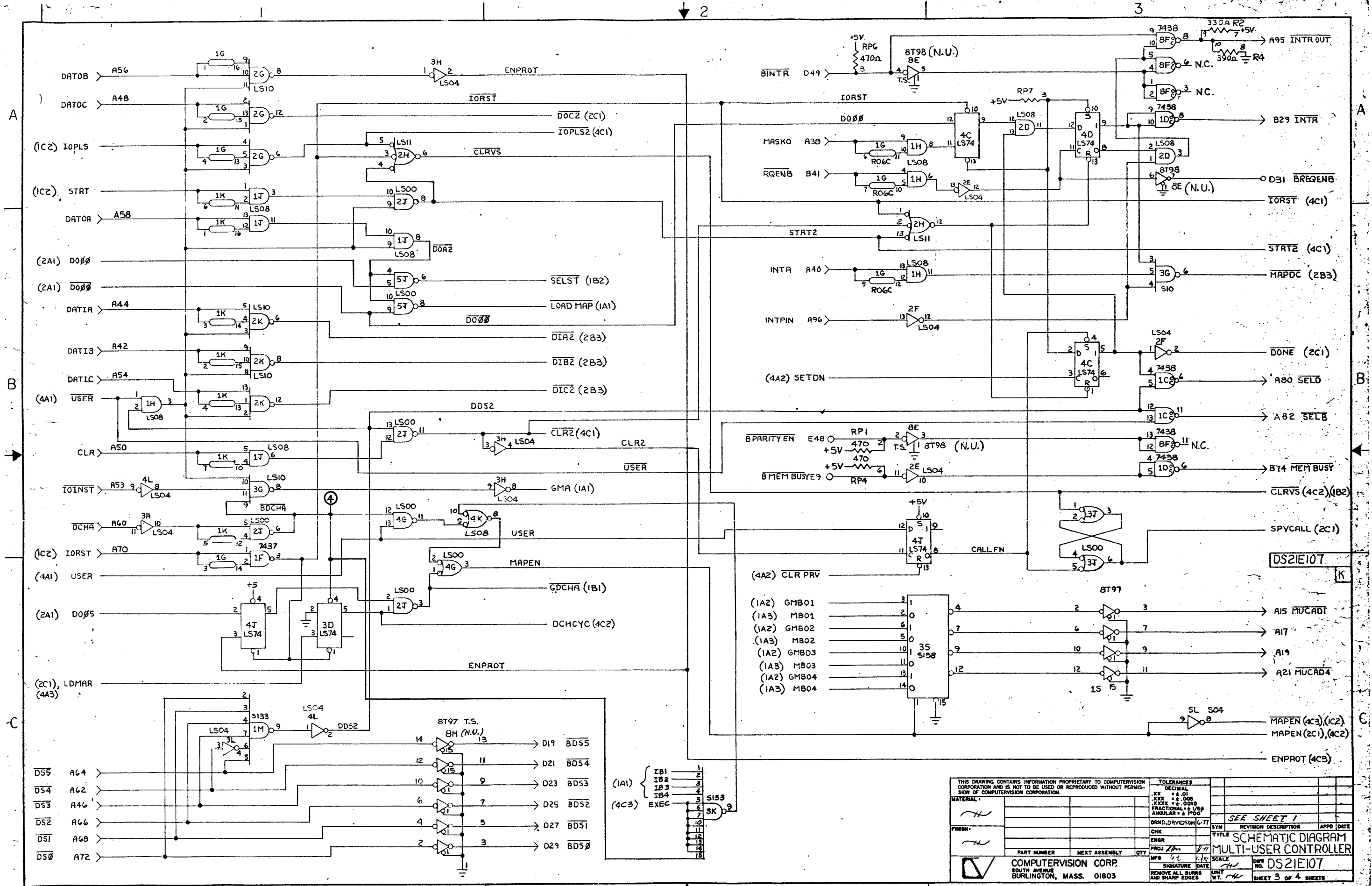
MAPDC  
 Multiplexer

MAPPING  
 TRACIVERS

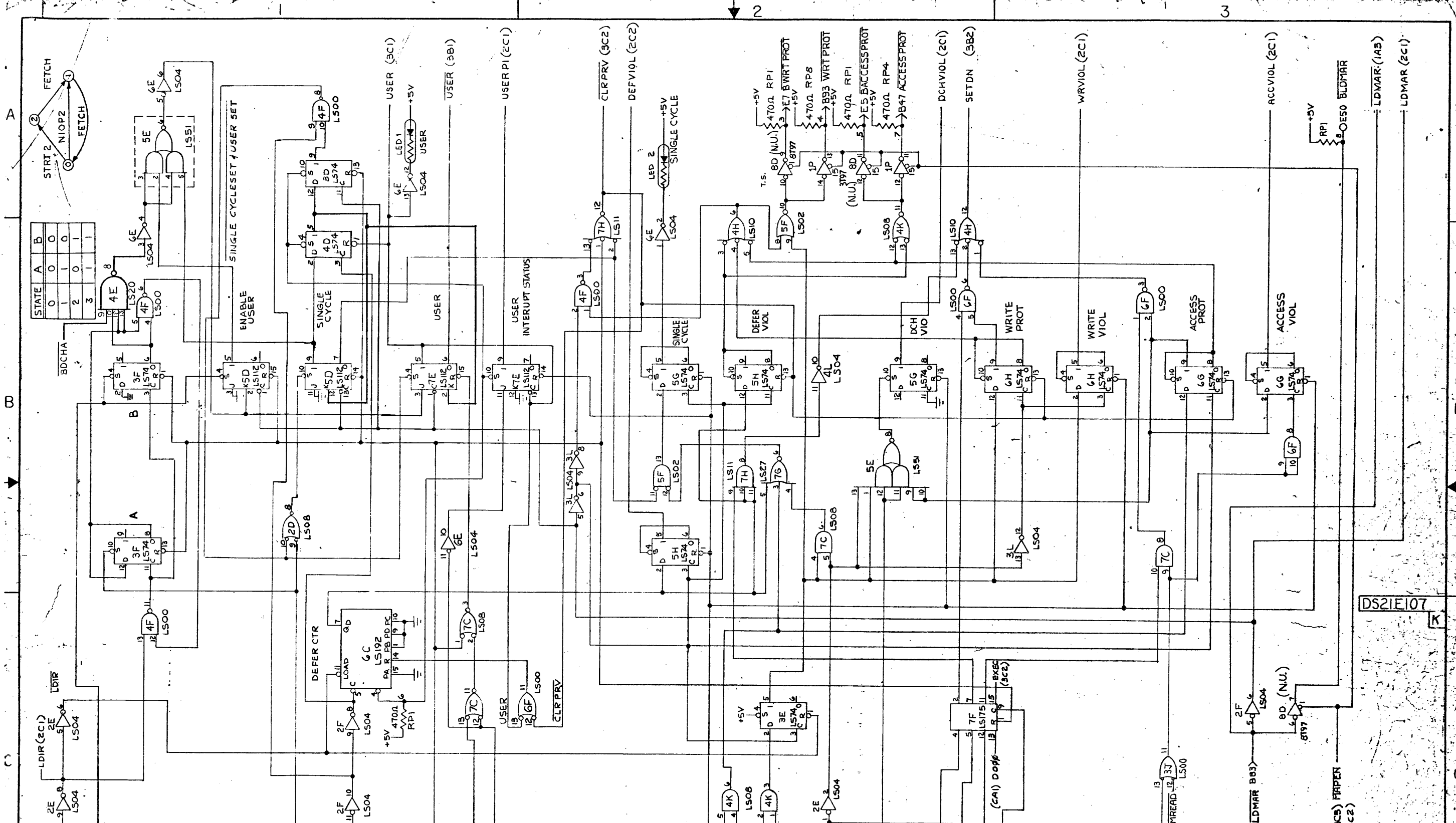
DS2IE107

SEE SHT 1

Handwritten notes and signatures at the bottom left of the page.



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MATERIAL		DRND. DAVIDSON (L-7)	SEE SHEET 1
FINISH		CHK	REVISION DESCRIPTION
		ENBR	APPO DATE
PART NUMBER	NEXT ASSEMBLY	QTY	TITLE
			SCHEMATIC DIAGRAM
			MULTI-USER CONTROLLER
COMPUTERVISION CORP.	SOUTH AVENUE	BURLINGTON, MASS. 01803	SCALE
			DWG NO. DS21E107
			SHEET 3 OF 4 SHEETS



STATE

A	B
0	0
1	1
2	0
3	1

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TOLERANCES			
.XX	DECIMAL		
.XXX	" + .00		
.XXXX	" + .0010		
FRACTIONAL	" + .0001		
ANGULAR	" + .0001		
MATERIAL			
FINISH			
DRWD, DRVIDSON	4-77		SEE SHT 1
CHK			
ENGR			
PROJ			
MPB			
SIGNATURE			
DATE			
REMOVE ALL BUBBS AND SHARP EDGES			
UNIT			
WT			
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803			
TITLE: SCHEMATIC DIAGRAM MULTI-USER CONTROLLER			
DWG NO: DS21E107			
SHEET 4 OF 4 SHEETS			

DS21E107

Q

A

2

2

3

3

A

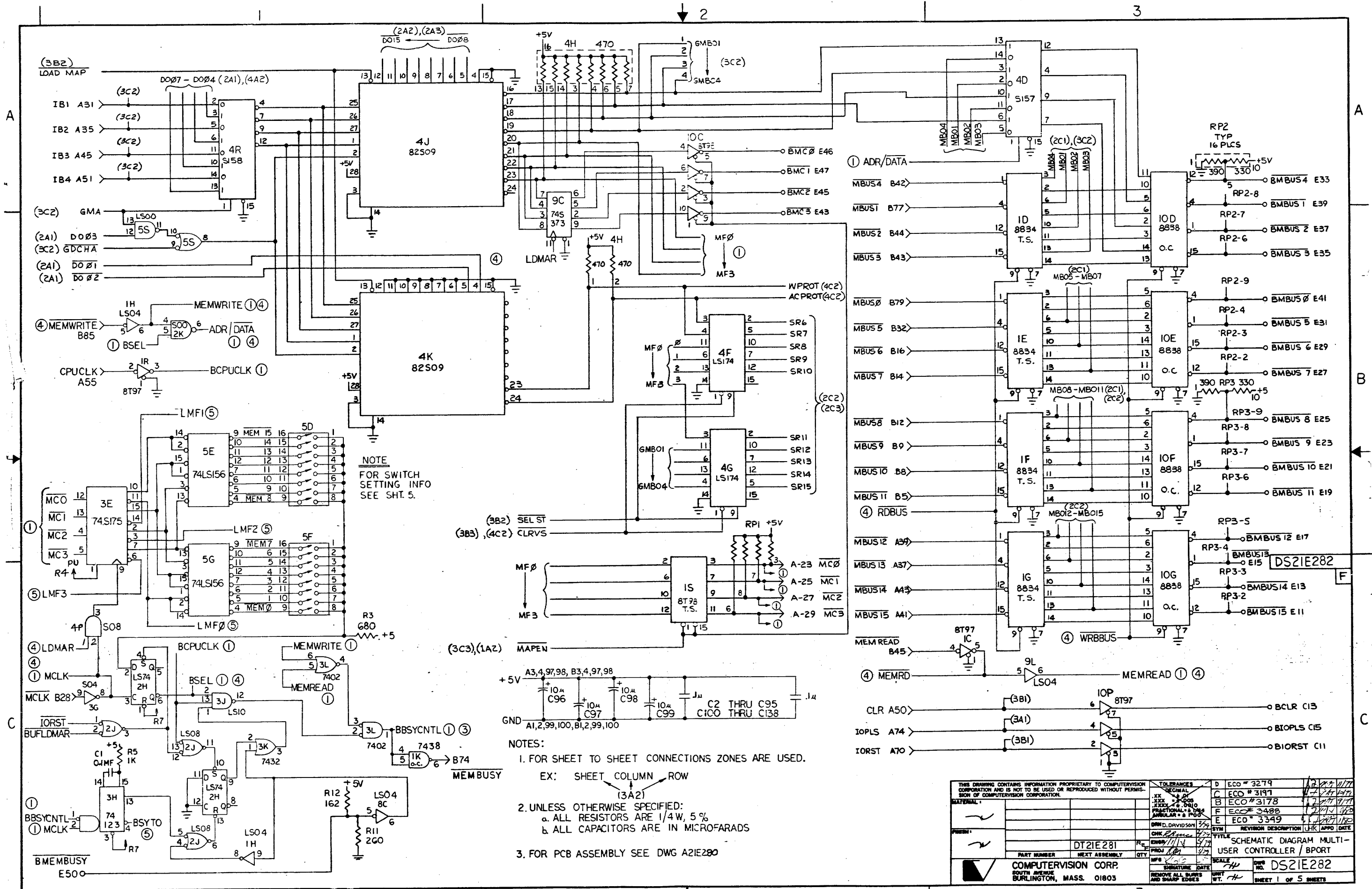
B

K

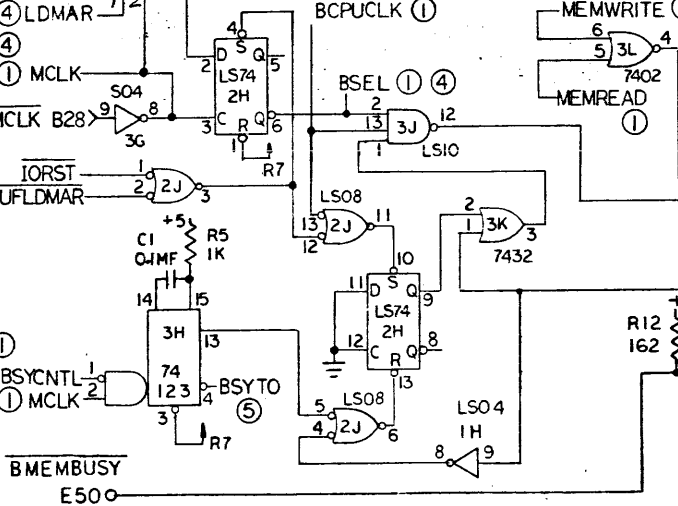
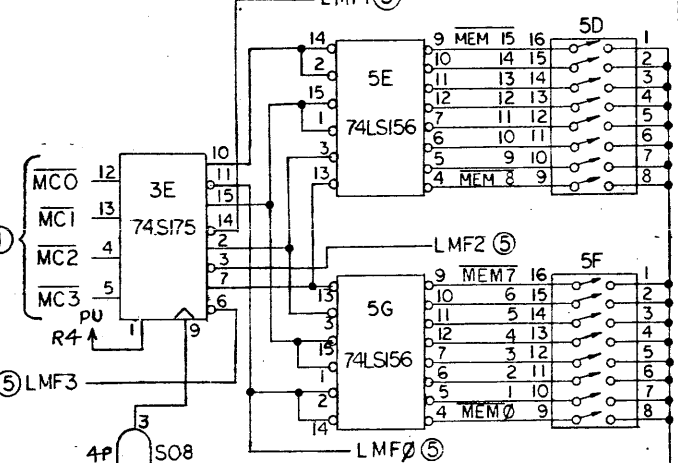
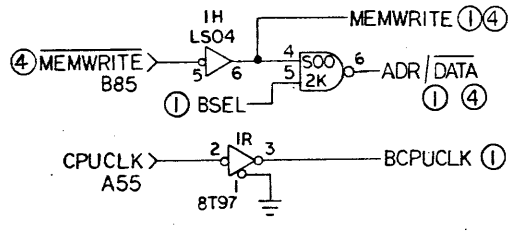
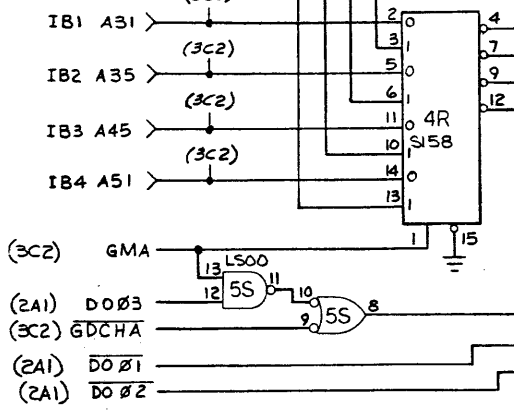
## **B-Port Memory Management and Protection Unit**

	<u>Sheet No.</u>
Mapper RAM	1
Bus Logic	1
Mapper Status Logic	2
I/O Logic	3
Timing Logic	4
Protection Logic	4
Switch Settings	5
Jumper Configuration	5
B-Port Connector Pinouts	5

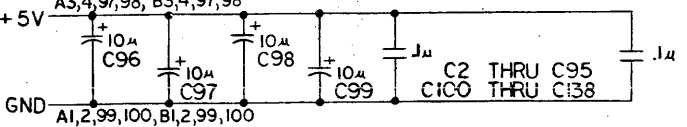
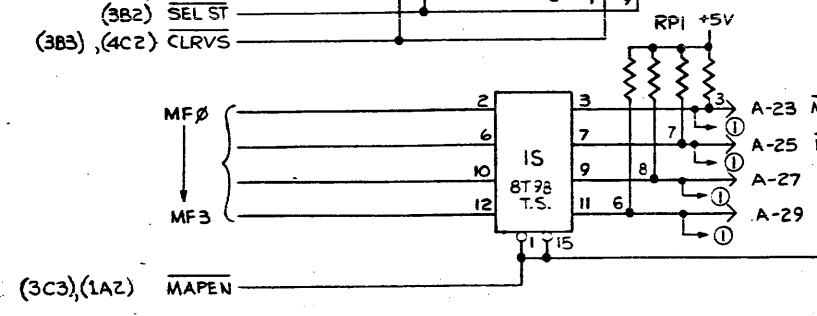




(3B2)  
LOAD MAP

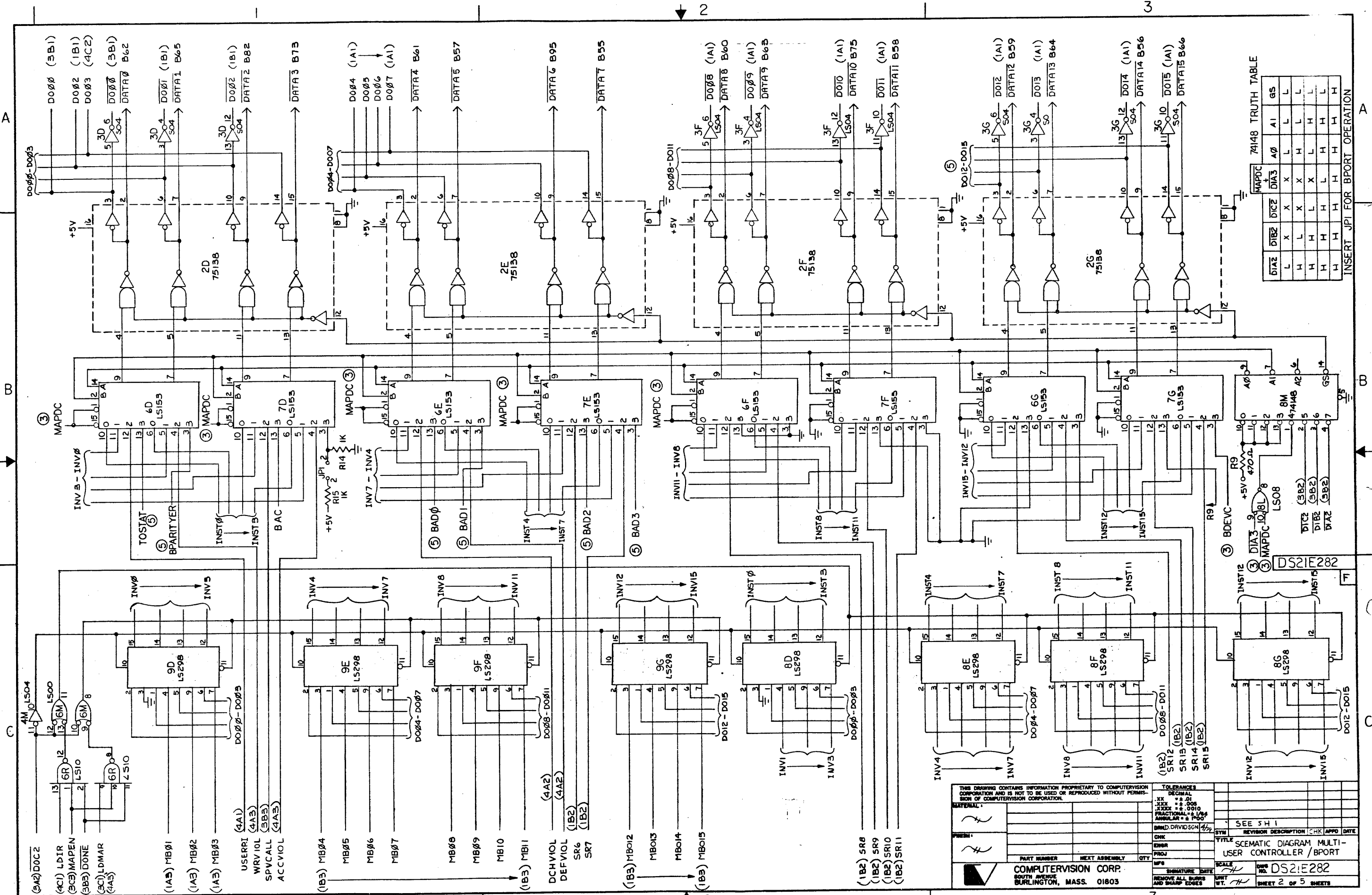


NOTE  
FOR SWITCH  
SETTING INFO  
SEE SHT. 5.



- NOTES:  
1. FOR SHEET TO SHEET CONNECTIONS ZONES ARE USED.  
EX: SHEET COLUMN ROW  
(3A2)  
2. UNLESS OTHERWISE SPECIFIED:  
a. ALL RESISTORS ARE 1/4 W, 5%  
b. ALL CAPACITORS ARE IN MICROFARADS  
3. FOR PCB ASSEMBLY SEE DWG A21E280

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MATERIAL		CHK. DATE		TITLE	
PART NUMBER		DATE		SCHEMATIC DIAGRAM MULTI-USER CONTROLLER / BPORT	
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803		SCALE		DWG NO. DS21E282 SHEET 1 OF 5 SHEETS	



74148 TRUTH TABLE

DIAZ	DIABZ	DICZ	DIACZ	DIA3	A0	A1	AS
L	X	X	X	X	L	L	L
H	L	X	X	X	H	L	L
H	H	L	X	X	L	H	L
H	H	H	L	X	L	H	H
H	H	H	H	L	L	H	H
H	H	H	H	H	L	H	H
H	H	H	H	H	H	L	H
H	H	H	H	H	H	H	H

INSERT JPI FOR BPORT OPERATION

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TOLERANCES  
 DECIMAL  
 .XX  
 .XXX  
 .XXXX  
 FRACTIONAL = 1/16  
 ANGULAR = 30°

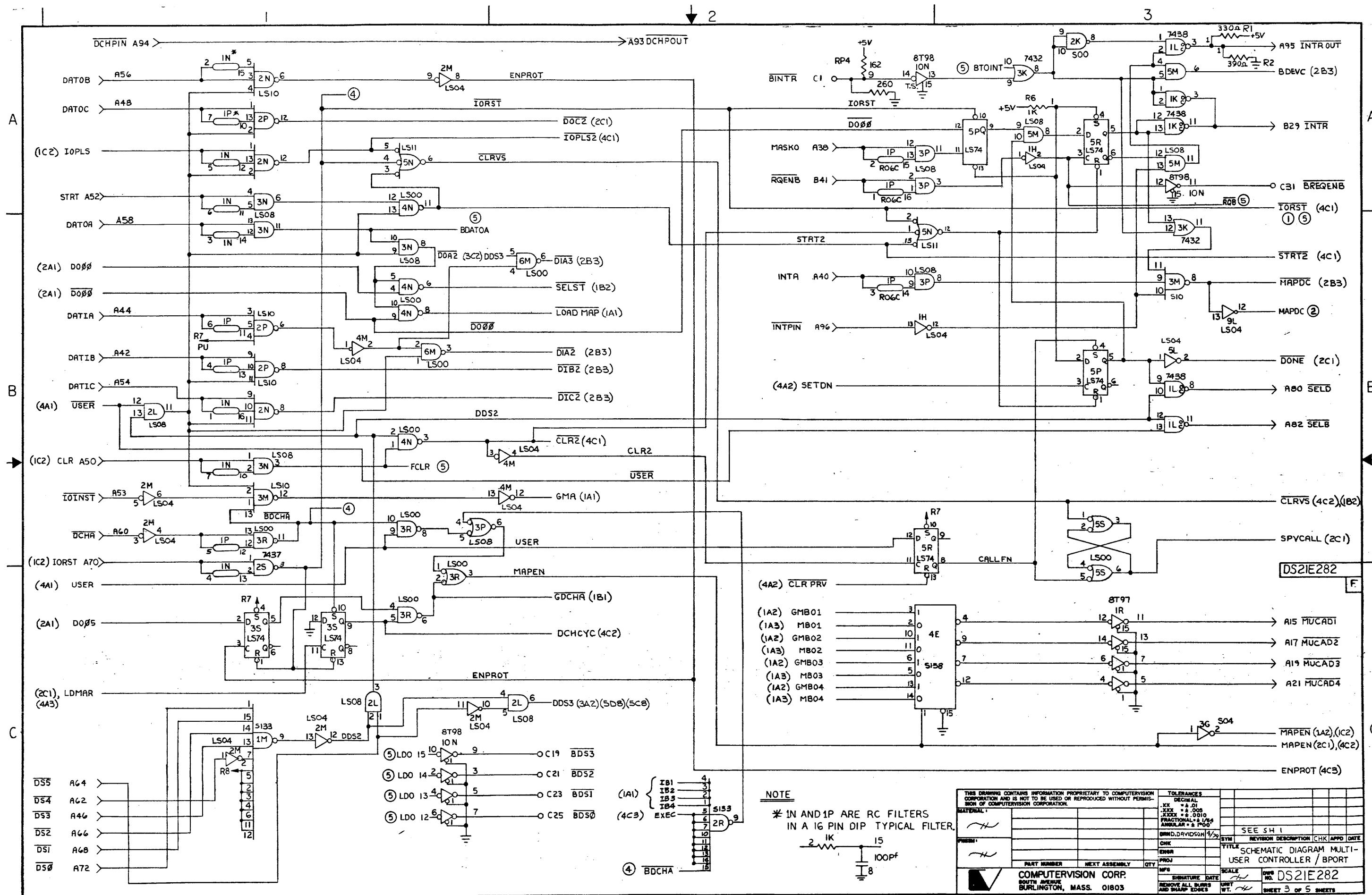
DATE: 1/1/77  
 DRAWN: DAVIDSON  
 CHECKED: [Signature]  
 APPROVED: [Signature]

SEE 5H1

REVISION DESCRIPTION  
 1 SCHEMATIC DIAGRAM MULTI-USER CONTROLLER/BPORT

COMPUTERVERSION CORP.  
 SOUTH AVENUE  
 BURLINGTON, MASS. 01803

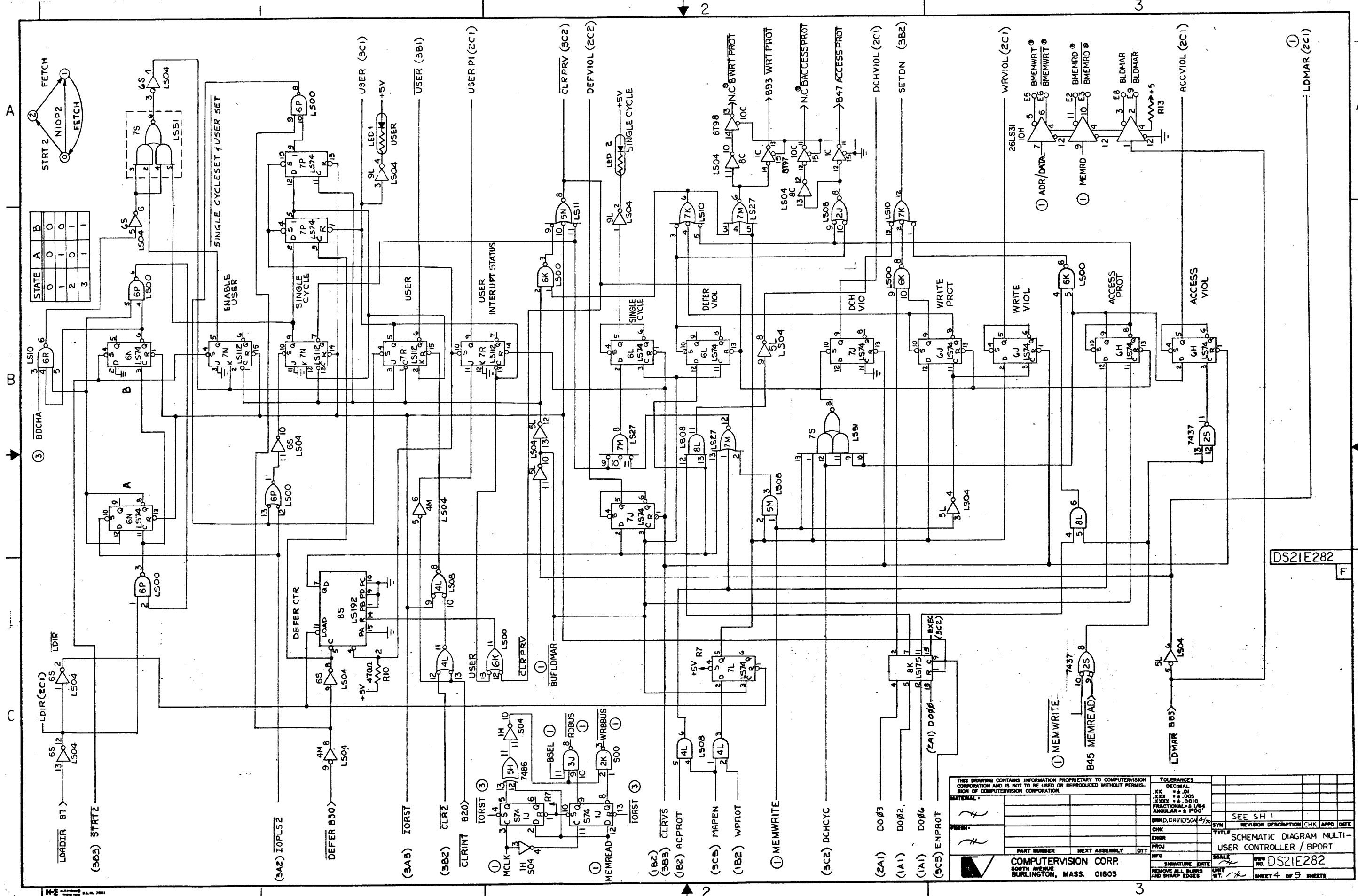
DS21E282  
 SHEET 2 OF 5 SHEETS



**NOTE**  
 \* IN AND 1P ARE RC FILTERS  
 IN A 16 PIN DIP TYPICAL FILTER.

$\frac{2}{1K} \frac{15}{100PF}$

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MATERIAL:				.XX = ±.01			
.XXX = ±.005				.XXX = ±.0010			
.XXXX = ±.0010				ANGULAR ±.005			
DRAWN: DAVIDSON				SYN: REVISION DESCRIPTION			
CHK: ENBR				APP: DATE			
PROJ:				TITLE: SCHEMATIC DIAGRAM MULTI-USER CONTROLLER / BPORT			
PART NUMBER: NEXT ASSEMBLY: QTY:				SCALE: DWS NO. DS2IE282			
SIGNATURE: DATE:				REMOVE ALL BURRS AND SHARP EDGES: WPT			
COMPUTERVISION CORP. SOUTH AVENUE BURLINGTON, MASS. 01803				SHEET 3 OF 5 SHEETS			



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**TOLERANCES**

DECIMAL	
.XX	±.01
.XXX	±.005
.XXXX	±.0010
FRACTIONAL 3/16"	±.0005
ANGULAR	±.0005

MATERIAL		REV	SYN	SEE SH 1
PART NUMBER		NEXT ASSEMBLY		QTY
PROJ		TITLE		
MFG		SCALE		DATE
SIGNATURE		DATE		DRG NO.
REMOVE ALL DIMS AND SHARP EDGES		SWT		SHEET 4 OF 5 SHEETS

**COMPUTERVISION CORP.**  
 SOUTH AVENUE  
 BURLINGTON, MASS. 01803

SWITCH PACKS 5D & 5F

THE PROPER SWITCHES IN SWITCH PACKS 5D & 5F MUST BE CLOSED WHEN THE MUC IS DRIVING BPORT MEMORIES. ONE SWITCH MUST BE CLOSED FOR EVERY 32K BPORT FIELD SEGMENT ADDRESS THAT IS BEING USED IN A CONFIGURED SYSTEM.

BPORT FIELD ADDR*	CLOSED SWITCH POSITION	
	5D	5F
0		8
1		7
2		6
3		5
4		4
5		3
6		2
7		1
8	8	
9	7	
10	6	
11	5	
12	4	
13	3	
14	2	
15	1	

\* THE BPORT FIELD ADDR REPRESENTS ONE 32K SEGMENT OF MEMORY.

REF SHT.2, JP1 MUST BE INSERTED WHEN THE MUC IS DRIVING BPORT MEMORIES.

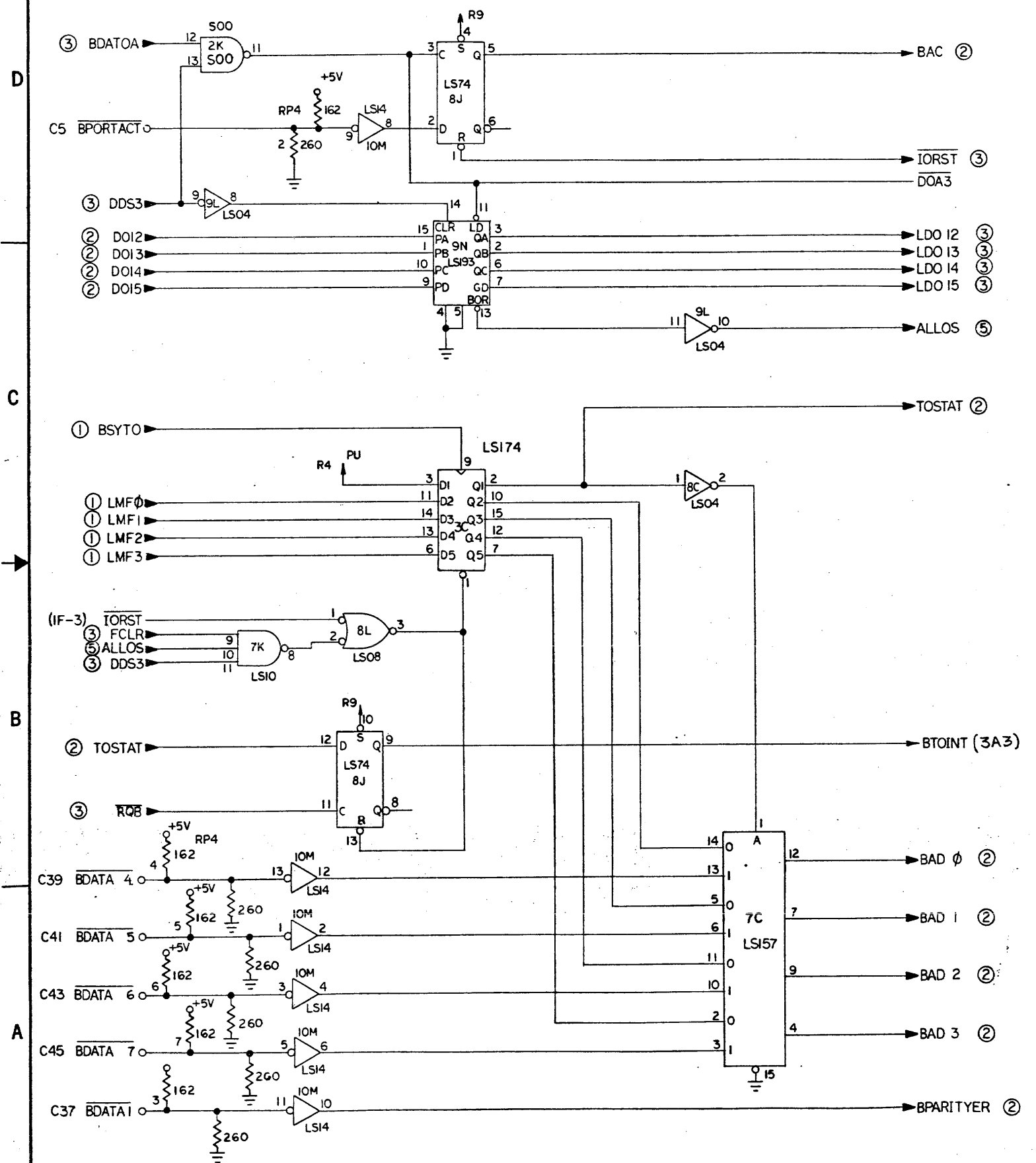
B PORT CONNECTOR PINOUTS

CONN C		CONN E	
1	BINTR	1	BMEMRD
3		3	BMEMRD
5	BPORTACT	5	BMEMWRT
7		7	BDMAR
9		9	BLDMAR
11	BIORST	11	BMEMBUS15
13	BCLR	13	
15	BIOPLS	15	
17		17	
19	BDS3	19	
21	BDS2	21	
23	BDS1	23	
25	BDS0	25	
27		27	
29		29	
31	BRQENB	31	
33		33	
35		35	
37	BDA14	37	FREE
39	BDA15	39	FREE
41	BDA16	41	BMEMBUS0
43	BMC3	43	FREE
45	BMC2	45	BMC0
47	BMC1	47	
49		49	BMEMBSY

DS21E282

ALL UNUSED PINS GROUNDED

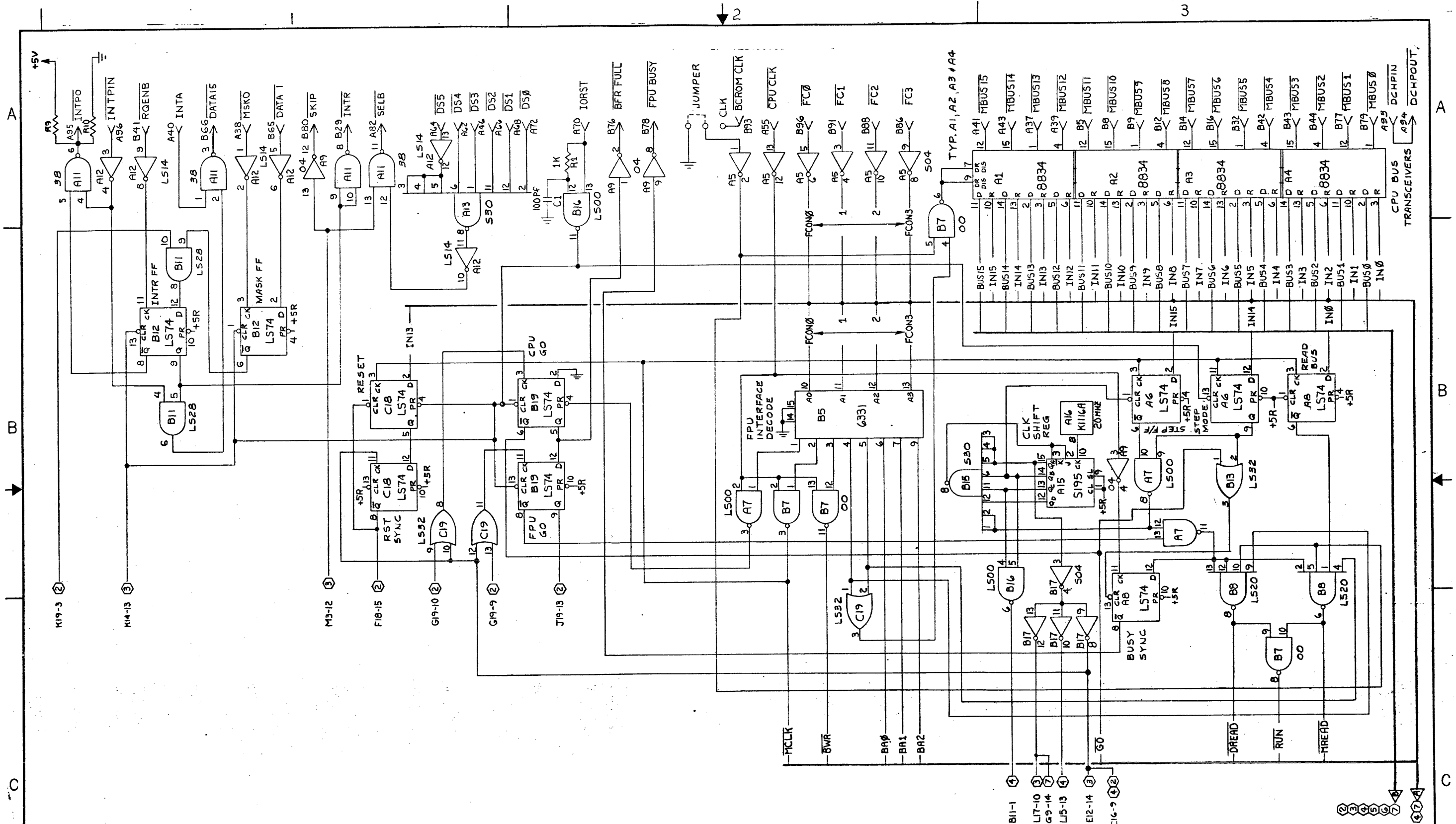
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MATERIAL:		DATE:	2/78
DESIGNER:		CHKD:	
APP'D:		ENGR:	
PROJ:		SCALE:	
PART NUMBER:		REV:	1
NEXT ASSEMBLY:		QTY:	
COMPUTERVERSION CORP. 201 Burlington Road Bedford, Massachusetts 01730		TITLE: SCHEMATIC DIAGRAM MULTI-USER CONTROLLER / BPORT SHEET NO. DS21E282 SHEET 5 OF 5 SHEETS	



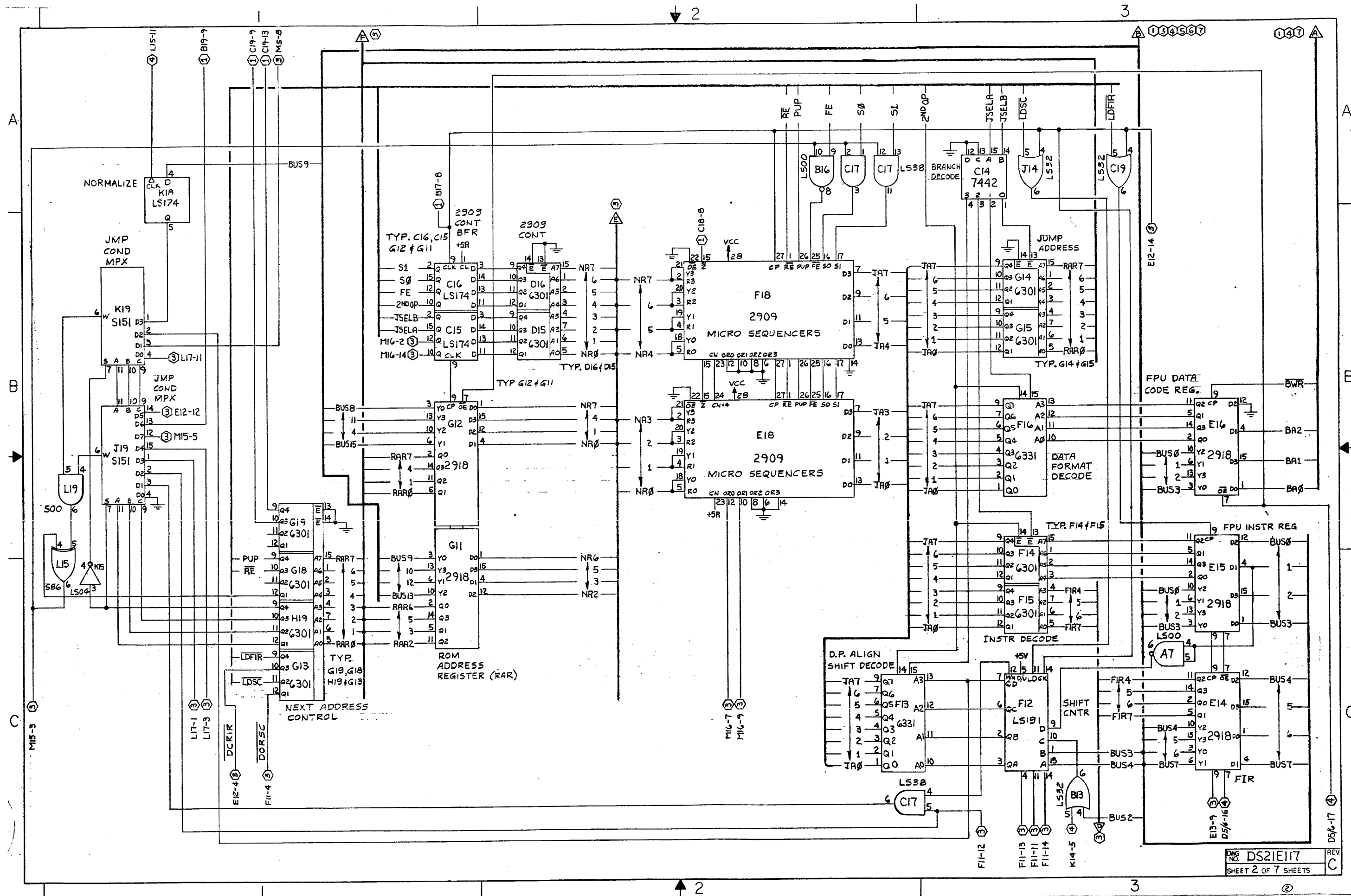
D  
C  
B  
A

D  
C  
B  
A

**Floating Point Unit**

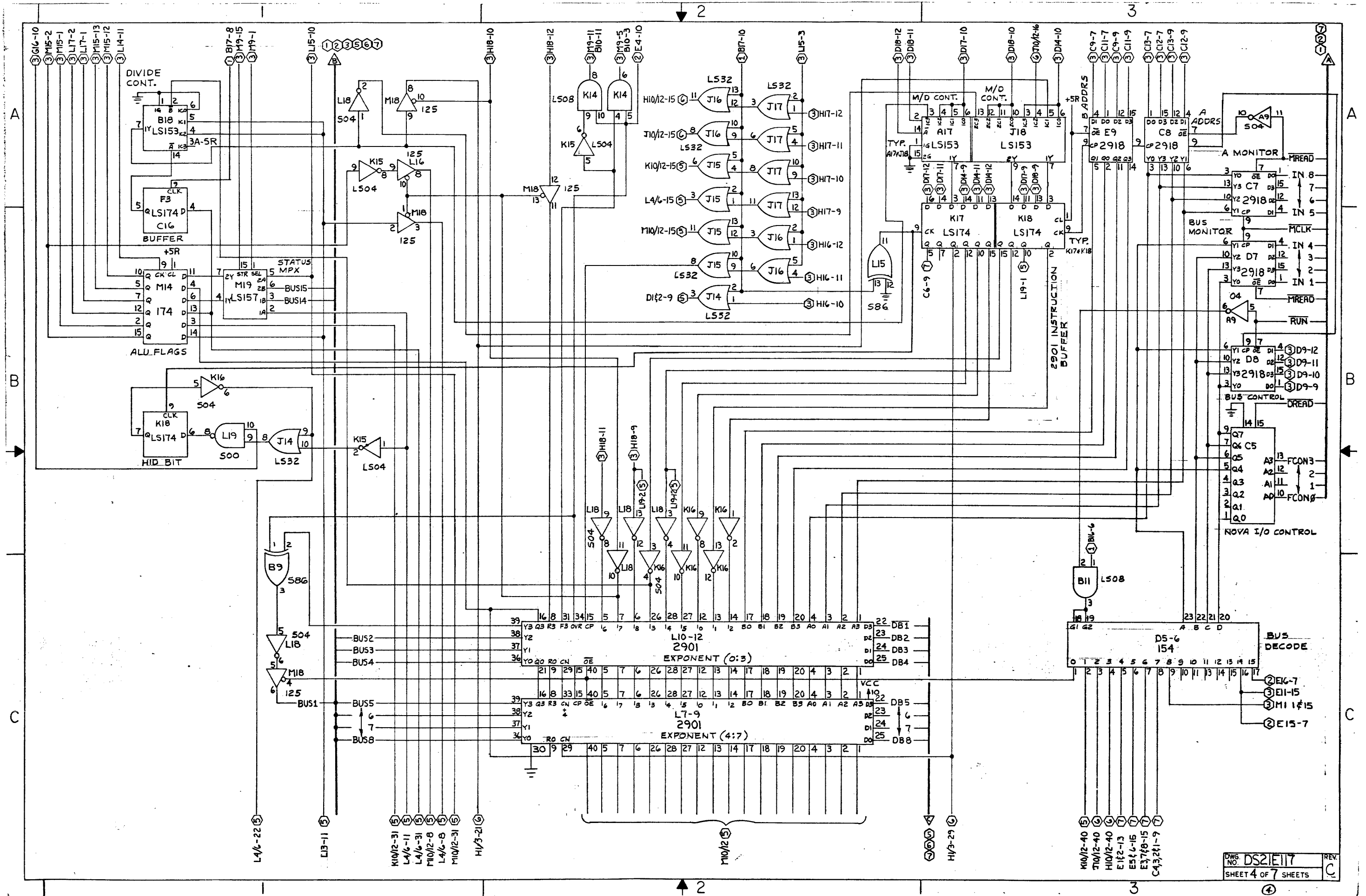


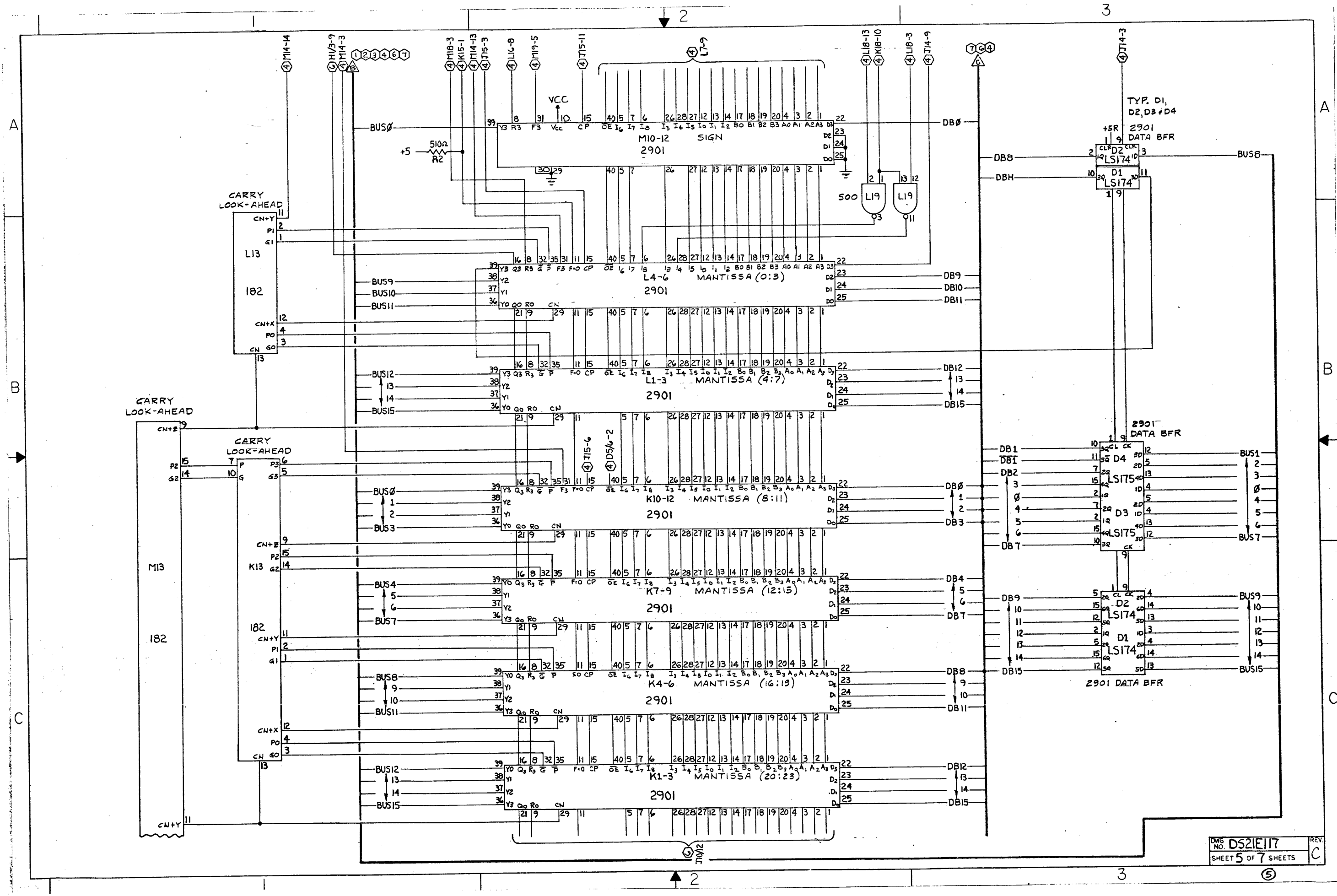
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PART NUMBER <b>A21E115</b>	NEXT ASSEMBLY QTY	PROJECT DATE	SCALE DATE	DRAWN DATE	CHECKED DATE
<b>COMPUTERSERVICES CORP.</b> SOUTH AVENUE BURLINGTON, MASS. 01803			<b>SCHEMATIC DIAGRAM</b> <b>FLOATING POINT UNIT</b> DS21E117 SHEET 1 OF 7 SHEETS		











A

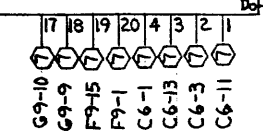
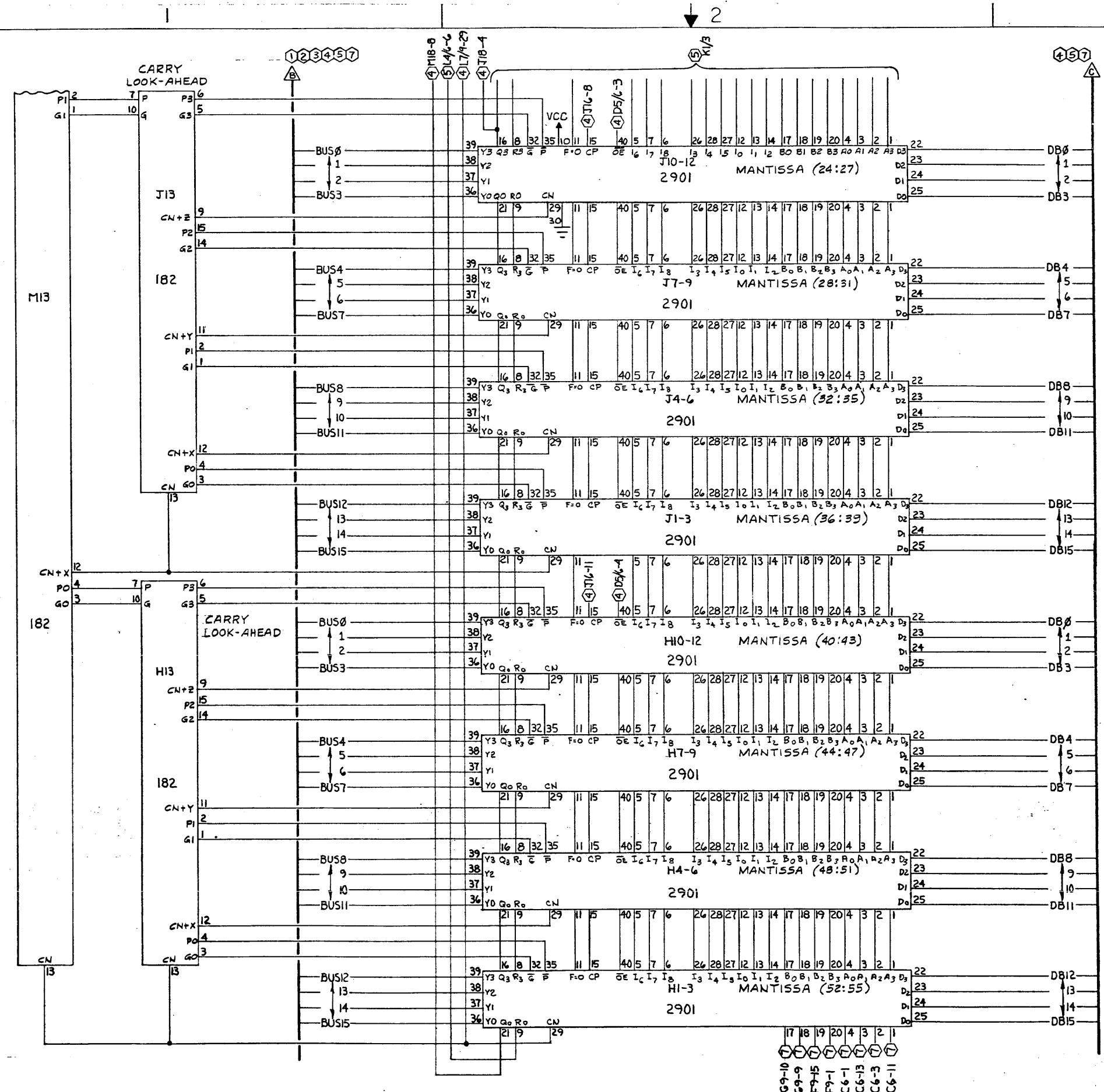
B

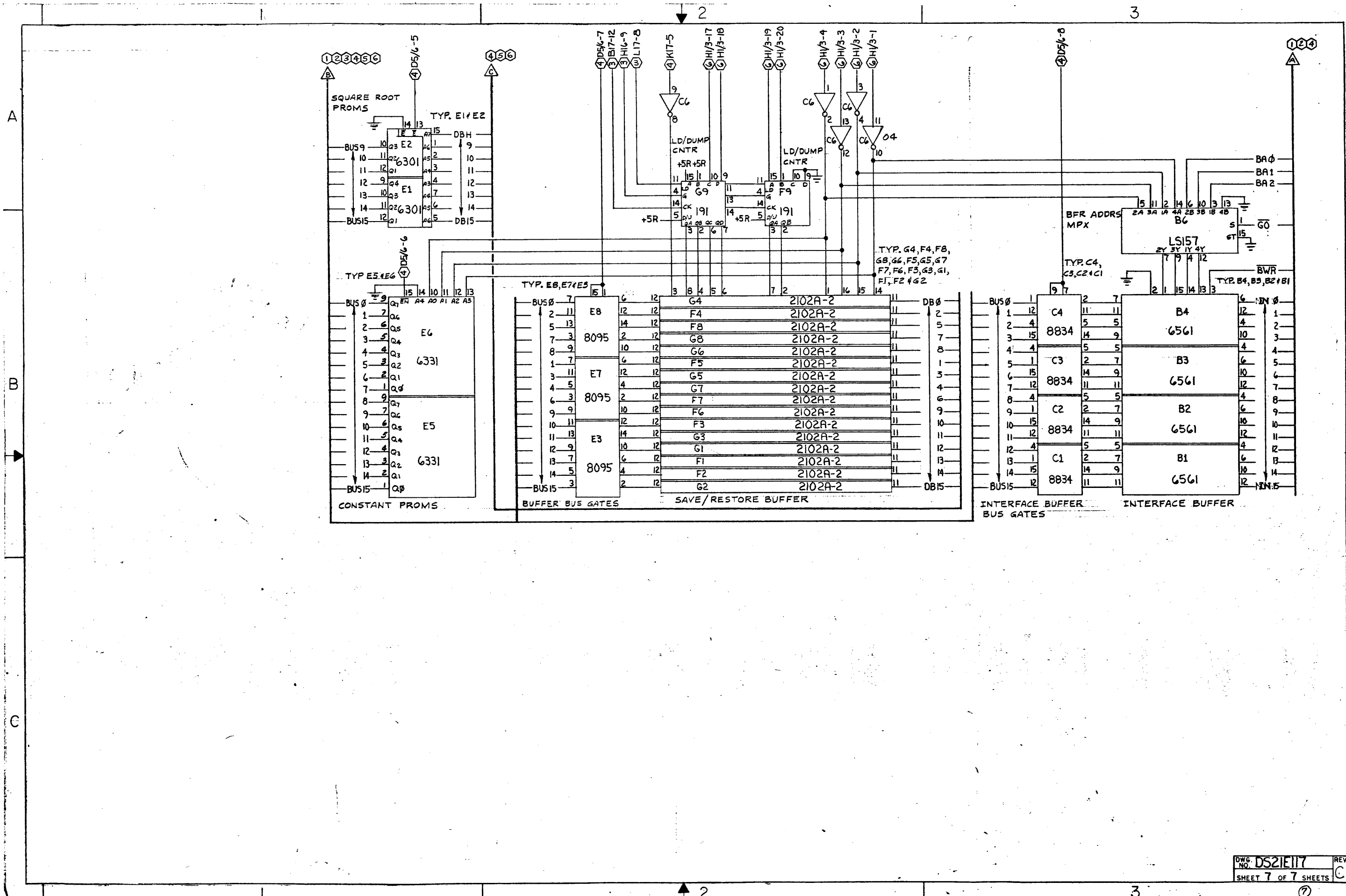
C

A

B

C





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Order No.: \_\_\_\_\_

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(Please print)

NAME: \_\_\_\_\_ DATE \_\_\_\_\_

TITLE: \_\_\_\_\_

COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

Please cut along this line

