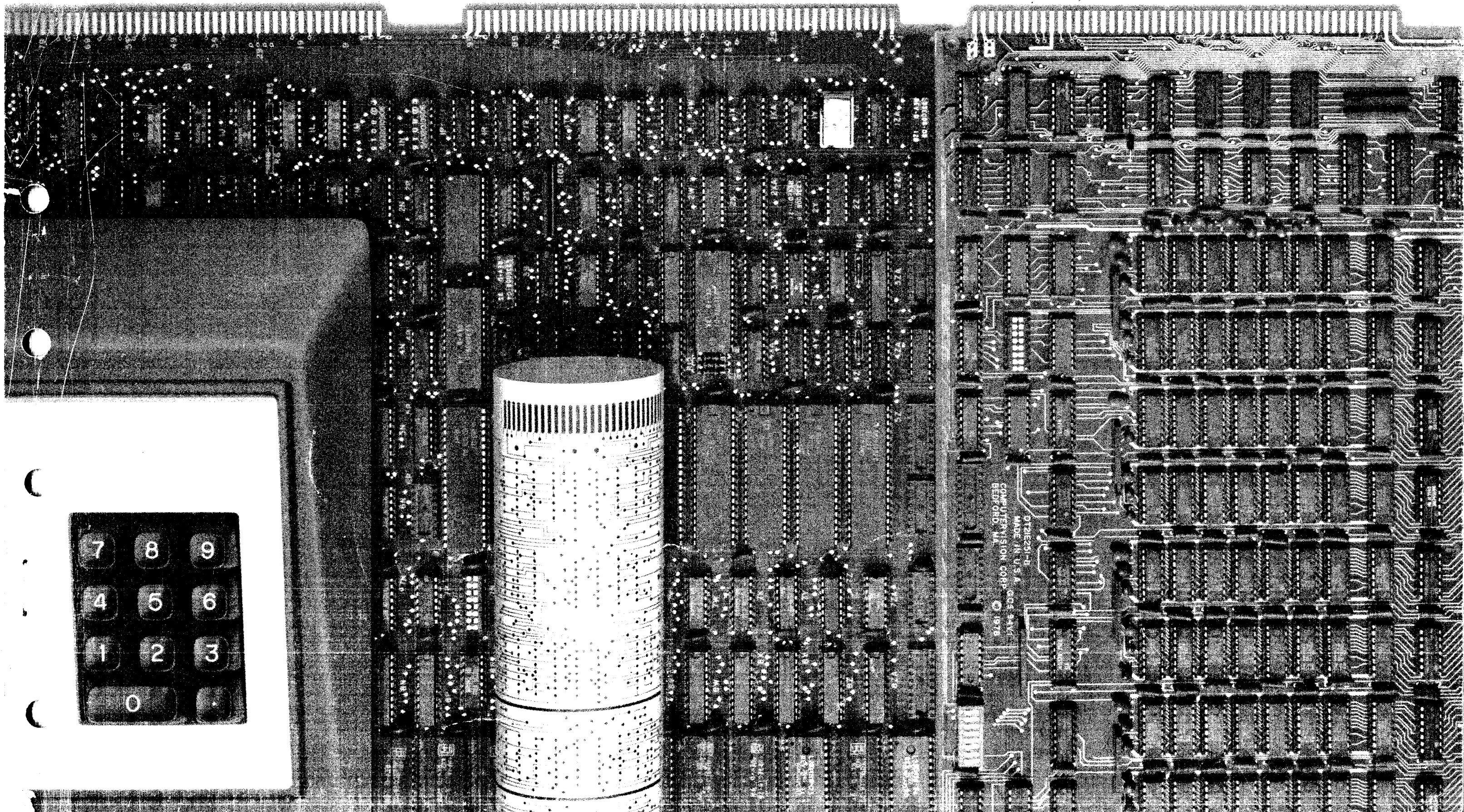


# Graphics Processing Unit (GPU)

Logic Diagrams



OTR12201-B  
MADE IN U.S.A. 604 34V  
COMPUTERVISION CORP. © 1978  
BEDFORD, MA

# Graphics Processing Unit

## Logic Diagrams

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DS23E017 (21 sheets)

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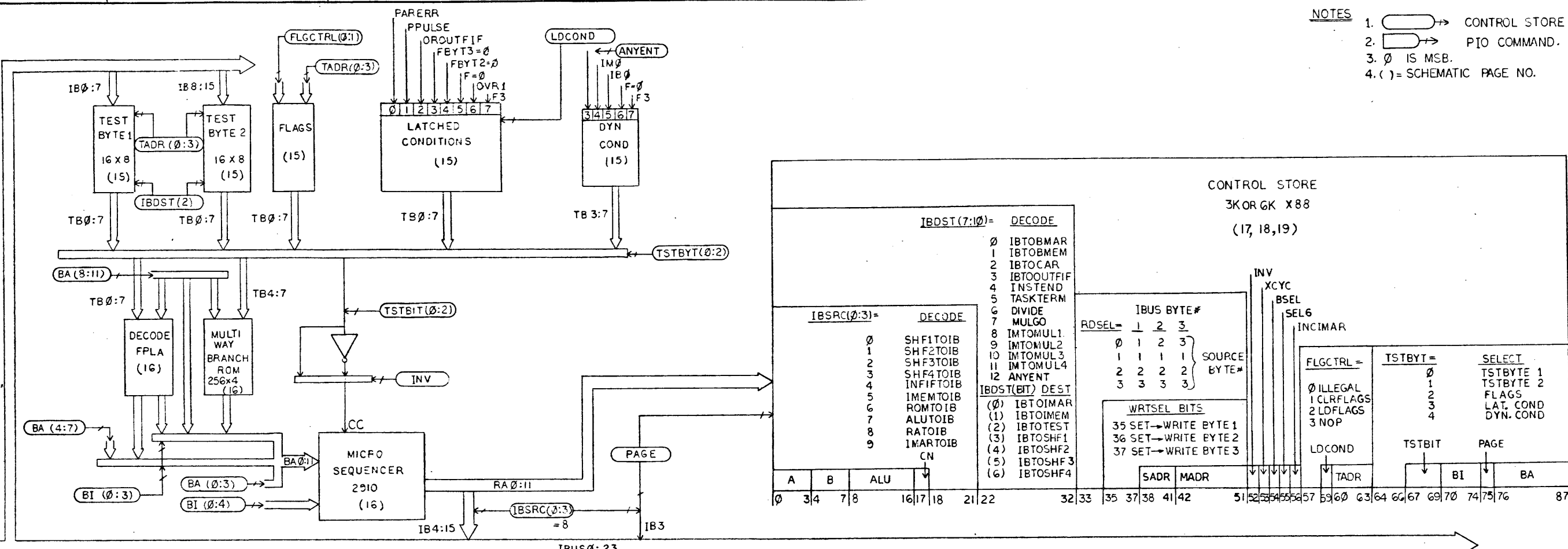
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## Graphics Processing Unit

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- NOTES
1. CONTROL STORE BIT(S).
  2. PIO COMMAND.
  3. 0 IS MSB.
  4. ( ) = SCHEMATIC PAGE NO.



**CONTROL STORE**  
3K OR 6K X 88  
(17, 18, 19)

IBDST(7:10) =	DECODE
0	IBTOBMAR
1	IBTOBMEM
2	IBTOCAR
3	IBTOOUTFIF
4	INSTEND
5	TASKTERM
6	DIVIDE
7	MULGO
8	INTOMUL1
9	INTOMUL2
10	INTOMUL3
11	INTOMUL4
12	ANYENT

IBSRC(0:3) =	DECODE
0	SHF1TOIB
1	SHF2TOIB
2	SHF3TOIB
3	SHF4TOIB
4	INF1TOIB
5	IMEMTOIB
6	ROMTOIB
7	ALUTOIB
8	RATOIB
9	1MARTOIB

IBDST(BIT)	DEST
0	IBTOIMAR
1	IBTOIMEM
2	IBTOITEST
3	IBTOSH1
4	IBTOSH2
5	IBTOSH3
6	IBTOSH4

**IBUS BYTE#**

RDSEL =	1	2	3
0	1	2	3
1	1	1	1
2	2	2	2
3	3	3	3

**WRTSEL BITS**

35 SET → WRITE BYTE 1  
36 SET → WRITE BYTE 2  
37 SET → WRITE BYTE 3

**FLGCTRL =**

0	ILLEGAL
1	CLRFLGS
2	LDFLGS
3	NOP

**TSTBYT =**

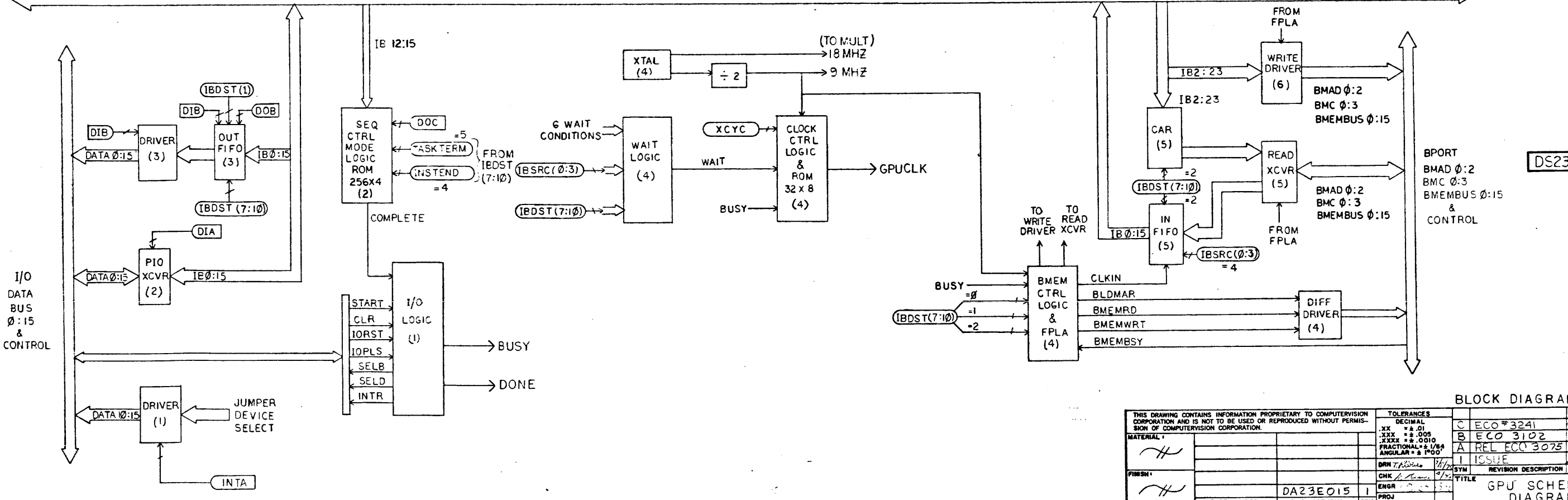
0	TSTBYTE 1
1	TSTBYTE 2
2	FLGS
3	LAT. COND
4	DYN. COND

**SELECT**

0	TSTBYTE 1
1	TSTBYTE 2
2	FLGS
3	LAT. COND
4	DYN. COND

**IBUS ADDRESS**

IBUS	0	3	4	7	8	16	17	18	21	22	32	33	35	37	38	41	42	51	52	53	54	55	56	57	59	60	63	64	66	67	69	70	74	75	76	87
------	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----



I/O DATA BUS 0:15 & CONTROL

BLOCK DIAGRAM

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES	DECIMAL	C	ECO #3241
		.XX	± .01	B	ECO 3102
		.XXX	± .005	A	REL ECO 3075
		.XXXX	± .0010		
		FRACTIONAL	± 1/64		
		ANGULAR	± 1°00'		
MATERIAL		DRN	1/1/77	SYM	REVISION DESCRIPTION
FINISH		CHK	1/1/77	TITLE	
		ENGR			
		PROJ			
PART NUMBER	DA23E015	QTY			
NEXT ASSEMBLY					
COMPUTERVISION CORP.		SIGNATURE	DATE	SCALE	DWG NO.
201 Burlington Road				NONE	DS23E017
Bedford, Massachusetts 01730		REMOVE ALL BURRS AND SHARP EDGES		UNIT	SHEET 1A OF 19 SHEETS

DS23E017

BPORT  
BMAD 0:2  
BMC 0:3  
BMEMBUS 0:15  
&  
CONTROL

D

D

C

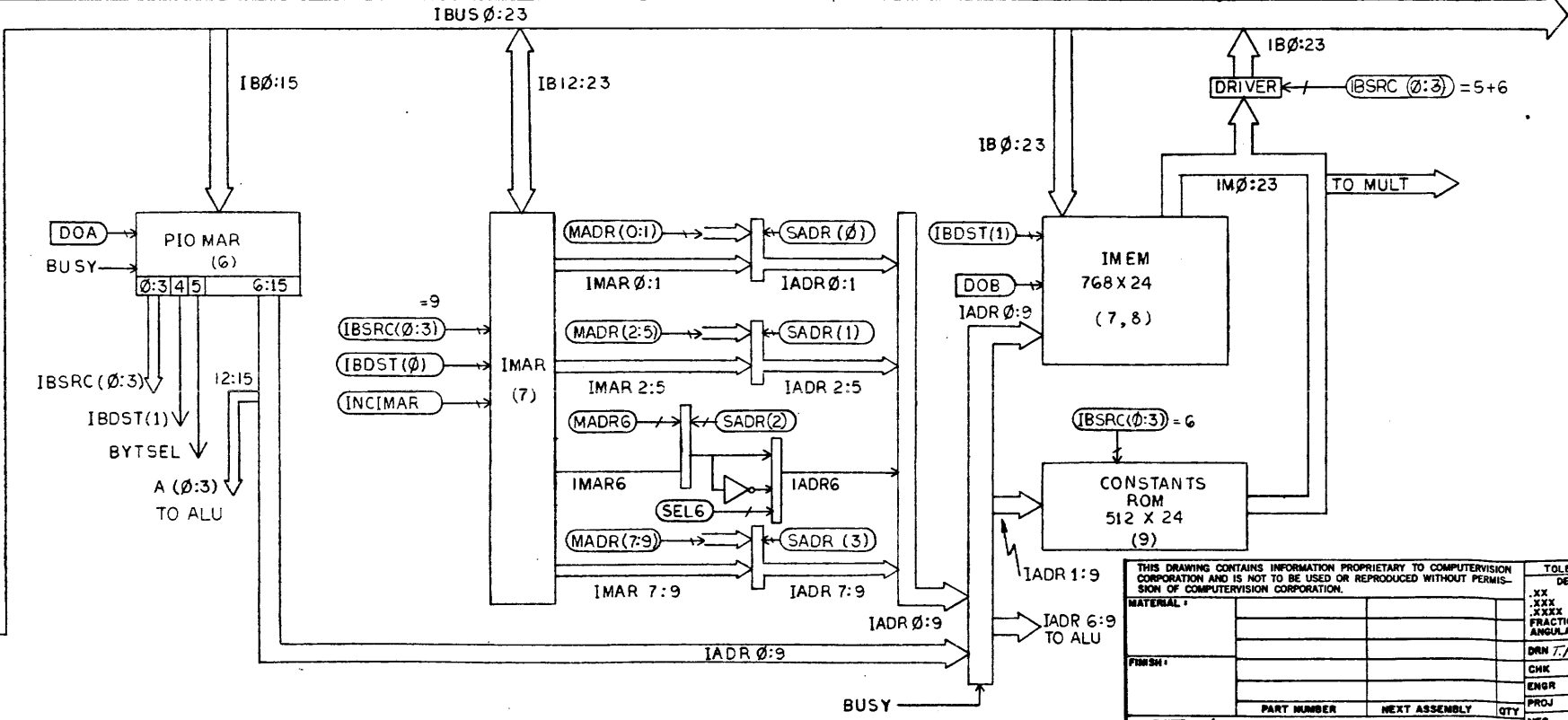
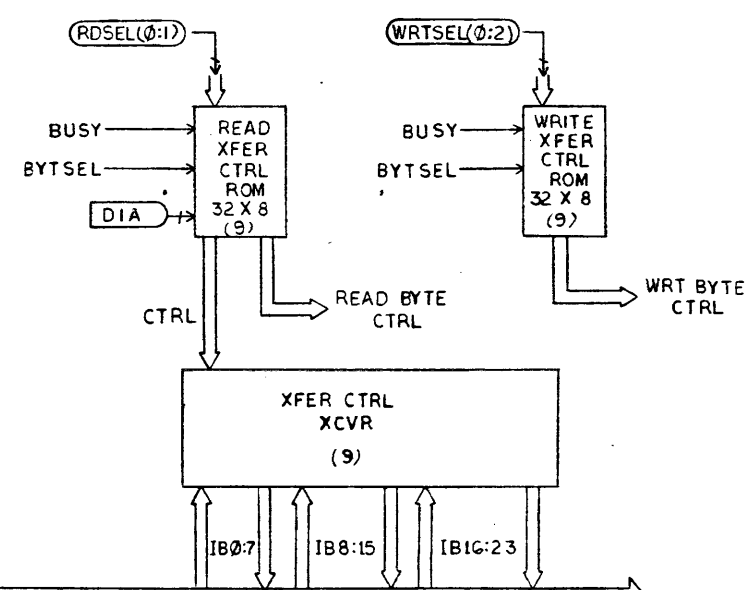
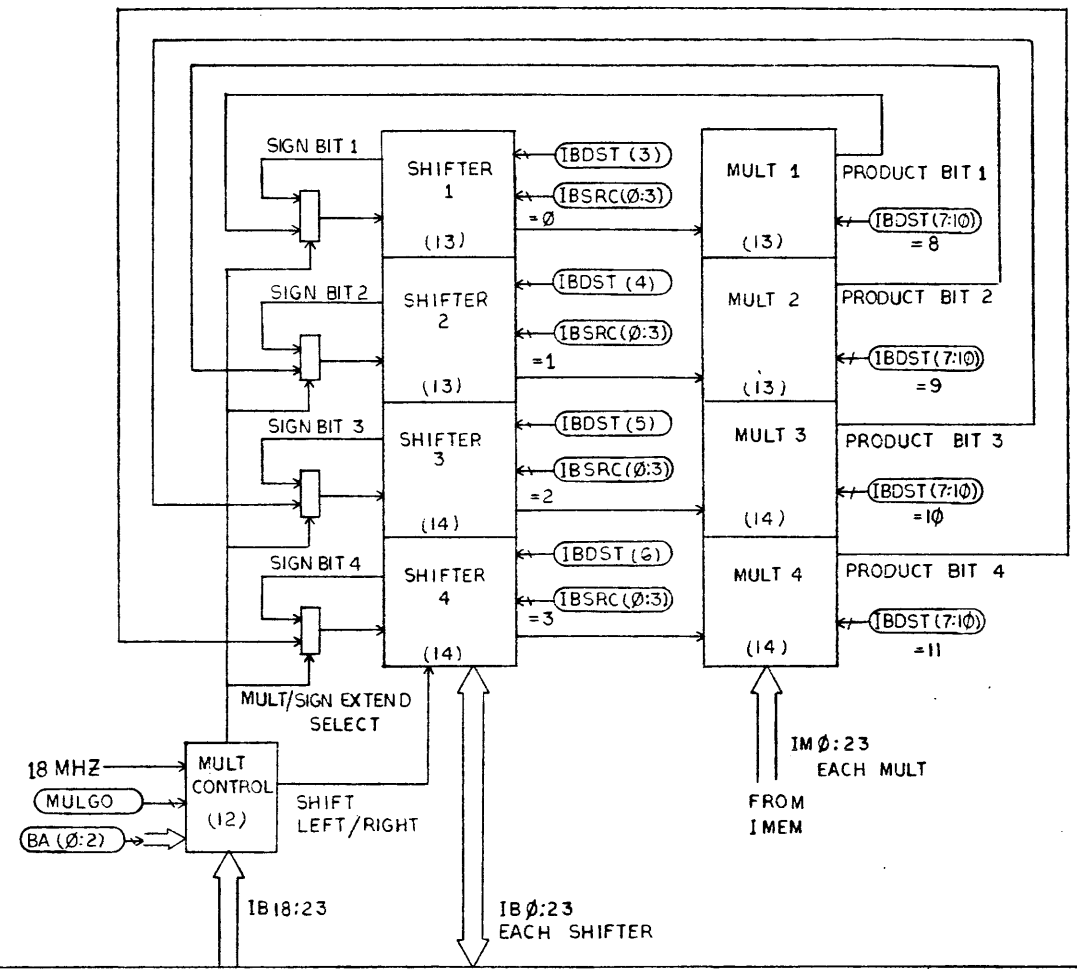
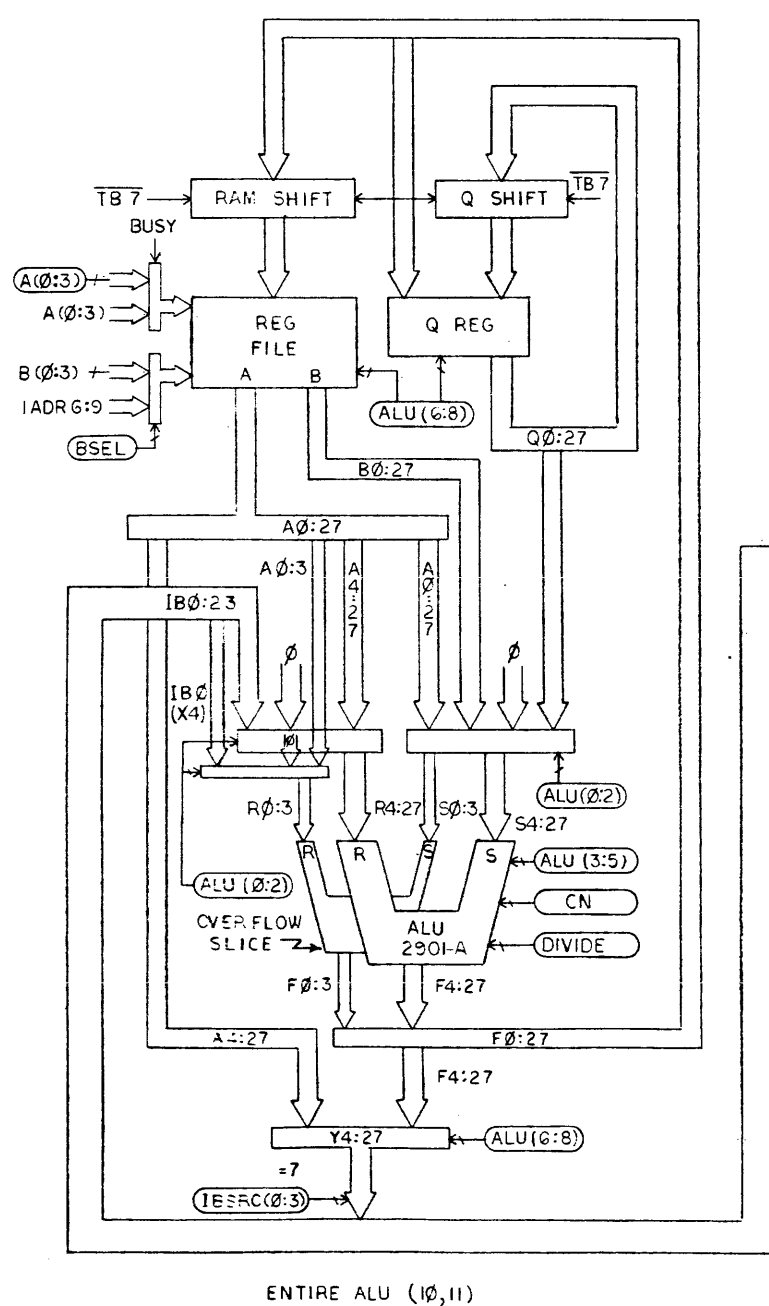
C

B

B

A

A



BLOCK DIAGRAM

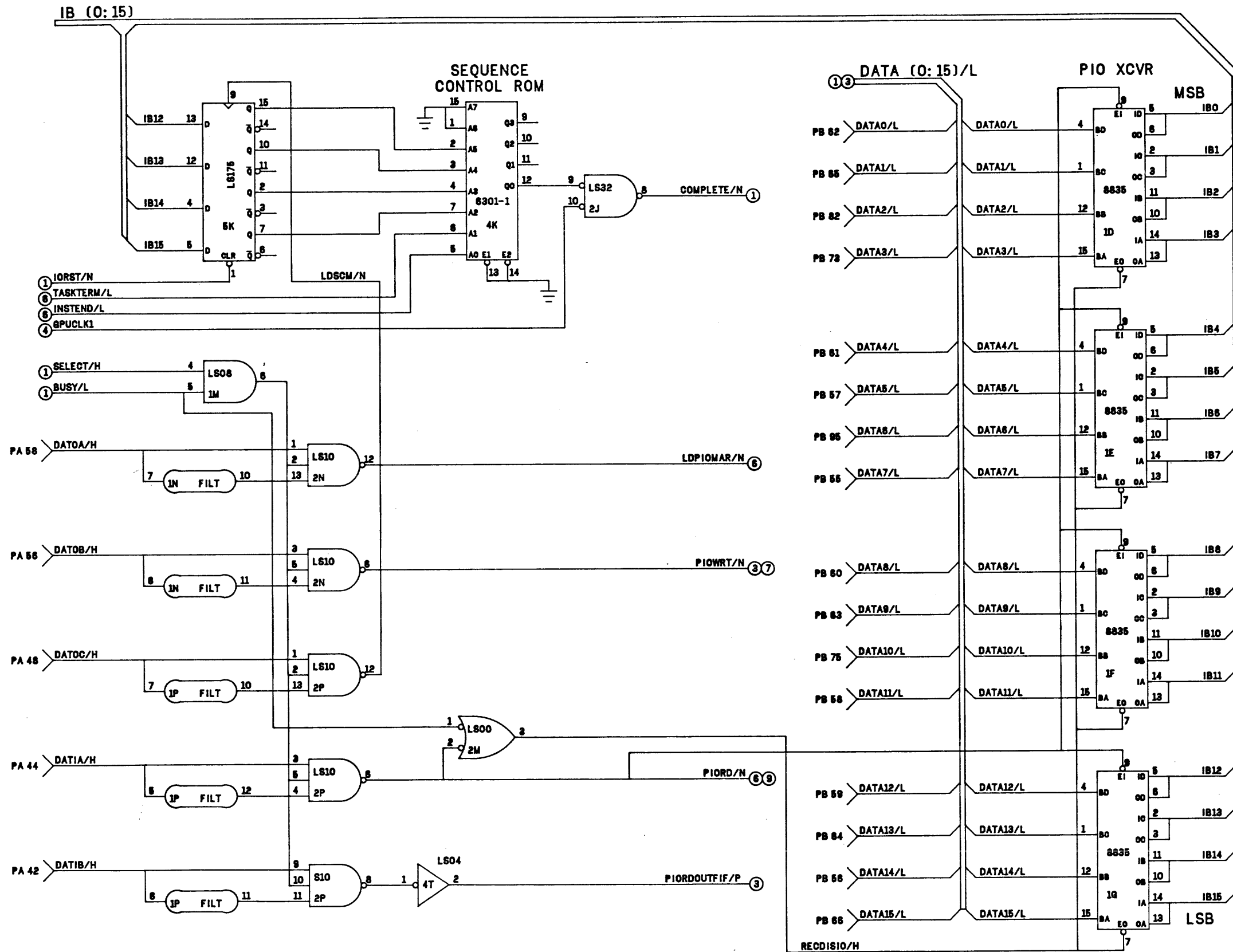
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TOLERANCES		DECIMAL		
.XX		= ± .01		
.XXX		= ± .005		
.XXXX		= ± .0010		
FRACTIONAL ± 1/64				
ANGULAR ± 1'00"				
MATERIAL:				
FINISH:				
PART NUMBER	NEXT ASSEMBLY	QTY	SCALE	DWG NO.
			NONE	DS23E 017
SIGNATURE DATE		UNWT	SHEET 2A OF 19 SHEETS	
REMOVE ALL BURRS AND SHARP EDGES				

COMPUTERVISION CORP.  
201 Burlington Road  
Bedford, Massachusetts 01730

DS23E 017





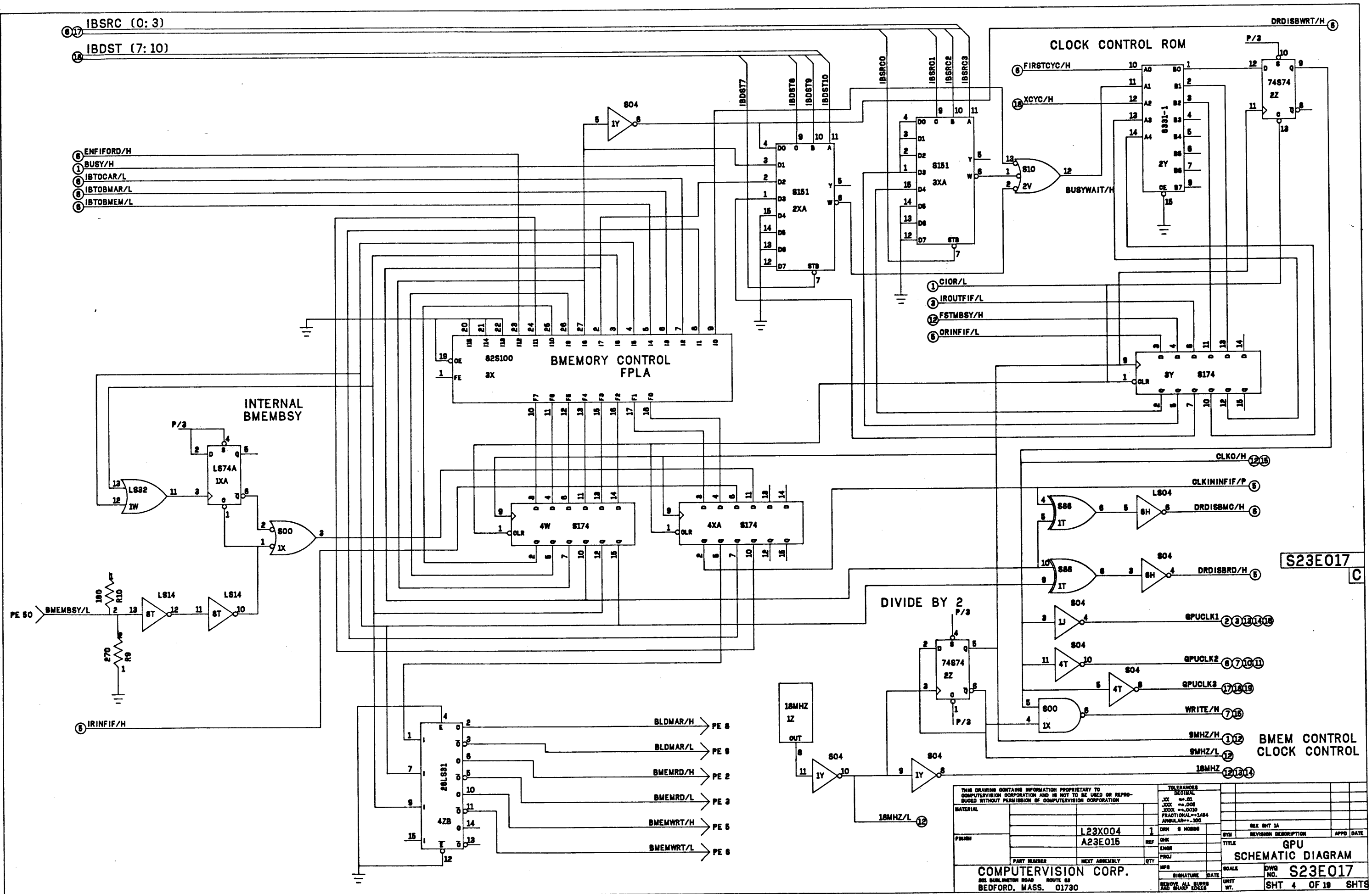
S23E017  
C

SEQ. CTRL MODE, PIO COMMANDS, PIO XCVR

<small>THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVERSION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVERSION CORPORATION</small>				<small>TELEGRANDER SERIAL</small> JXX -01 JXXX -0.006 JXXX -0.000 FRACTIONAL--L04 ANGULAR--300	
MATERIAL				ORIG & HOBBS	SEE SHT 1A
FINISH	L23X004	1	REF	DATE	BYM REVISION DESCRIPTION APPD DATE
	A23E015		ENGR		TITLE GPU SCHEMATIC DIAGRAM
PART NUMBER	NEXT ASSEMBLY	QTY	PROJ		DWG NO. S23E017
<b>COMPUTERVERSION CORP.</b> <small>800 BURLINGTON ROAD          BEDFORD, MASS. 01730</small>				SIGNATURE DATE	SCALE UNIT SHT 2 OF 19 SHTS



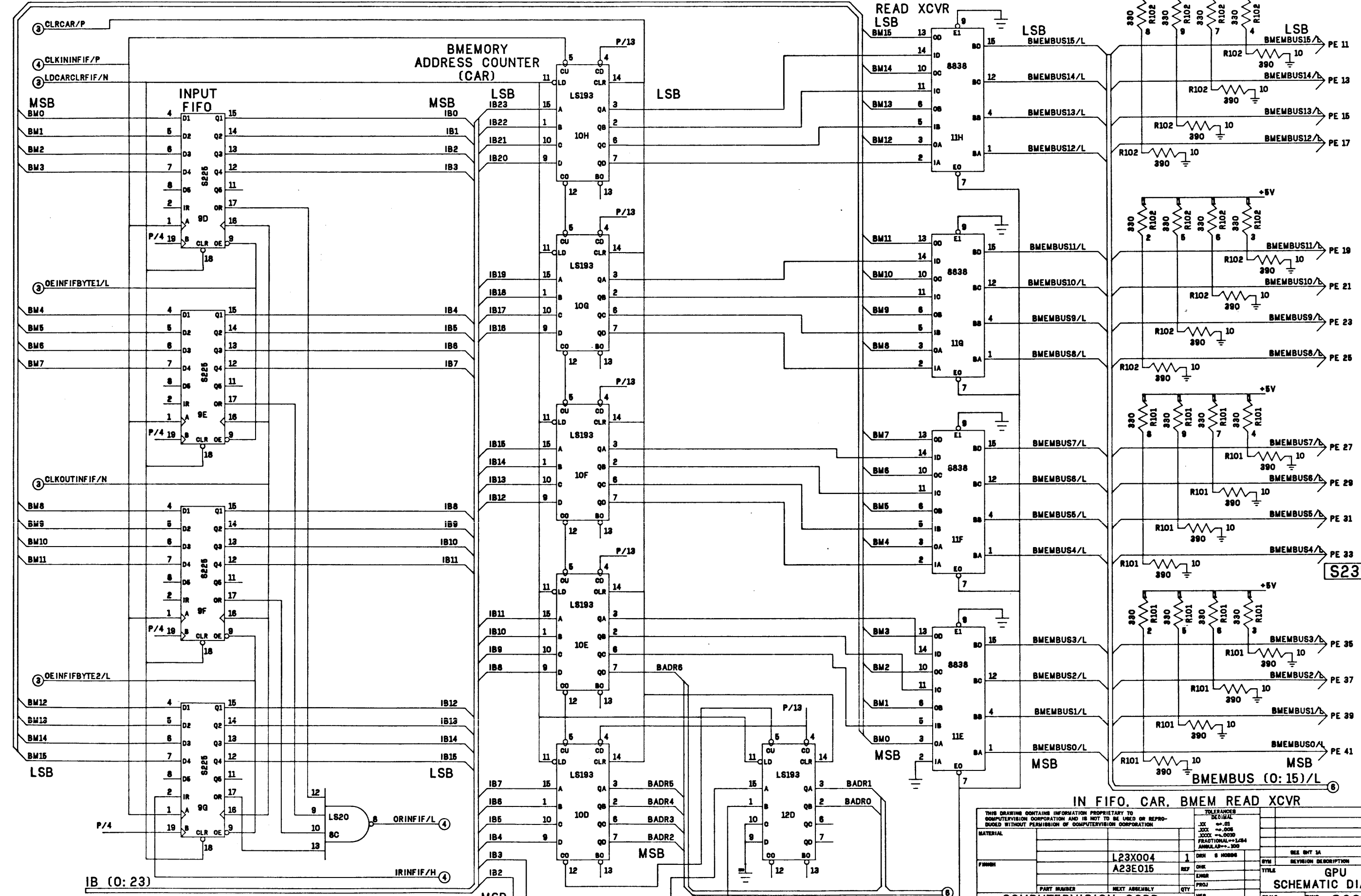




S23E017  
C

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION				TOLERANCES DECIMAL XX .005 XXX .008 XXXX .0010 FRACTIONAL--1/64 ANGULAR--30°		REV INT 3A			
MATERIAL						REV	REVISION DESCRIPTION	APPRO	DATE
FINISH	L23X004	1	ENR	9	10888				
	A23E015	REF	ENR						
PART NUMBER		NEXT ASSEMBLY	QTY						
COMPUTERVISION CORP. ONE BURLINGTON ROAD ROUTE 68 BEDFORD, MASS. 01730				SCALE		DWG NO.		S23E017	
				SIGNATURE		DATE		UNIT WT.	
				REMOVE ALL STAPLES AND BUMP LOCKS		SHT 4 OF 19		SHTS	

BM (0:15)

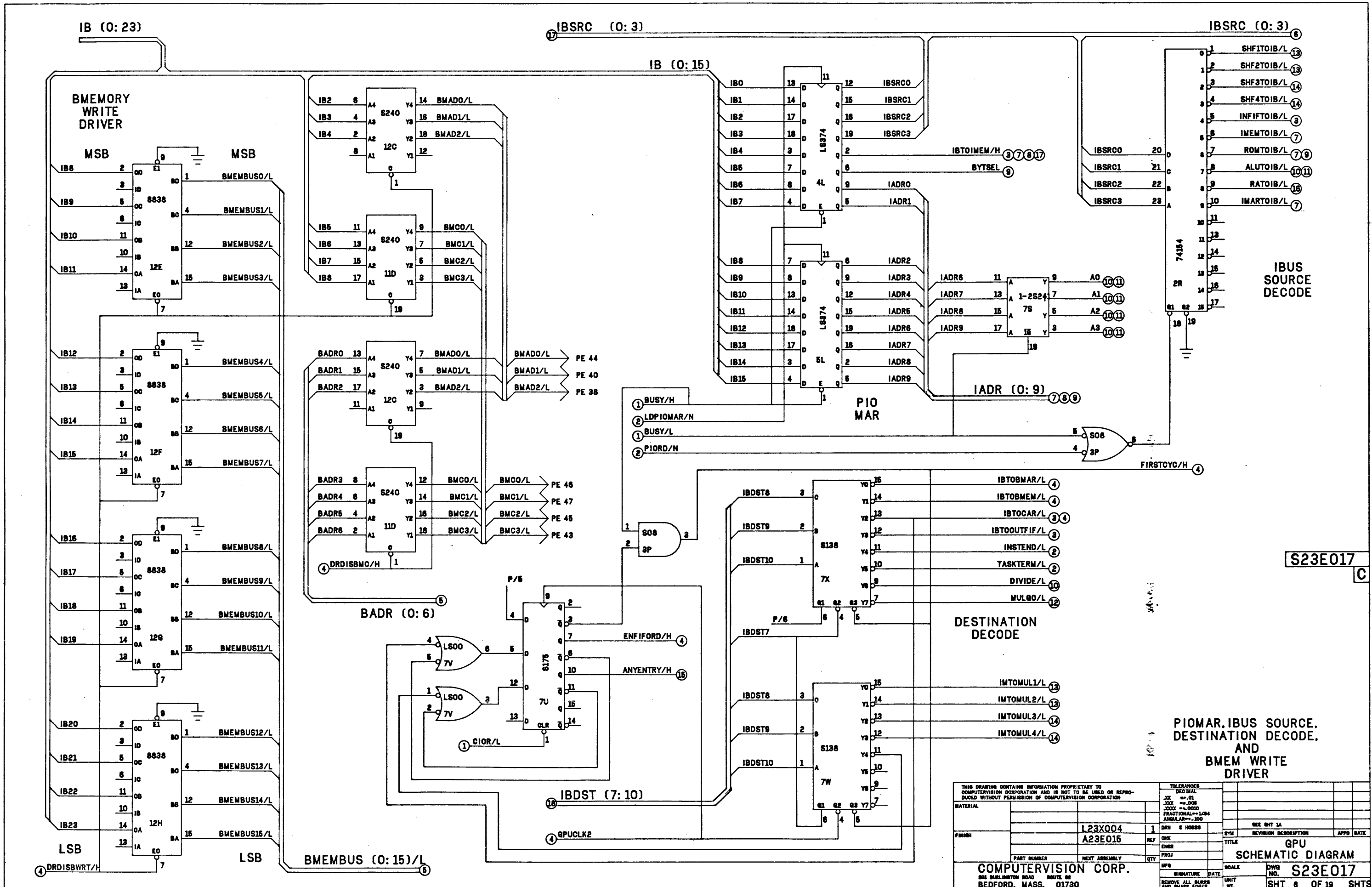


S23E017

C

IN FIFO, CAR, BMEM READ XCVR

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MATERIAL				DESIGN	DATE
FINISH	L23X004	1	REF	CHK	DATE
	A23E015		ENGR		
PART NUMBER	NEXT ASSEMBLY	QTY	PROJ		
COMPUTATION CORP. 801 BURLINGTON ROAD SUITE 62 BEDFORD, MASS. 01730			SIGNATURE	DATE	SCALE
			REMOVE ALL DIMS AND SHARP EDGES	UNIT WT.	DWG NO. S23E017
					SHT 6 OF 19 SHTS



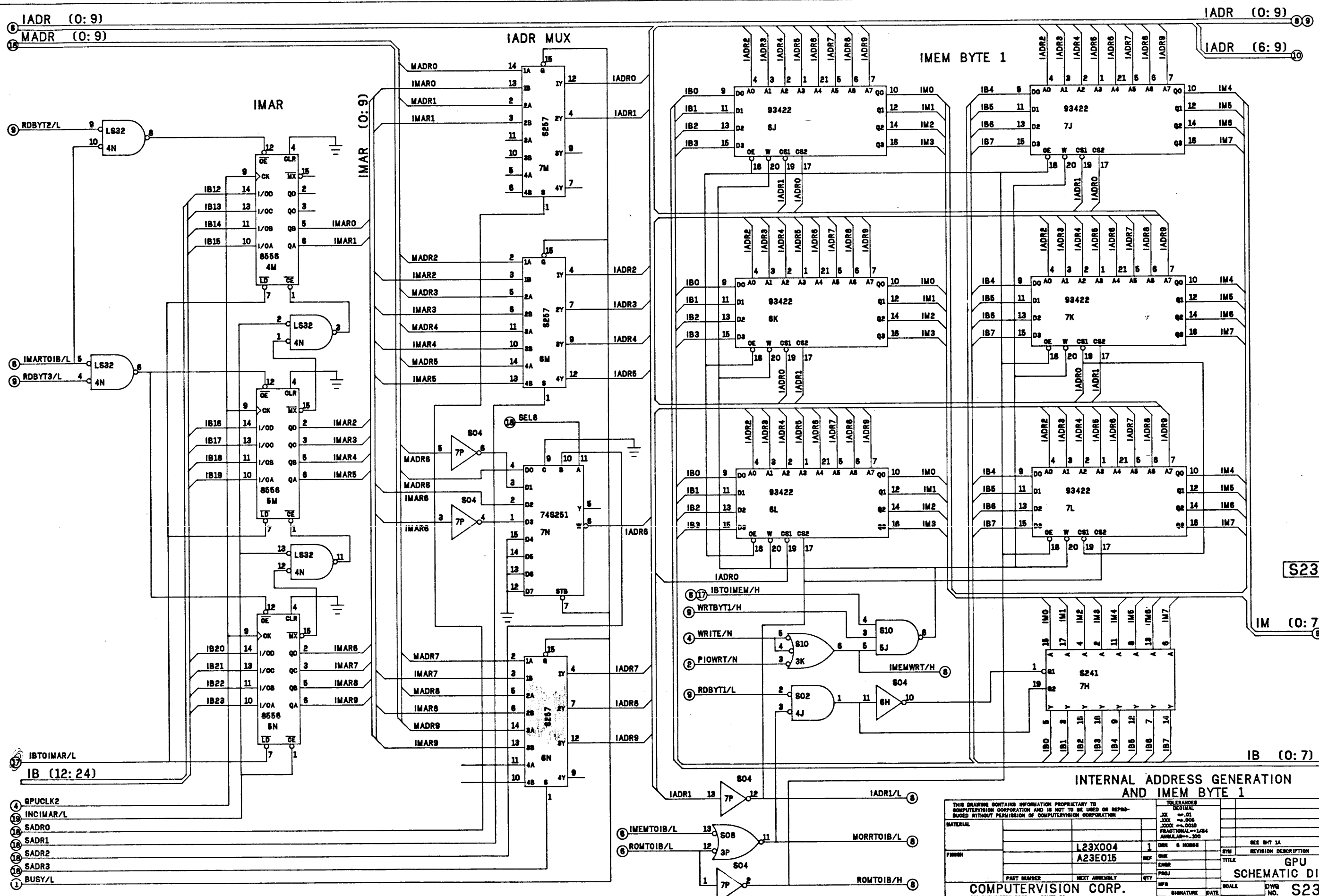
IBUS SOURCE DECODE

S23E017

C

PIO MAR, IBUS SOURCE, DESTINATION DECODE, AND BMEM WRITE DRIVER

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTATION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTATION CORPORATION				TOLERANCES DECIMAL XX .XX XXX .XXX FRACTIONAL ANGULAR											
MATERIAL															
FINISH															
PART NUMBER		NEXT ASSEMBLY		QTY		SIGNATURE		DATE		SCALE		UNIT NO.		SHT 6 OF 19 SHTS	
L23X004		A23E015		1		DRN S HOBBS						GPU SCHEMATIC DIAGRAM		S23E017	
COMPUTATION CORPORATION 301 BURLINGTON ROAD ROUTE 88 BEDFORD, MASS. 01730															



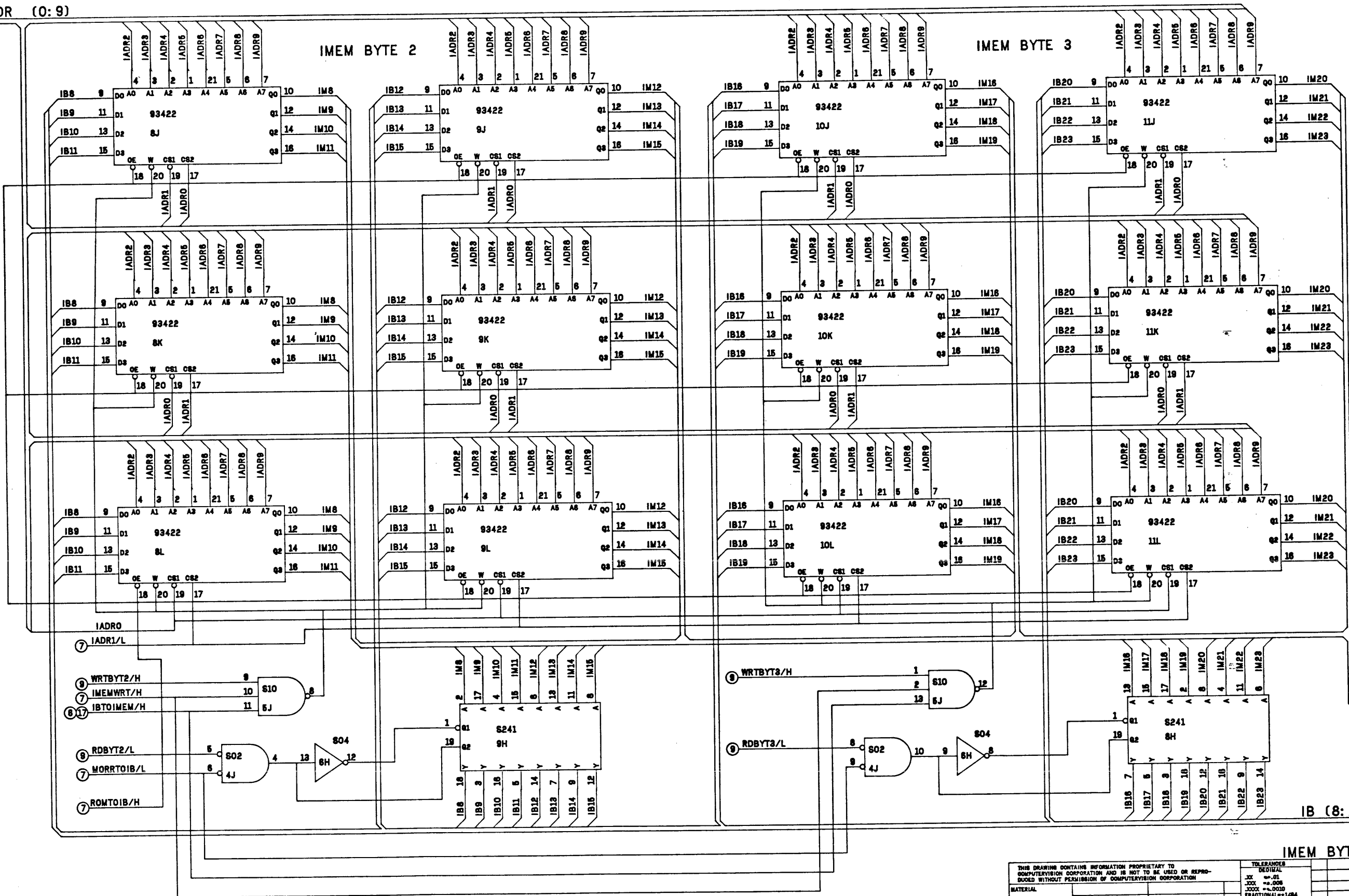
S23E017  
C

INTERNAL ADDRESS GENERATION AND IMEM BYTE 1

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:		
		XX	±.01	
		XXX	±.005	
		XXXX	±.0025	
		FRACTIONAL	±.004	
		ANGULAR	±.004	
FINISH				REV 04 1A
				REV DESCRIPTION
				APPRO DATE
PART NUMBER	NEXT ASSEMBLY	QTY	UFB	TITLE
				GPU SCHEMATIC DIAGRAM
COMPUTERVISION CORP.		SCALE	DWG NO.	S23E017
300 BURLINGTON ROAD ROUTE 62 BEDFORD, MASS. 01730		SIGNATURE DATE	UNIT NO.	SHT 7 OF 19 SHTS
		REMOVE ALL BURRS AND SHARP EDGES	UNIT WT.	



87 IADR (0:9)



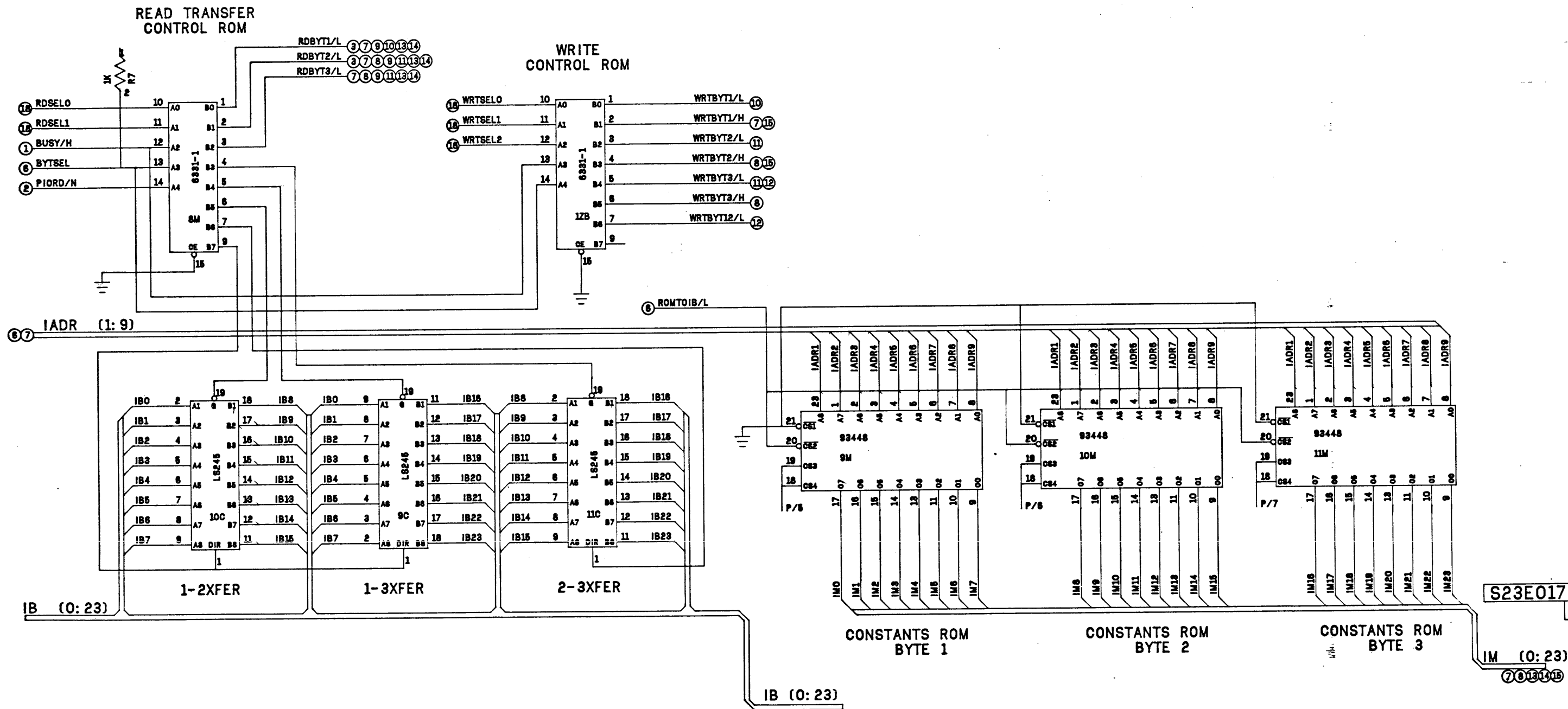
S23E017 C

IM (8:23)

IB (8:23)

IMEM BYTE 2 AND 3

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 ANGULAR		REV. BY SA	
MATERIAL		L23X004	1	DRN 8 NOV88	SYN
FINISH		A23E016	REF	ENGR	REVISION DESCRIPTION
PART NUMBER	NEXT ASSEMBLY		PROJ		DATE
COMPUTERVISION CORP. 301 BURLINGTON ROAD BEDFORD, MASS. 01730		TITLE GPU SCHEMATIC DIAGRAM		DWG NO. S23E017 SHT 8 OF 18 SHTS	

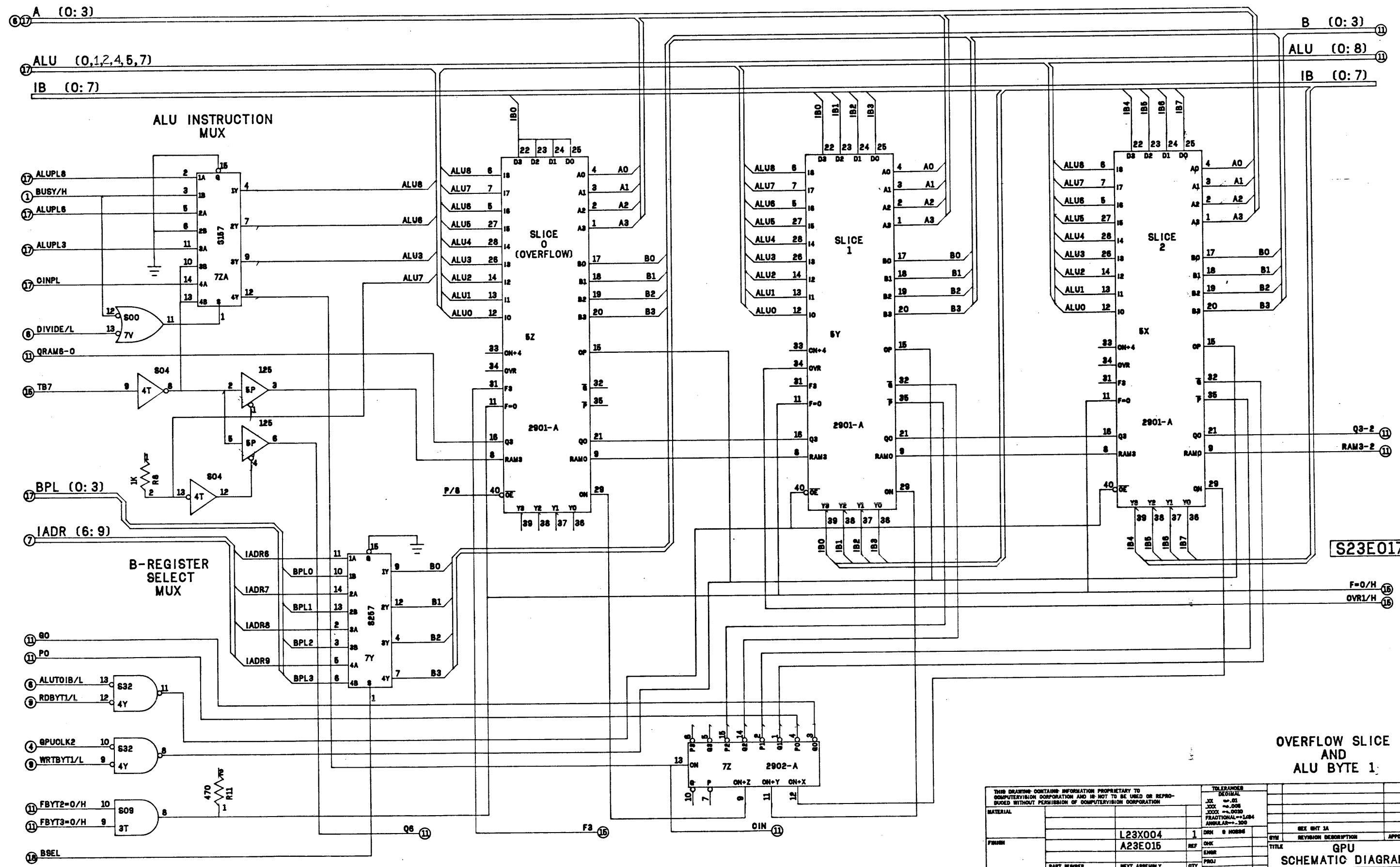


**IBUS TRANSFER CONTROL AND CONSTANTS ROM**

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES DECIMAL XXX = .01 XXXX = .005 XXXXX = .0005 FRACTIONAL = 1/16 ANGLES = 30°		SEE SHIT 3A	
MATERIAL		DRN	Q	NOBS	
QTY	1	CHK			
REF	L23X004	ENGR			
PROJ	A23E015	PROJ			
PART NUMBER		QTY			
NEXT ASSEMBLY		DATE		SCALE	
COMPUTERVISION CORP.		SIGNATURE		DWG NO.	
ONE BURLINGTON ROAD ROUTE 68 BEDFORD, MASS. 01730		DATE		SHT 9 OF 19 SHTS	
		UNIT WT.		SHT 9 OF 19 SHTS	

S23E017

IM (0:23)  
7 8 9 10 11 12 13 14 15

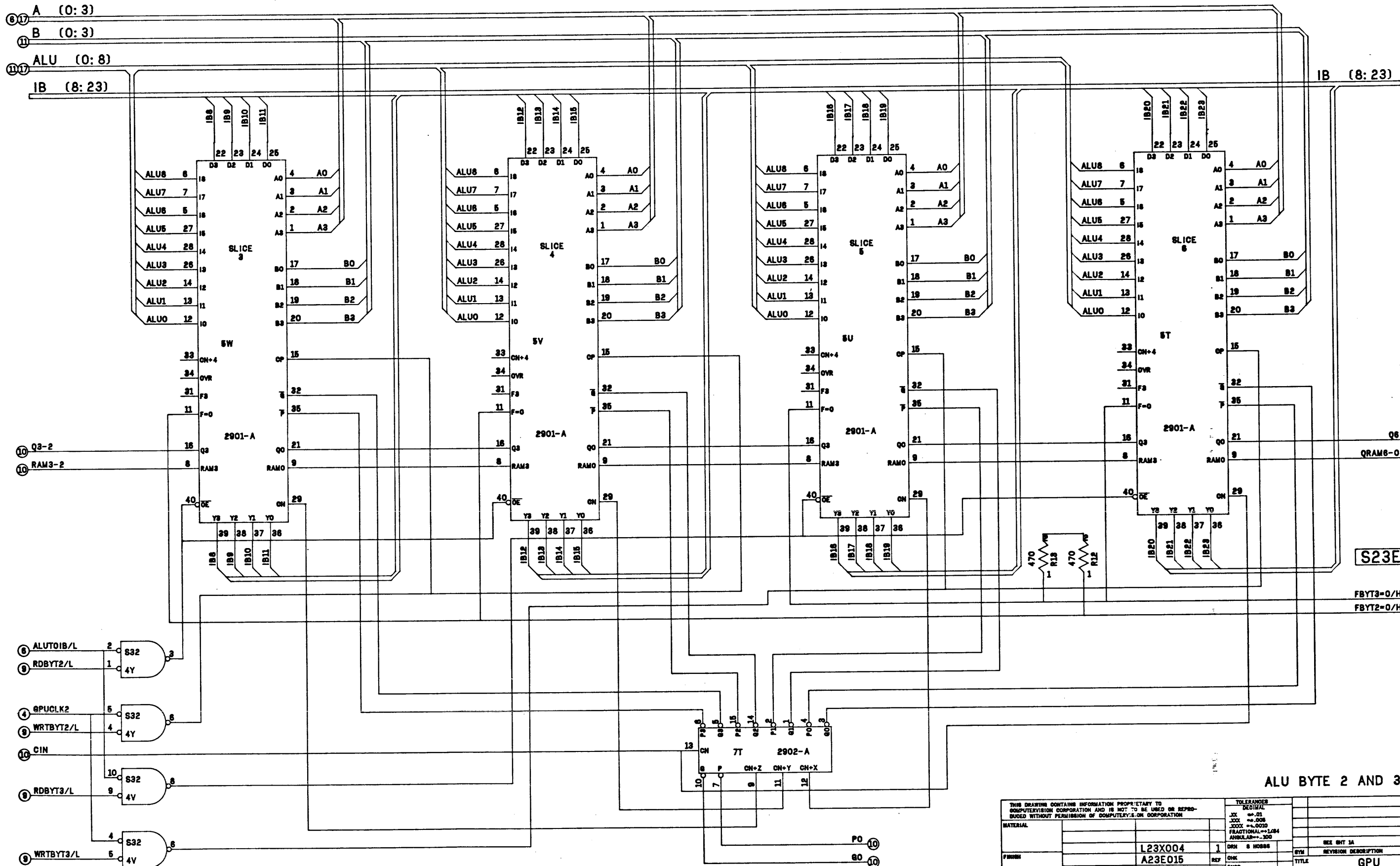


S23E017 C

F=0/H 15  
OVR1/H 16

OVERFLOW SLICE AND ALU BYTE 1

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 XX .01 XXX .005 XXXX .0030 FRACTIONAL .0004 ANGULAR .300			
MATERIAL				QTY	DRN	BY	DATE
	L23X004			1	DRN	8	NOV88
FORM	A23E015			REF	CHK		
				ENR			
				PROJ			
PART NUMBER	NEXT ASSEMBLY			QTY			
COMPUTERVISION CORP. 301 DARTMOUTH ROAD ROUTE 62 BEDFORD, MASS. 01730				SIGNATURE DATE		SCALE DWS NO. S23E017	
				REMOVE ALL DIMS AND SHARP EDGES		UNIT WT. SHT 10 OF 19 SHTS	

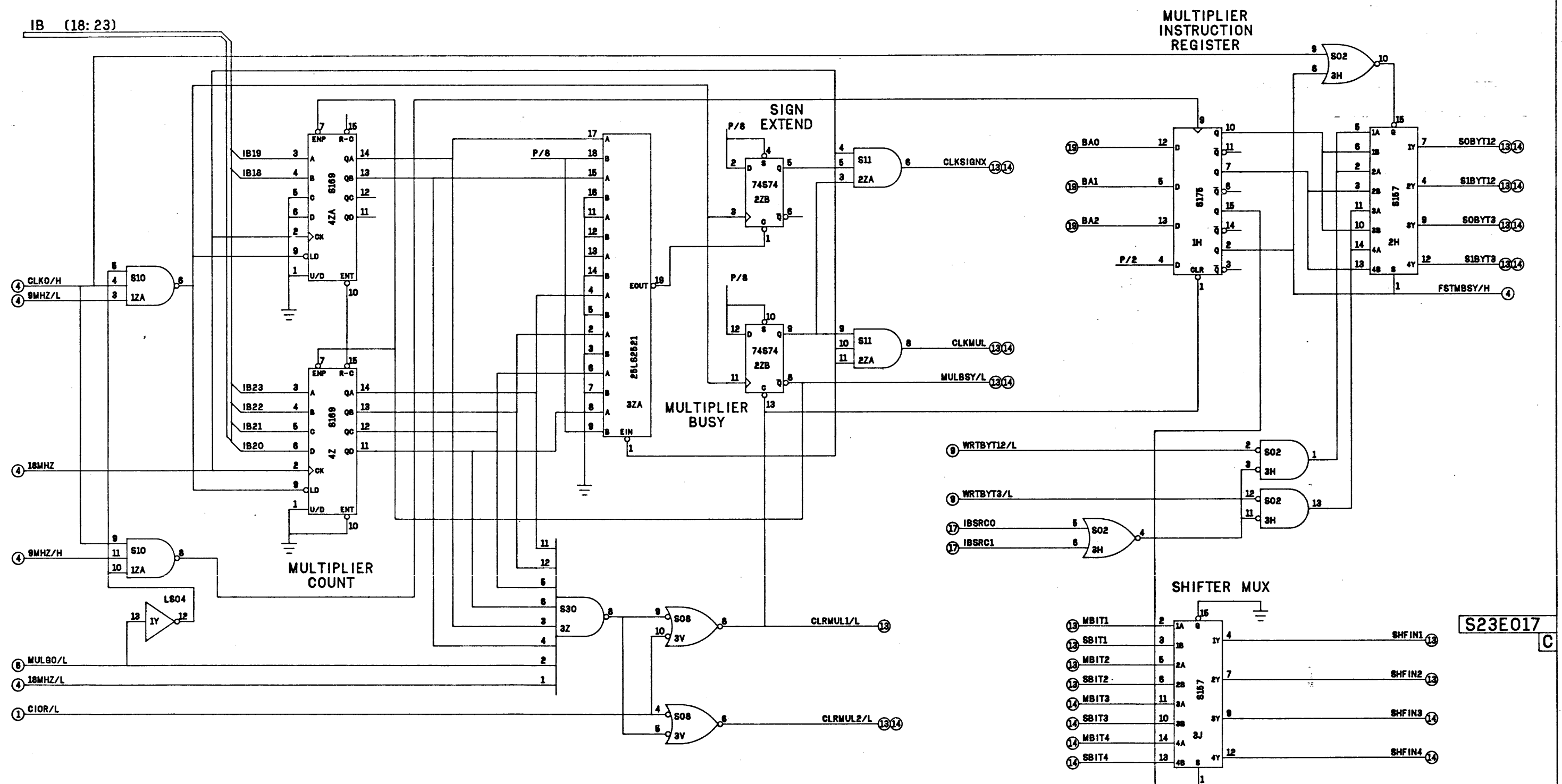


ALU BYTE 2 AND 3

S23E017

FBYT3=0/H  
FBYT2=0/H

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION				TOLERANCES UNLESS SPECIFIED DECIMAL XXX .001 XXX .005 XXX .010 FRACTIONAL 1/16 1/32 1/64 1/128 1/256 1/512 1/1024	
MATERIAL				REV	DATE
FORM	L23X004	1	CHK	REV	DATE
	A23E015	REF	ENGR	REV	DATE
		PROJ			
PART NUMBER	REV	QTY			
COMPUTERVISION CORP.			SCALE		
300 BURLINGTON ROAD			DWG NO.		
BEDFORD, MASS. 01730			SHT 11 OF 19 SHTS		

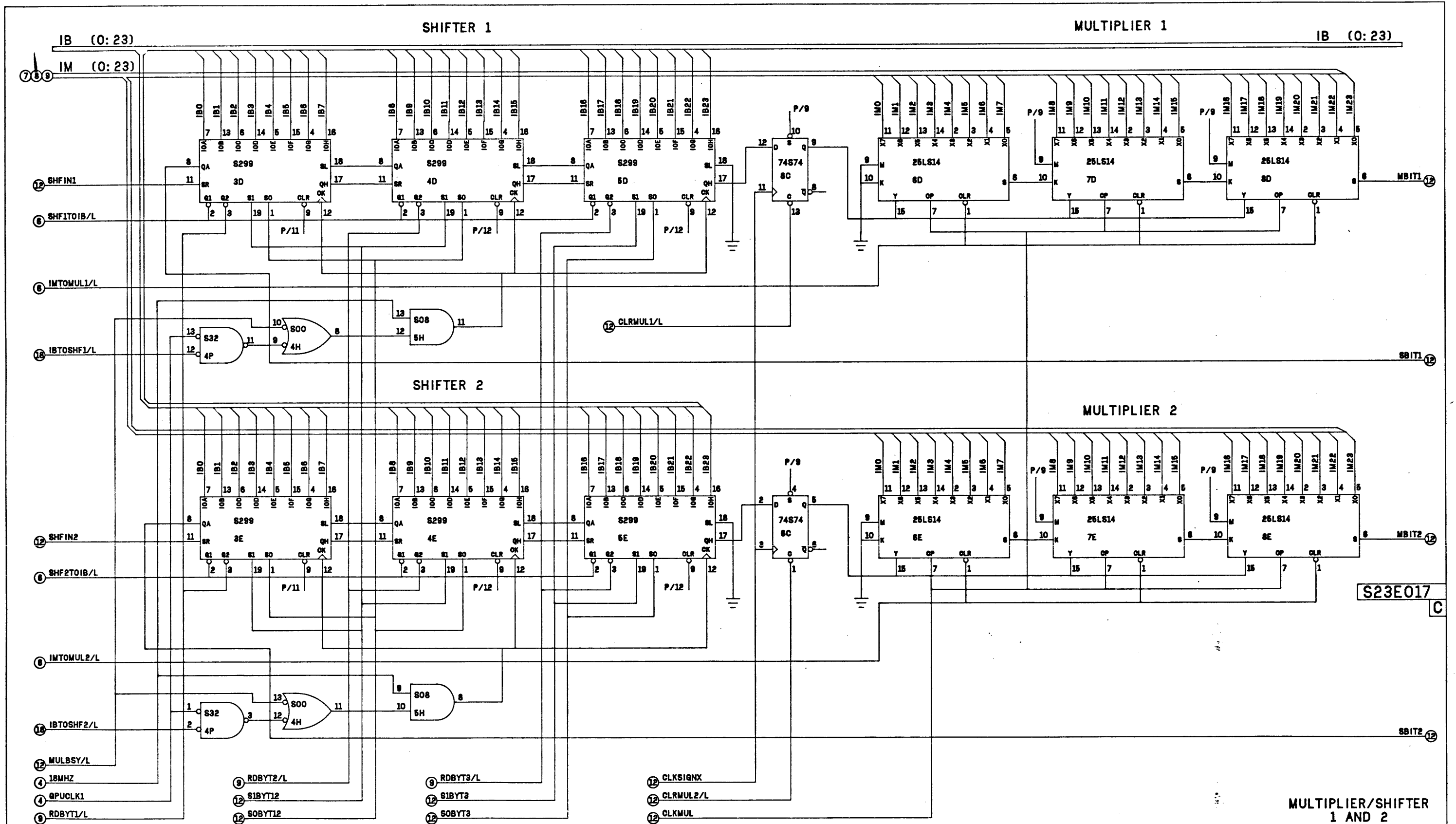


S23E017  
C

MULTIPLIER CONTROL

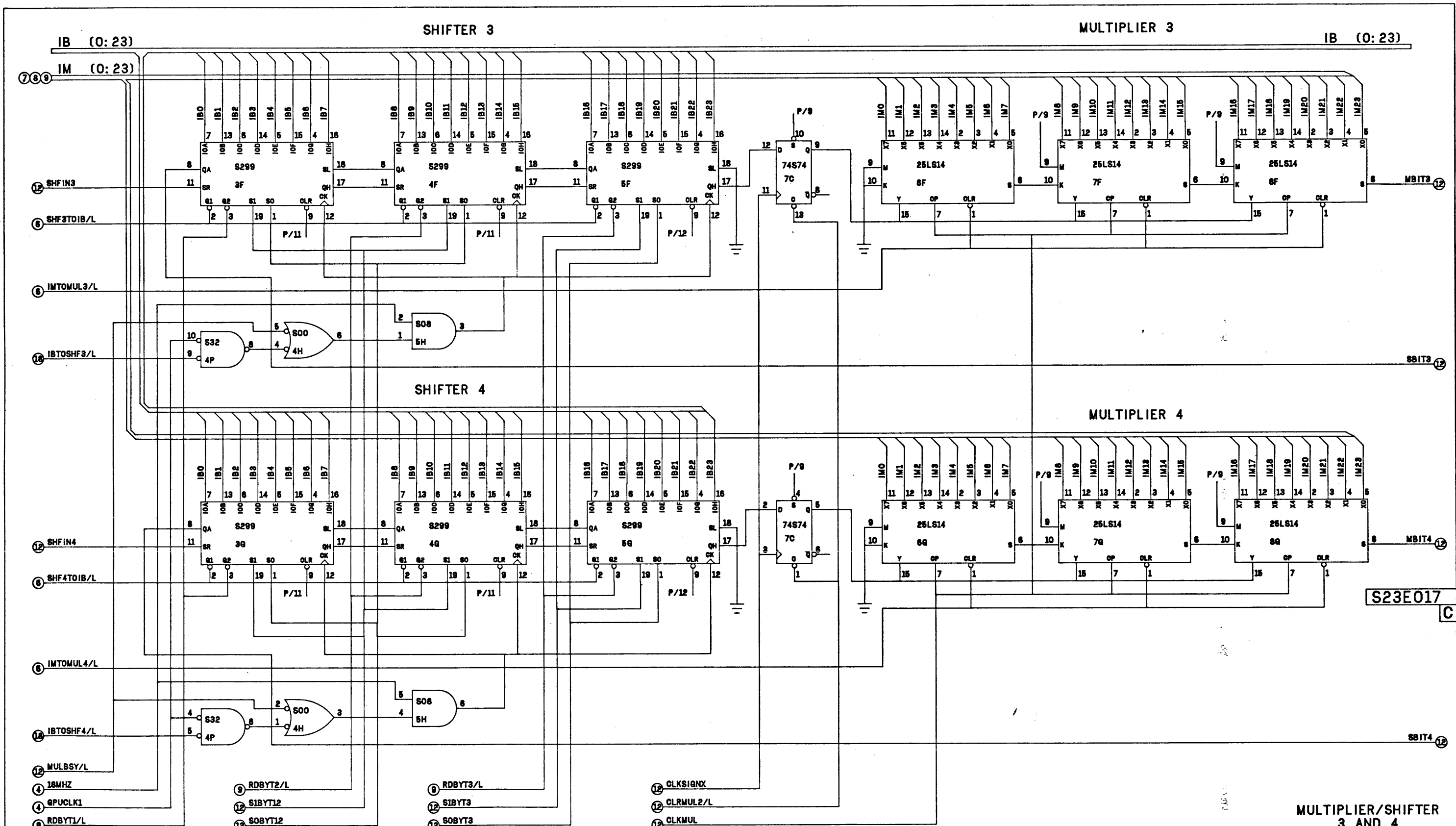
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES UNLESS SPECIFIED			
MATERIAL					
FINISH					
PART NUMBER	L23X004	1	DWG 8 HORSES	BYM	REVISEN DESCRIPTION
NEXT ASSEMBLY	A23E015	REF	CHK	APPD	DATE
COMPUTERVISION CORP.		SCALE		TITLE	
301 BURLINGTON ROAD ROUTE 82 BEDFORD, MASS. 01730		DWG NO. S23E017		GPU SCHEMATIC DIAGRAM	
REMOVE ALL BURRS AND SHARP EDGES		SIGNATURE DATE		SHT 12 OF 19 SHTS	





MULTIPLIER/SHIFTER 1 AND 2

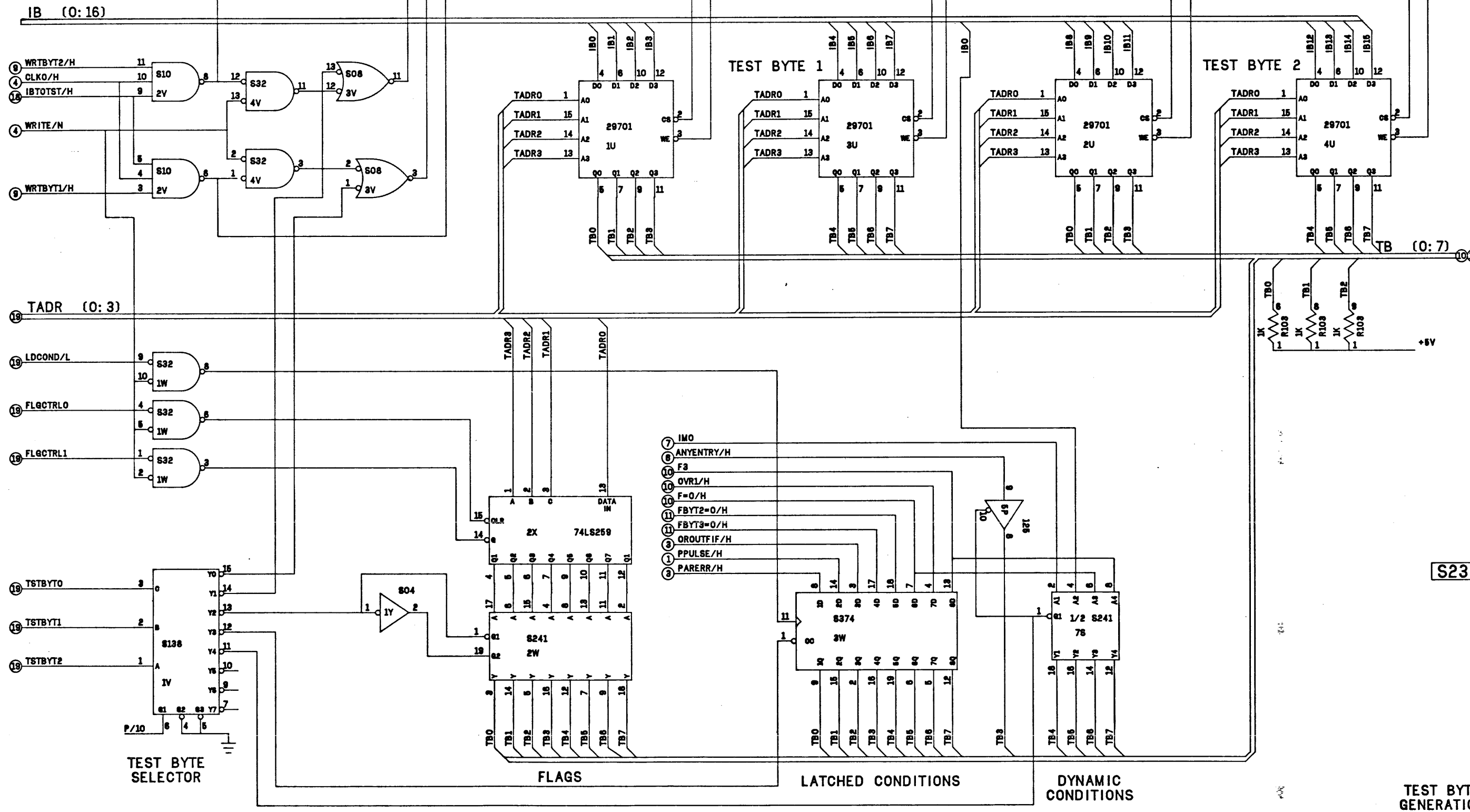
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION			TOLERANCES DECIMAL XX ±.01 XXX ±.005 XXXX ±.0010 FRACTIONAL ±1/64 ANGULAR ±.100		
MATERIAL			DRN 6 H0000	REV INT 1A	
FINISH	L23X004	1	ONE	SYM	REVISION DESCRIPTION
	A23E015	REF	ENGR	TITLE	GPU SCHEMATIC DIAGRAM
			PROJ	DWG NO.	S23E017
			QTY	SCALE	SHT 13 OF 19 SHTS
PART NUMBER NEXT ASSEMBLY			SIGNATURE DATE	UNIT	
COMPUTERVISION CORP. 801 BURLINGTON ROAD ROUTE 62 BEDFORD, MASS. 01730			REMOVE ALL MARKS AND SHARP EDGES	WT.	



S23E017  
C

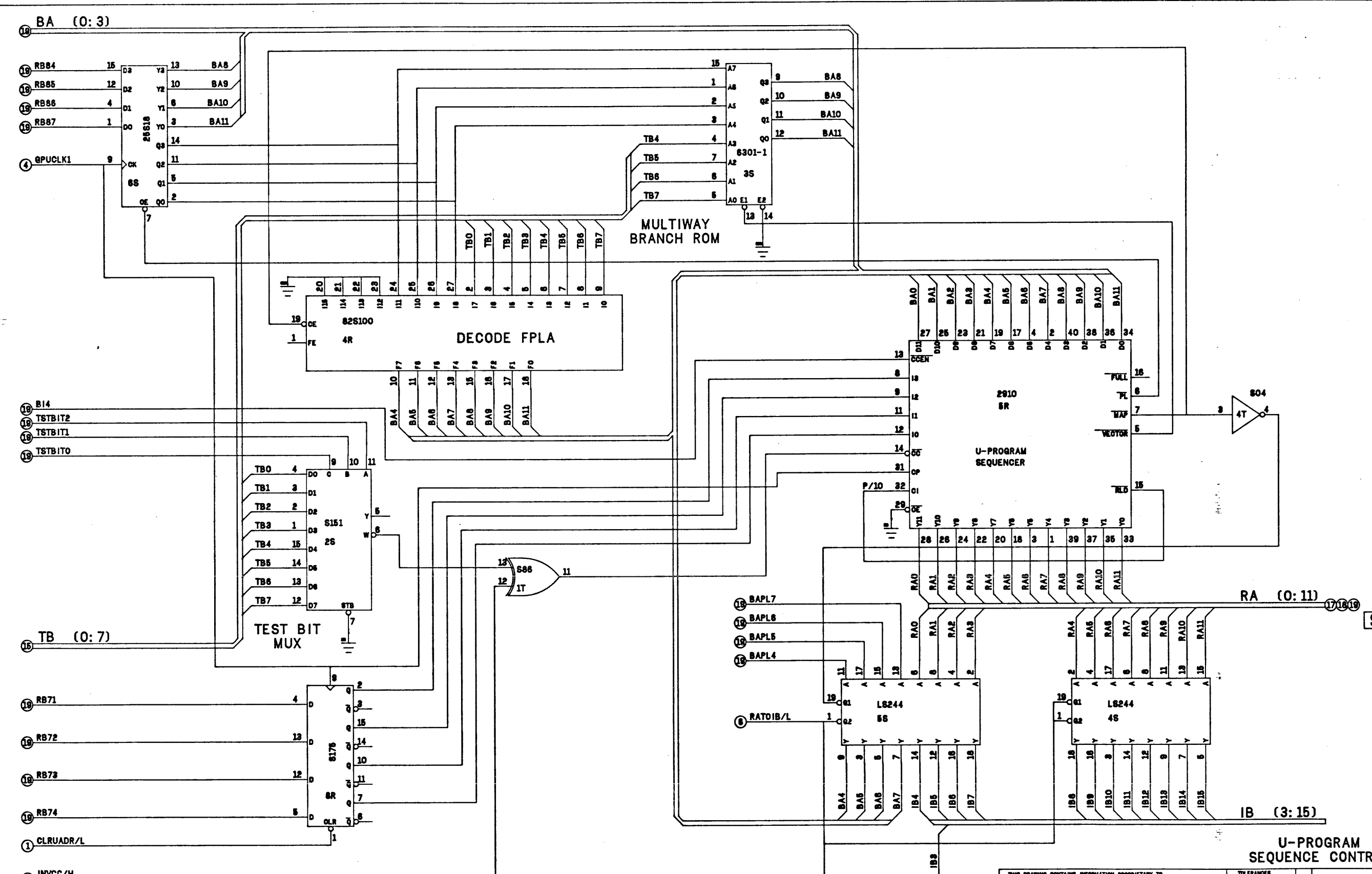
MULTIPLIER/SHIFTER  
3 AND 4

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 ANGULAR--.100			
MATERIAL				SEE SHIT 1A	
FINISH	L23X004 A23E015	1	DRW 6 NOV86	BYN	REVISION DESCRIPTION APPD DATE
PART NUMBER				TITLE	GPU SCHEMATIC DIAGRAM
NEXT ASSEMBLY				SCALE	DWG NO. S23E017
QTY				SIGNATURE DATE	UNIT NO. SHT 14 OF 19 SHTS
COMPUTERVISION CORP. 301 BURLINGTON ROAD ROUTE 62 BEDFORD, MASS. 01730				REMOVE ALL BURRS AND SHARP EDGES	



S23E017  
C

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRO- DUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES DECIMAL .01 FRACTIONAL .005 ANGULAR .1/16			
MATERIAL				REV B 1A	
FINISH	L23X004	1	DRW 8 NOV88	BYN	REVISION DESCRIPTION
	A23E015	REF	ENR	ENR	APPD DATE
			PROJ		TITLE
PART NUMBER	NEXT ASSEMBLY	QTY			GPU SCHEMATIC DIAGRAM
COMPUTERVISION CORP. 805 BURLINGTON ROAD SUITE 88 BEDFORD, MASS. 01730			DATE SIGNATURE	SCALE UNIT WT.	DWG NO. S23E017 SHT 15 OF 19 SHTS



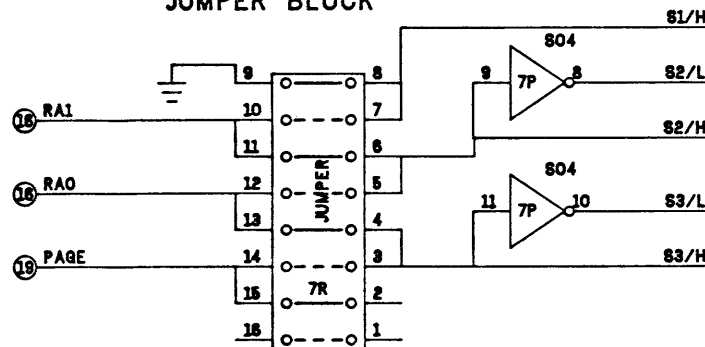
S23E017  
C

U-PROGRAM SEQUENCE 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			
		XXXX .001			
		FRACTIONAL-->1/64			
		ANGULAR-->.100			
				SEE SHT 1A	
MATERIAL		QTY	DRN	BY	DATE
	L23X004	1	DRN	HOBBS	
FINISH	A23E015	REF	CHK		
		ENGR			
		PRJ			
PART NUMBER	NEXT ASSEMBLY	QTY			
COMPUTERVISION CORP.			SCALE	DWG NO.	S23E017
200 BURLINGTON ROAD SUITE 00			SIGNATURE	DATE	
BEDFORD, MASS. 01730			REMOVE ALL BURRS AND SHARP EDGES	DRN	DATE
			WRIT		
					SHT 16 OF 19 SHTS

15 PAGE

CONTROL STORE BANK SELECT JUMPER BLOCK

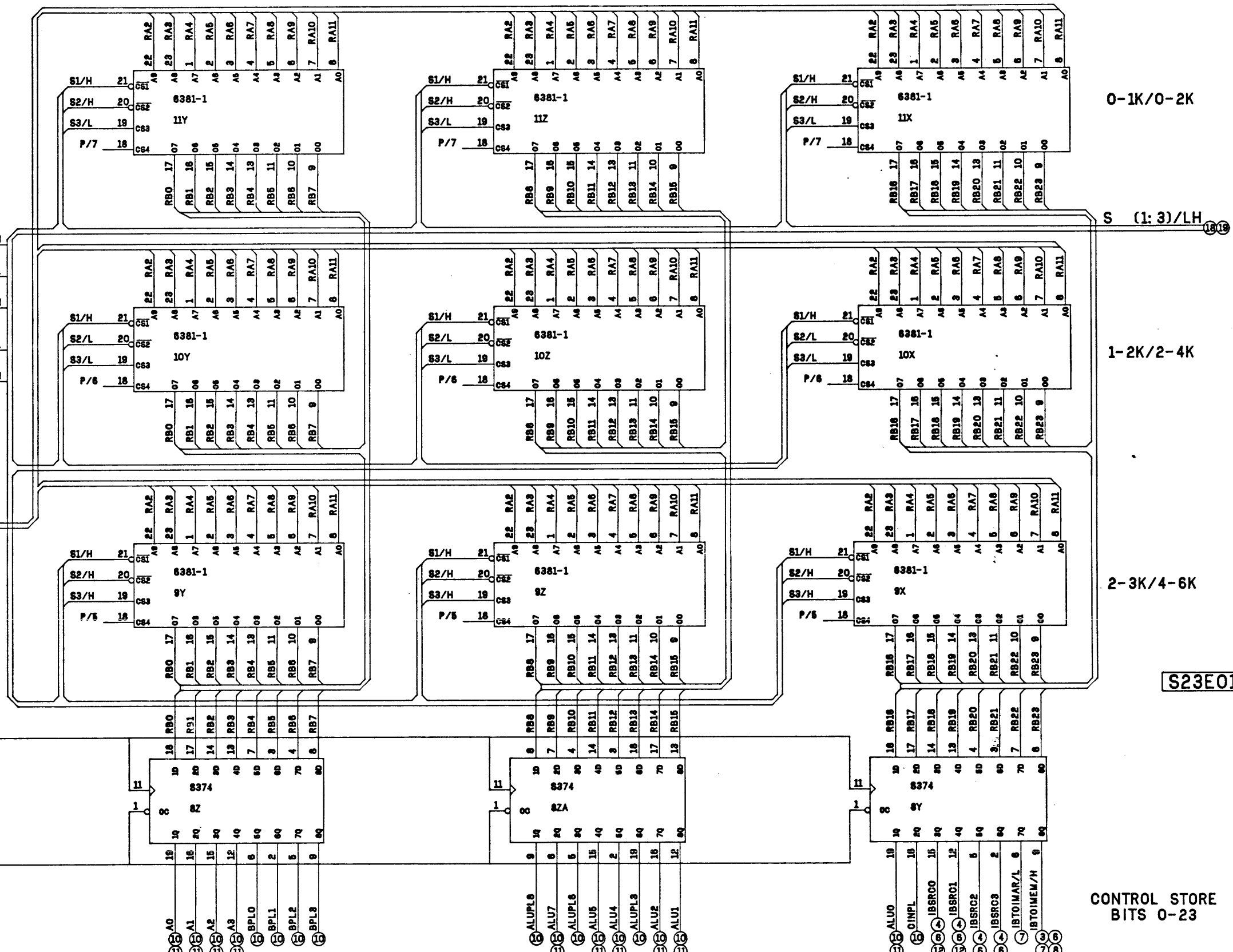


— 1K X 8 PROMS  
 - - - 2K X 8 PROMS

RA (2:11)

GPUCLK3

BUSY/L



O-1K/0-2K

1-2K/2-4K

2-3K/4-6K

S23E017

CONTROL STORE BITS 0-23

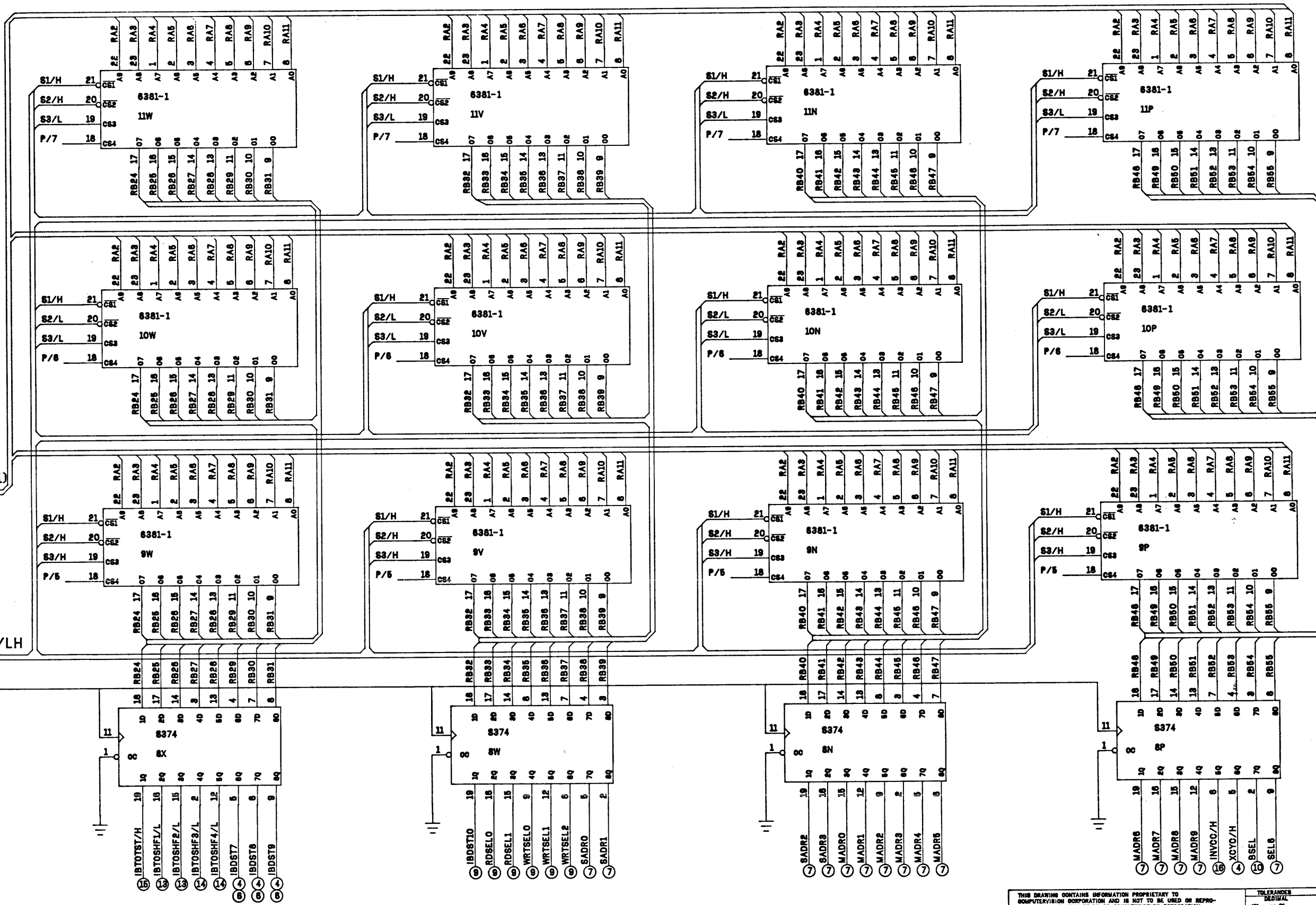
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVERSION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVERSION CORPORATION.		TOLERANCES UNLESS SPECIFIED: .125 ±.01 .001 ±.001 .002 ±.002 .005 ±.005 .010 ±.010 .015 ±.015 .020 ±.020 .030 ±.030 .040 ±.040 .050 ±.050 .060 ±.060 .070 ±.070 .080 ±.080 .090 ±.090 .100 ±.100	
MATERIAL			
FINISH	L23X004	1	DRN 8 HOURS
	A23E015	REF	ENGR
PART NUMBER		QTY	PROJ
COMPUTERVERSION CORP.			
301 BURLINGTON ROAD ROUTE 62			
BEDFORD, MASS. 01730			
SIGNATURE DATE		SCALE	DWG NO. S23E017
REMOVE ALL BURRS AND SHARP EDGES		UNIT	SHT 17 OF 19 SHTS



RA (2:11)

S (1:3)/LH

GPUCLK3



0-1K/0-2K

1-2K/2-4K

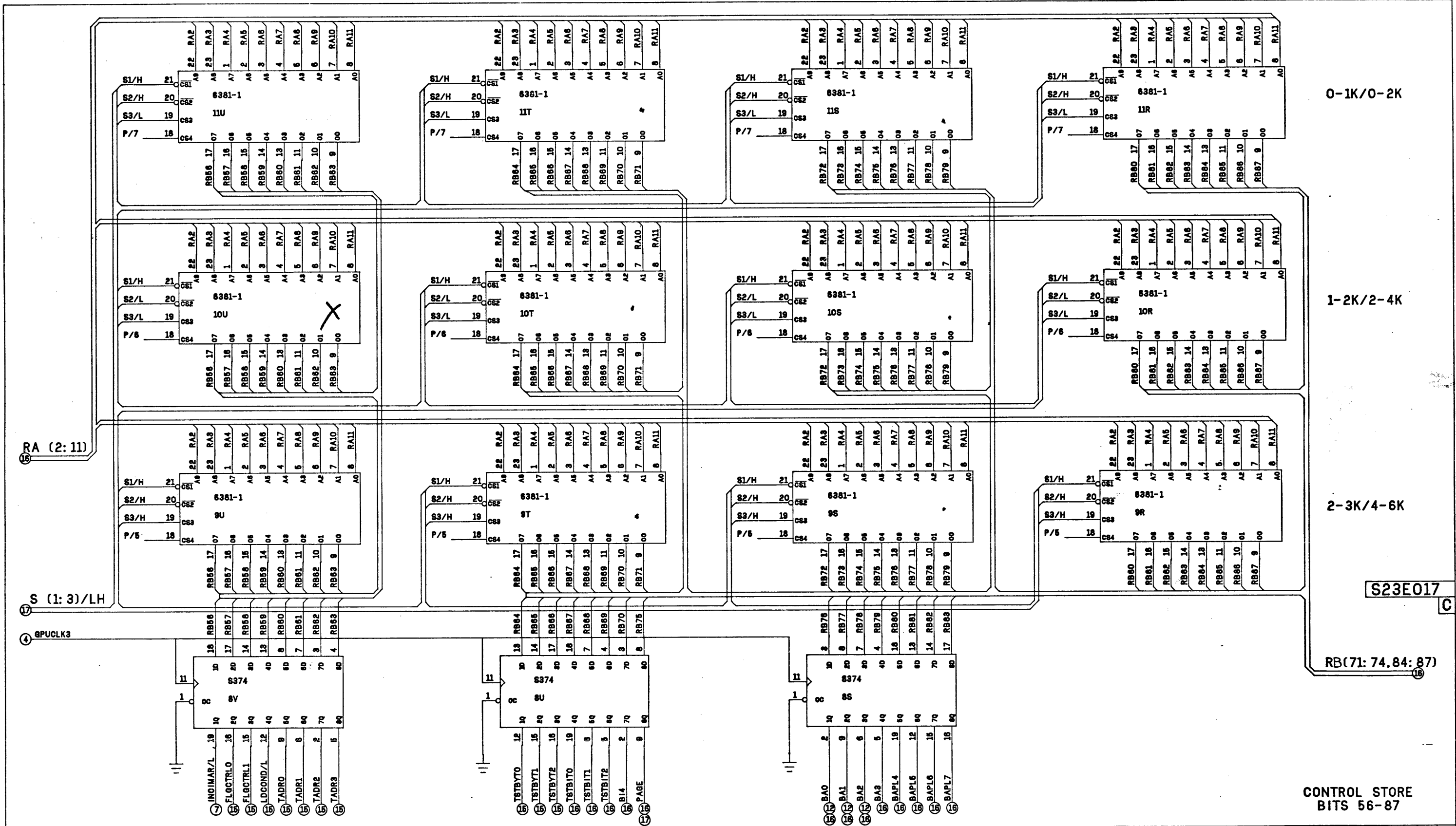
2-3K/4-6K

S23E017

C

CONTROL STORE  
BITS 24-55

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRO- DUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES DECIMAL 0.01 XXX 0.006 XXXX 0.0030 FRACTIONAL ANGLES 1:50			
MATERIAL				SEE INT 1A	
FINISH	L23X004	1	DRH & HOBBS	DATE	APPO DATE
	A23E015	REF	CHK	TITLE	
			ENR	REVISION DESCRIPTION	
			PROJ	APPO DATE	
PART NUMBER	NEXT ASSEMBLY	QTY	MFR	TITLE	
COMPUTERVISION CORP.			SIGNATURE	DATE	SCALE
801 BURLINGTON ROAD BEDFORD, MASS. 01730					DWG NO. S23E017
REMOVE ALL S AND BRASS			UNIT WT.	SHT 16 OF 19 SHTS	



0-1K/0-2K

1-2K/2-4K

2-3K/4-6K

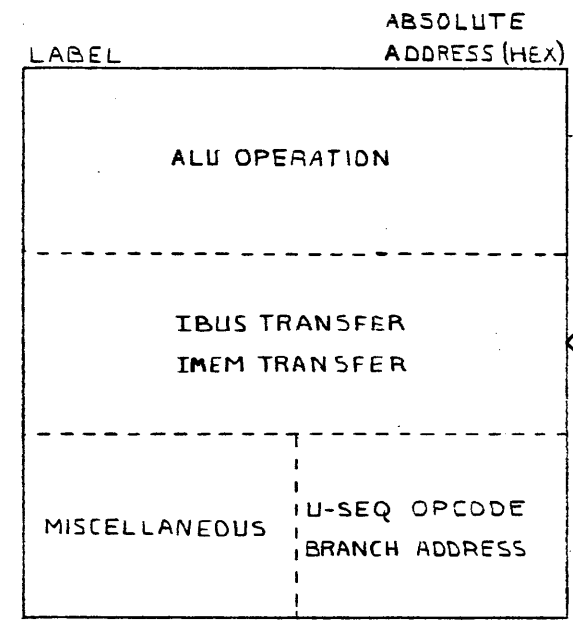
S23E017

RB(71: 74.84: 87)

CONTROL STORE  
BITS 56-87

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRO- DUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION		TOLERANCES DECIMAL 0.01 0.005 0.0025 FRACTIONAL 1/16 ANGULAR 1/16			
MATERIAL				SEE SH 1A	
FINISH	L23X004	1	DRH 8 HOBBS	BYN	REVISION DESCRIPTION
	A23E015	REF	ENGR		DATE
		PROJ			
PART NUMBER	NEXT ASSEMBLY	QTY			
COMPUTERVISION CORP. 801 BURLINGTON ROAD ROUTE 82 BEDFORD, MASS. 01730			SIGNATURE	DATE	SCALE
					DWG NO. S23E017
					UNIT WT. SHT 19 OF 19 SHTS

**GPU Microprogram Flow Charts**



**ALU OPERATION**  
 $R(OP) S, SHIFT \rightarrow DEST$   
 $R = (RA, \emptyset, IB)$   
 RA = REG FILE A-ADDR  
 IB = IBUS DATA  
 $S = (RA, RB, \emptyset, Q)$   
 RB = REG FILE B-ADDR  
 Q = Q REG  
 $(OP) = (+, -, OR, AND, EXOR, EXNOR)$   
 $SHIFT = (RS, LS)$  IF A SHIFT EXISTS  
 RS = RIGHT SHIFT  
 LS = LEFT SHIFT  
 $DEST = (RB, Q, F)$   
 F = ALU OUTPUT

NOTE: WHEN RB OR Q IS SELECTED AS THE ALU DEST, THE RESULT WILL ALSO APPEAR AT THE F OUTPUT

**IBUS TRANSFER (IB)**  
 $IBUS SOURCE: RDSEL \rightarrow IBUS DEST: WRTSEL$   
 IBUS SOURCES = SHF1  
 SHF2  
 SHF3  
 SHF4  
 INFIFO  
 ALU  
 RA  
 IMAR  
 $IMEM - \overline{SADR: MADDR} IMEM$   
 $ROM - \overline{SADR: MADDR} ROM$   
 $RDSEL = (RDALL, RD1, RD2, RD3)$   
 IBUS DESTINATIONS = BMAR  
 BMEM  
 CAR  
 OUTFIFO  
 IMAR  
 $IMEM - \overline{SADR: MADDR} IMEM$   
 TEST -  $\overline{TADR}$  TEST  
 SHF1  
 SHF2  
 SHF3  
 SHF4  
 $WRTSEL = (WRT\emptyset, WRT1, WRT2, WRT3, WRT12, WRT13, WRT23, WRTALL)$

**IMEM TRANSFER**  
 $\overline{SADR: MADDR} IMEM \rightarrow IMEM DESTINATION$   
 IMEM DESTINATIONS = MUL1  
 MUL2  
 MUL3  
 MUL4

**U-SEQ OPCODE**  
 SEE THE U-CODE LISTING FOR THE 16 POSSIBLE OPCODES AND THEIR DEFINITIONS

**BRANCH ADDRESS**  
 :XYZ- REPRESENTS THE LABEL THAT A JUMP WILL GO TO UPON EXECUTION

( )-REPRESENTS AN ABSOLUTE NUMBER

**MISCELLANEOUS**  
 TASKTERM  
 LDCOND  
 XCYC  
 INCIMAR  
 INV  
 MULGO (OP)  
 (OP) = (LSHF, RSSEX, MULT)  
 DIVIDE  
 CLRFLAGS  
 $FLAG(X) = (\emptyset, 1)$   
 $X = \emptyset, 1, 2, \dots, 7$   
 INSTEND  
 IADRB  
 P2

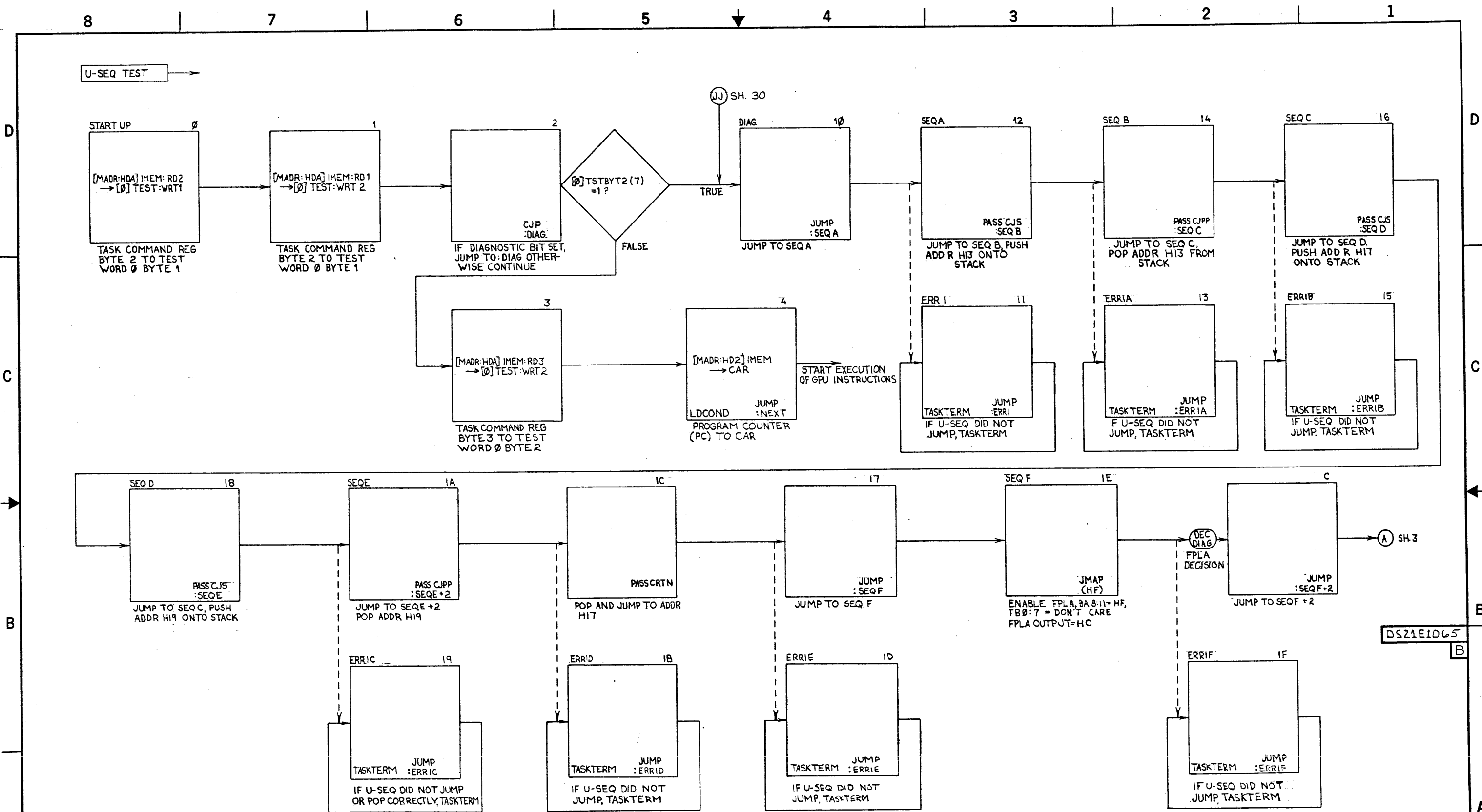
**TEST CONDITION**  
 TEST BYTE 1  
 $\overline{TADR} TSTBYT1 (TSTBIT) = (\emptyset, 1) ?$   
 TEST BYTE 2  
 $\overline{TADR} TSTBYT2 (TSTBIT) = (\emptyset, 1) ?$   
 FLAGS TEST BYTE  
 $FLAG(X) = (\emptyset, 1) ?$   
 $X = \emptyset, 1, 2, \dots, 7$   
 LATCHED CONDITIONS TEST BYTE  
 $F = \emptyset ?$   
 $FBYT2 = \emptyset ?$   
 $FBYT3 = \emptyset ?$   
 $F3 = 1 ?$   
 $OVR1 = 1 ?$

**DYNAMIC CONDITIONS TEST BYTE**  
 $F = \emptyset ?$   
 $F3 = 1 ?$   
 $IB\emptyset = 1 ?$   
 $IM\emptyset = 1 ?$

NOTE: THESE ARE DENOTED BY THE WORD "DYNAMIC" WITHIN THE TEST DIAMOND

DS 21E1065

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		DECIMAL	
		.XX ± .01	
		.XXX ± .005	
		.XXXX ± .0010	
		FRACTIONAL ± 1/64	
		ANGULAR ± 1°00'	
MATERIAL		B ECO #3421	
FINISH		A REL. ECO 3283	
DRAWN BY: D. Heave		10-77	
CHKD BY: [Signature]		10-77	
ENGR BY: [Signature]		10-77	
PROJ		TITLE	
PART NUMBER		L21X009	
NEXT ASSEMBLY		QTY	
COMPUTERVISION CORP.		SCALE	
201 Burlington Road		DWS NO. DS21E1065	
Bedford, Massachusetts 01730		REMOVE ALL BARRS AND SHARP EDGES	
SIGNATURE		DATE	
UNIT		SHEET 1 OF 30 SHEETS	



DS21E1065

CHECK FOR DIAGNOSTIC BIT SET  
TEST U-SEQ FUNCTIONALITY INCLUDING DECODE FPLA

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MATERIAL:		XX	DECIMAL ±.01
FINISH:		.XXX	±.005
PART NUMBER		.XXXX	±.0010
NEXT ASSEMBLY		FRACTIONAL	± 1/64
QTY		ANGULAR	± .000"
MFG		A SEE SHEET 1	
SIGNATURE DATE		SYM	REVISION DESCRIPTION
REMOVE ALL BURRS AND SHARP EDGES		ENGR	APPRO DATE
SCALE		PROJ	TITLE
DWG NO.		GPU MICROPROGRAM FLOW CHARTS	
SHEET 0 OF 30 SHEETS		COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730	



8

7

6

5

4

3

2

1

D

D

C

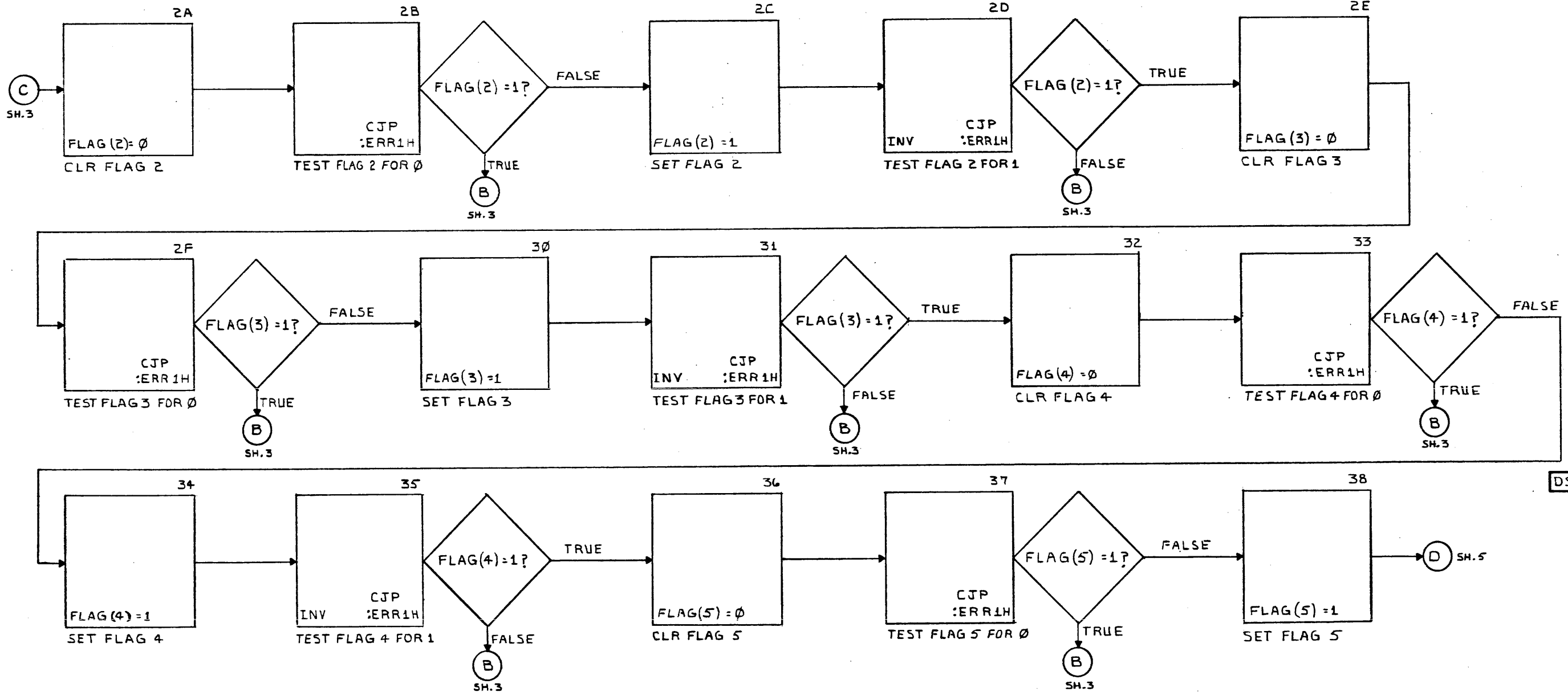
C

B

B

A

A



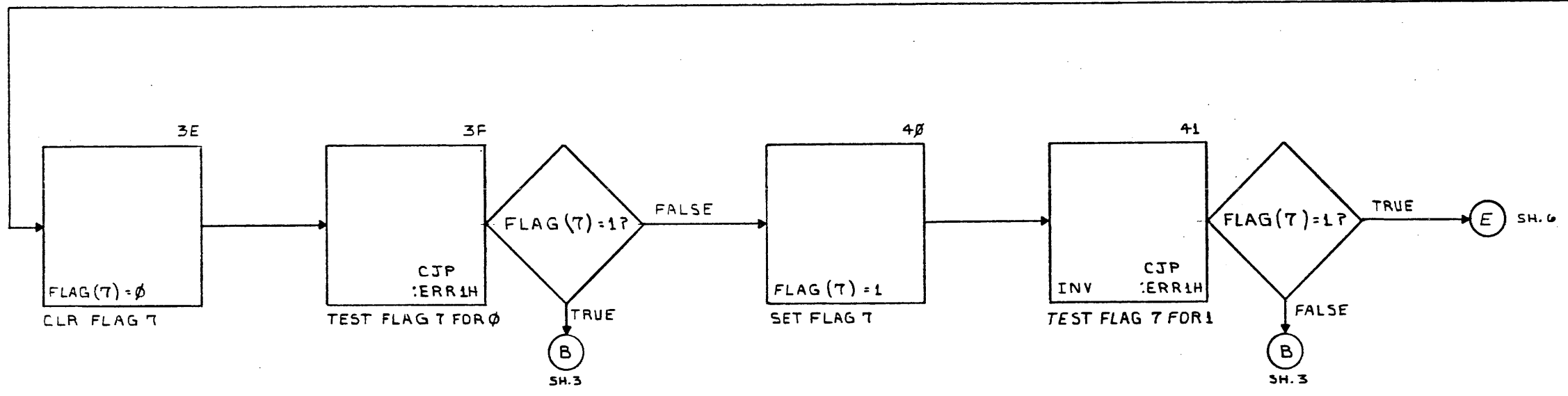
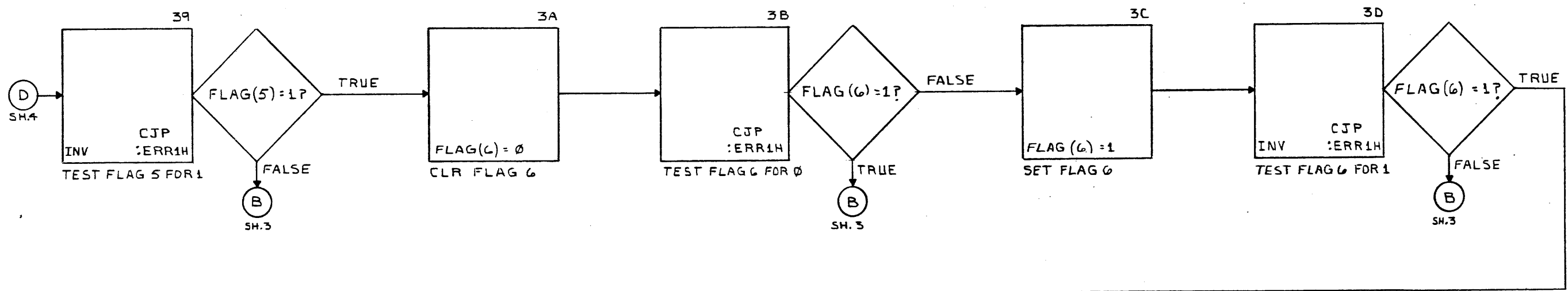
DS21E1065  
B

CONTINUE FLAGS BYTE TEST

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES	
MATERIAL:		DECIMAL	
FINISH:		.XX = ± .01	
PROJ:		.XXX = ± .005	
MFG:		.XXX = ± .0010	
PART NUMBER		FRACTIONAL = ± 1/64	
NEXT ASSEMBLY		ANGULAR = ± 1°00'	
QTY		DRN D.O'Hearn 10-78	
COMPUTERVISION CORP.		CHK	
201 Burlington Road		ENGR	
Bedford, Massachusetts 01730		PROJ	
SIGNATURE DATE		SCALE	
REMOVE ALL BURRS AND SHARP EDGES		DWG NO.	DS21E1065
		UNIT	WT. X
		SHEET 4 OF 30 SHEETS	



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



DS21E1065  
B

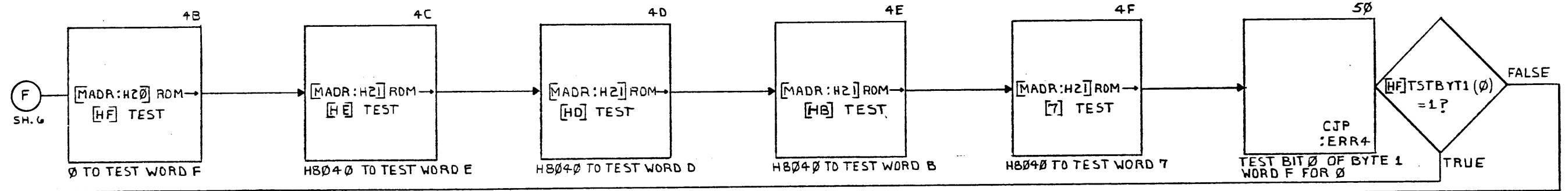
FINISH FLAGS BYTE TEST

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			
		.XXXX = ±.0010			
		FRACTIONAL = 1/8"			
		ANGULAR = ± 1°00'			
MATERIAL		DRN D.04	DATE 2-75	CYR	REVISION DESCRIPTION
CHK					
ENGR					
PROJ					
PART NUMBER	NEXT ASSEMBLY	QTY	SCALE	DWG NO.	DS21E1065
			SIGNATURE DATE	UNIT	SHEET 5 OF 30 SHEETS
			REMOVE ALL BARRIS AND SWAMP EDGES		

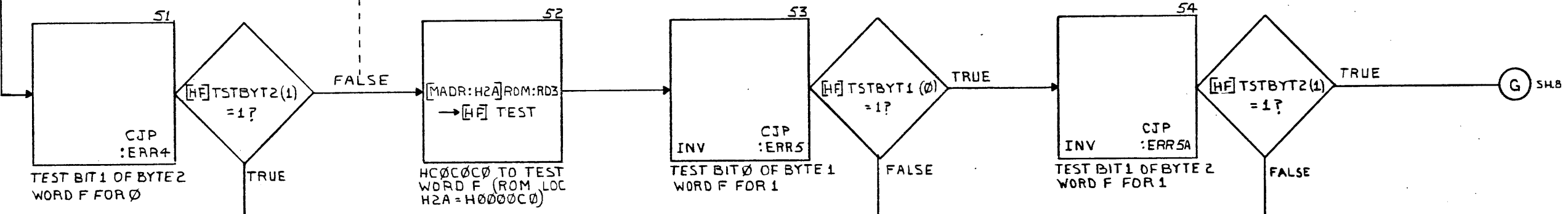


8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

TEST BYTE FILE ADDRESS TEST → CHECK TEST FILE ADDRESS LINES



READ BYTE 3 TEST → CHECK BYTE 3 TO BYTE 1, AND BYTE 3 TO BYTE 2 DATA TRANSFERS



ERR 4 142  
JUMP  
TASKTERM :ERR 4  
IF ANY ADDRESS LINE FOR  
THE TEST BYTE FILE  
IS IN ERROR, TASKTERM

ERR 5 143  
JUMP  
TASKTERM :ERR 5  
IF BYTE 3-1 TRANSFER  
IN ERROR, TASKTERM

ERR 5A 144  
JUMP  
TASKTERM :ERR 5A  
IF BYTE 3-2 TRANSFER  
IN ERROR, TASKTERM

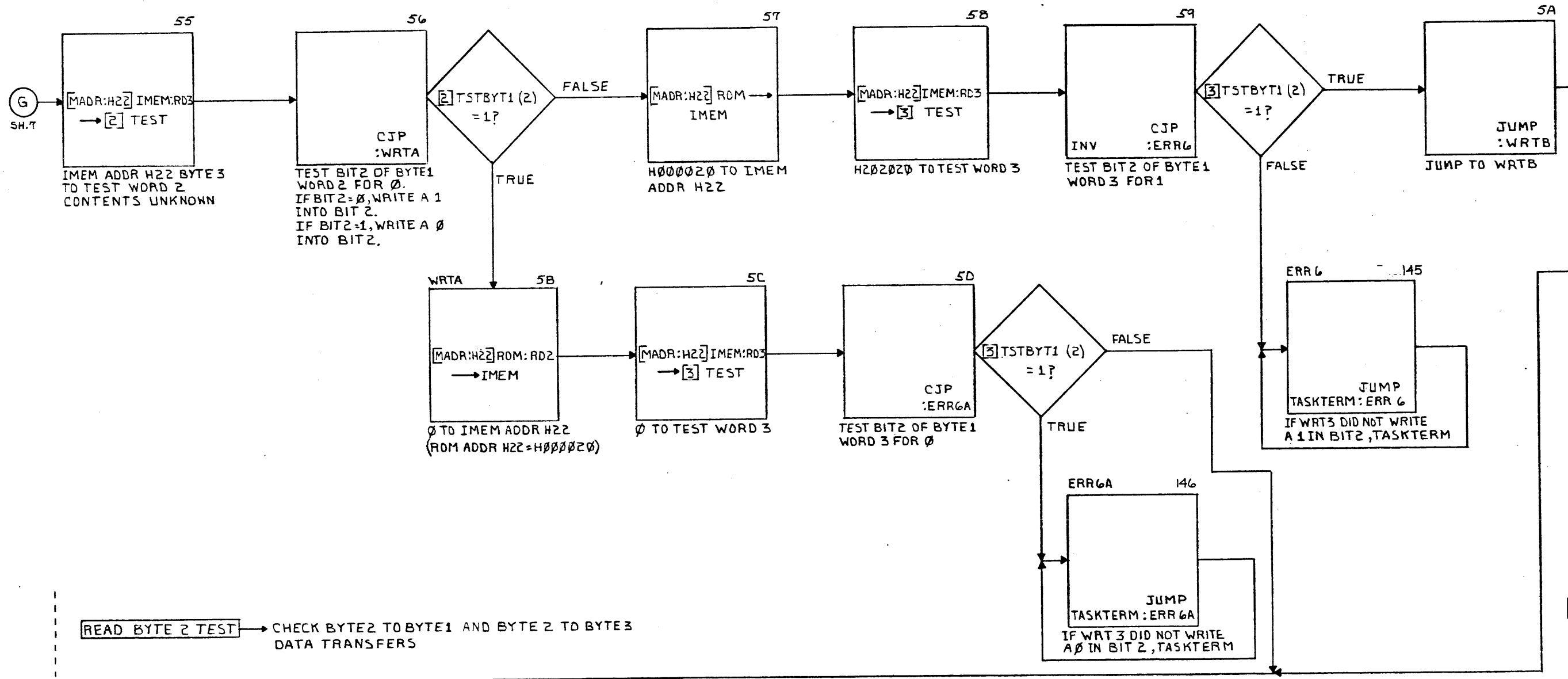
DS21E1065  
B

CHECK TEST BYTE FILE ADDRESSING,  
TEST READ CTRL ROM BYTE 3

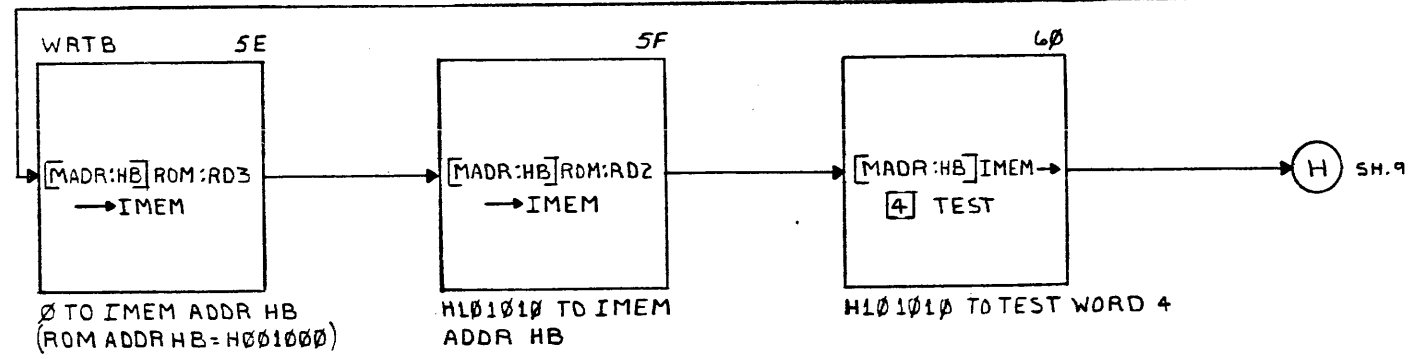
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSON OF COMPUTERVISION CORPORATION.				TOLERANCES			
				DECIMAL			
				.XX = ±.01			
				.XXX = ±.005			
				.XXXX = ±.0010			
				FRACTIONAL = ± 1/64			
				ANGULAR = ± 1'00"			
MATERIAL:				DRN D. O'Hearn	0.75	SEE SHEET 1	
FINISH:				CHK		TITLE	
				ENGR		GPU MICROPROGRAM	
				PROJ		FLOW CHARTS	
PART NUMBER	NEXT ASSEMBLY	QTY	MFG	SIGNATURE	DATE	SCALE	DWG NO.
							DS21E1065
				REMOVE ALL BURRS AND SHARP EDGES	DRY WT.		SHEET 7 OF 30 SHEETS

8 7 6 5 4 3 2 1

**WRITE CTRL ROM TEST** → CHECK TO INSURE THAT ROM DATA CAN BE WRITTEN INTO BYTE 3 OF THE IMEM (THIS VERIFIES WRT 3)



**READ BYTE 2 TEST** → CHECK BYTE 2 TO BYTE 1 AND BYTE 2 TO BYTE 3 DATA TRANSFERS

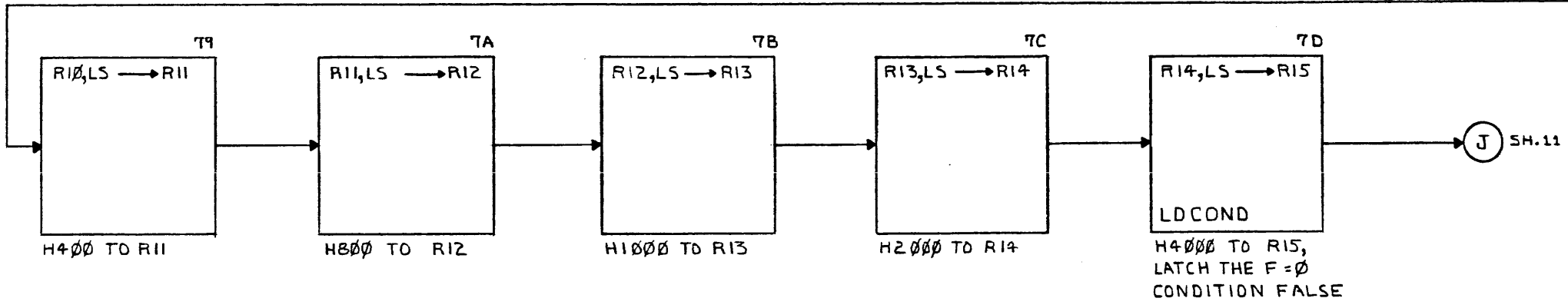
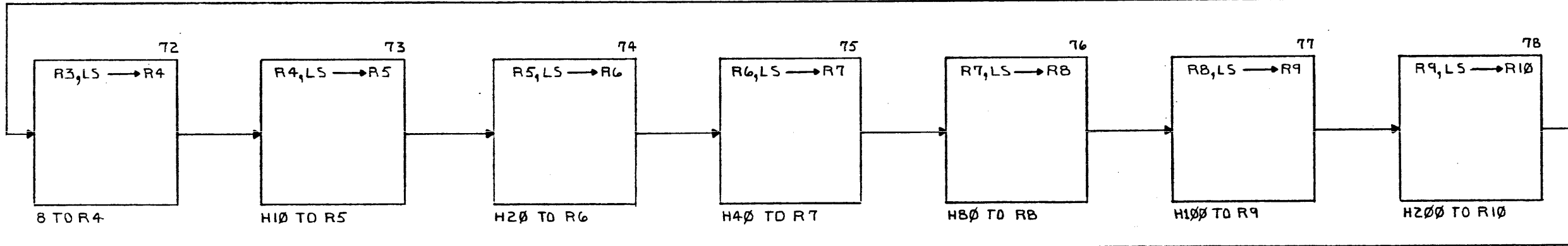
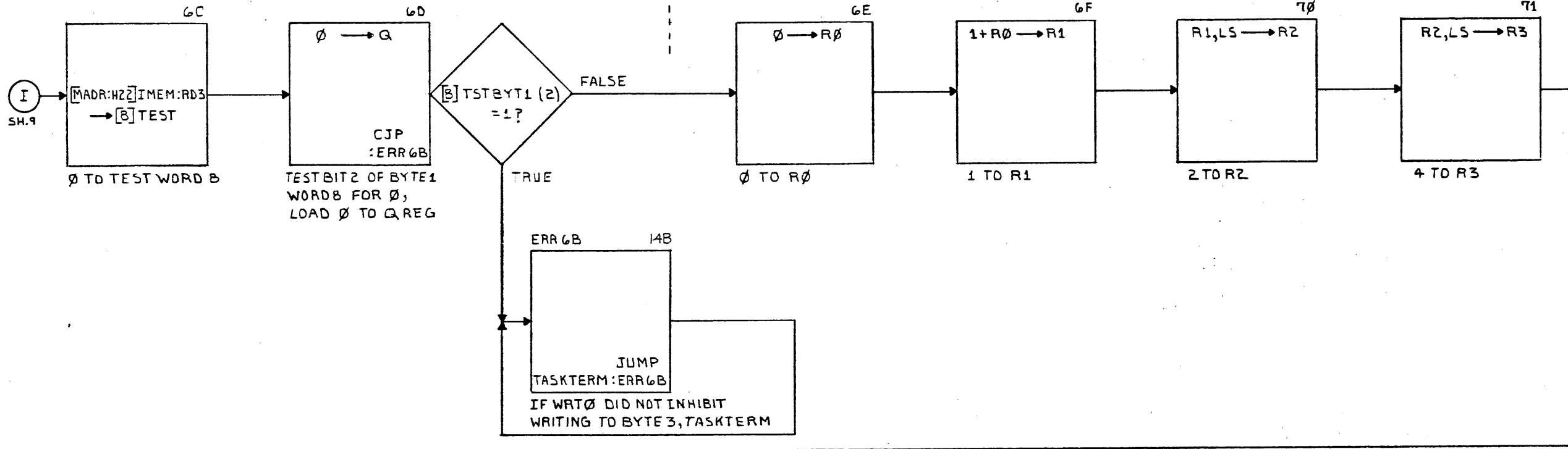


TEST WRITE CTRL ROM BYTE 3,  
START READ CTRL ROM BYTE 2 TEST

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				DECIMAL			
				.XX	± 0.1		
				.XXX	± 0.005		
				.XXXX	± 0.0010		
				FRACTIONAL	± 1/64		
				ANGULAR	± 1'00"		
MATERIAL				DRN D. O'Hearn, D. T.	SYM	SEE SHEET 1	
FRESH				CHK	REVISION DESCRIPTION	APPD	DATE
				ENGR			
				PROJ	TITLE	GPU MICROPROGRAM FLOW CHARTS	
PART NUMBER	NEXT ASSEMBLY	QTY	MFG	SIGNATURE	DATE	SCALE	DWG NO. DS21E 1065
						UNVT	SHEET 8 OF 30 SHEETS
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730				REMOVE ALL BURRS AND SHARP EDGES			



ALU TEST → FIRST LOAD THE REGISTER FILES

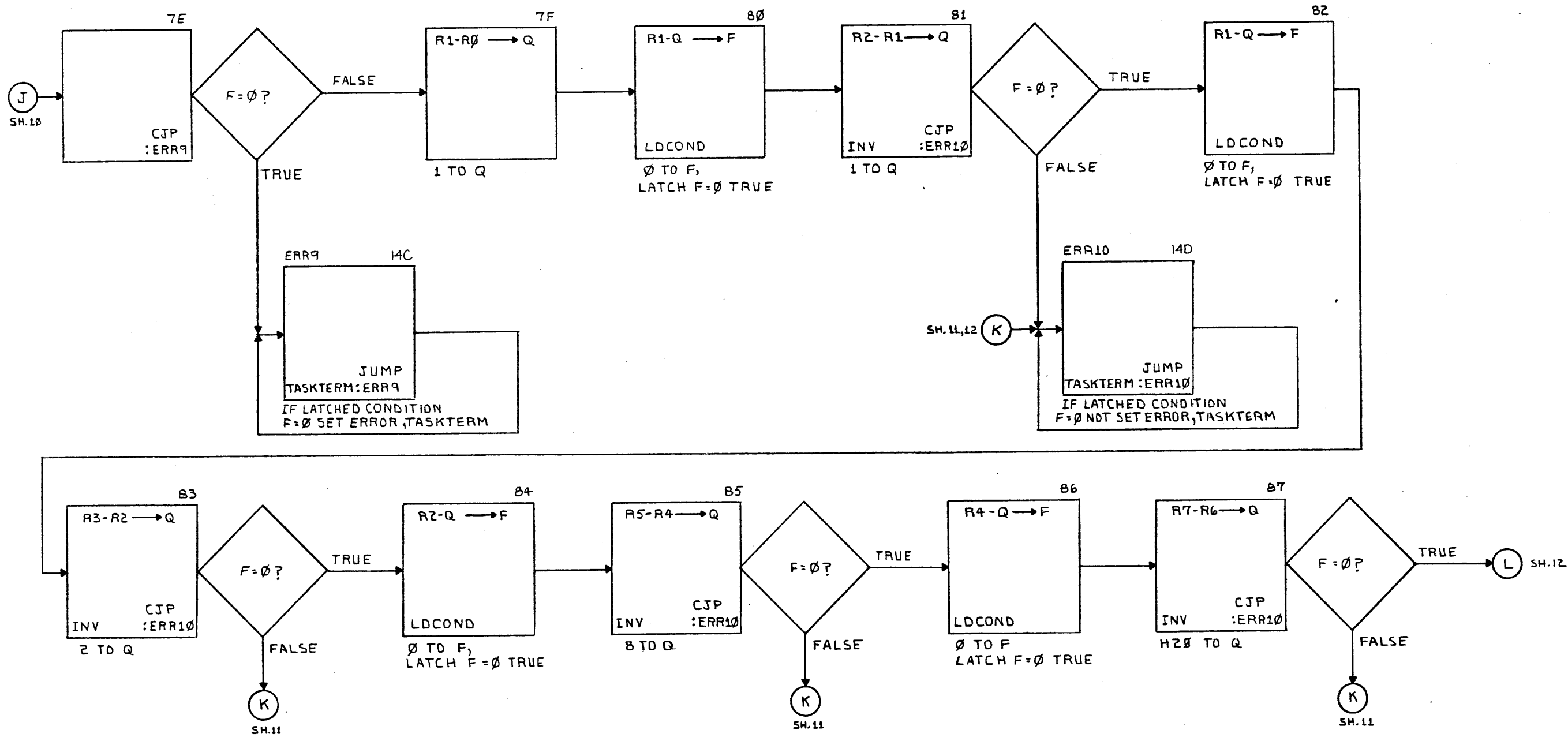


FINISH WRITE CTRL ROM BYTE 3 TEST, START ALU TEST

DS21E1065

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MATERIAL:		DECIMAL	
FINISH:		.XX ± .01	
PROJ:		.XXX ± .005	
PART NUMBER		.XXX ± .0010	
NEXT ASSEMBLY		FRACTIONAL ± 1/64	
QTY		ANGULAR ± 1°00'	
MFG		DRN D. O'Hearn 10-73	SYM
SIGNATURE			REVISION DESCRIPTION
DATE			APPRO DATE
REMOVE ALL BURRS AND SHARP EDGES		SCALE	TITLE
		UNIT	GPU MICROPROGRAM FLOW CHARTS
		DWG NO.	DS21E1065
		SHEET	10 OF 30 SHEETS

ALU TEST → NOW USE THE REGISTER FILE, Q REG, AND ARITHMETIC SECTION TO CHECK THE ALU OPERATION



ERR9 14C  
JUMP  
TASKTERM:ERR9  
IF LATCHED CONDITION  
F=0 SET ERROR, TASKTERM

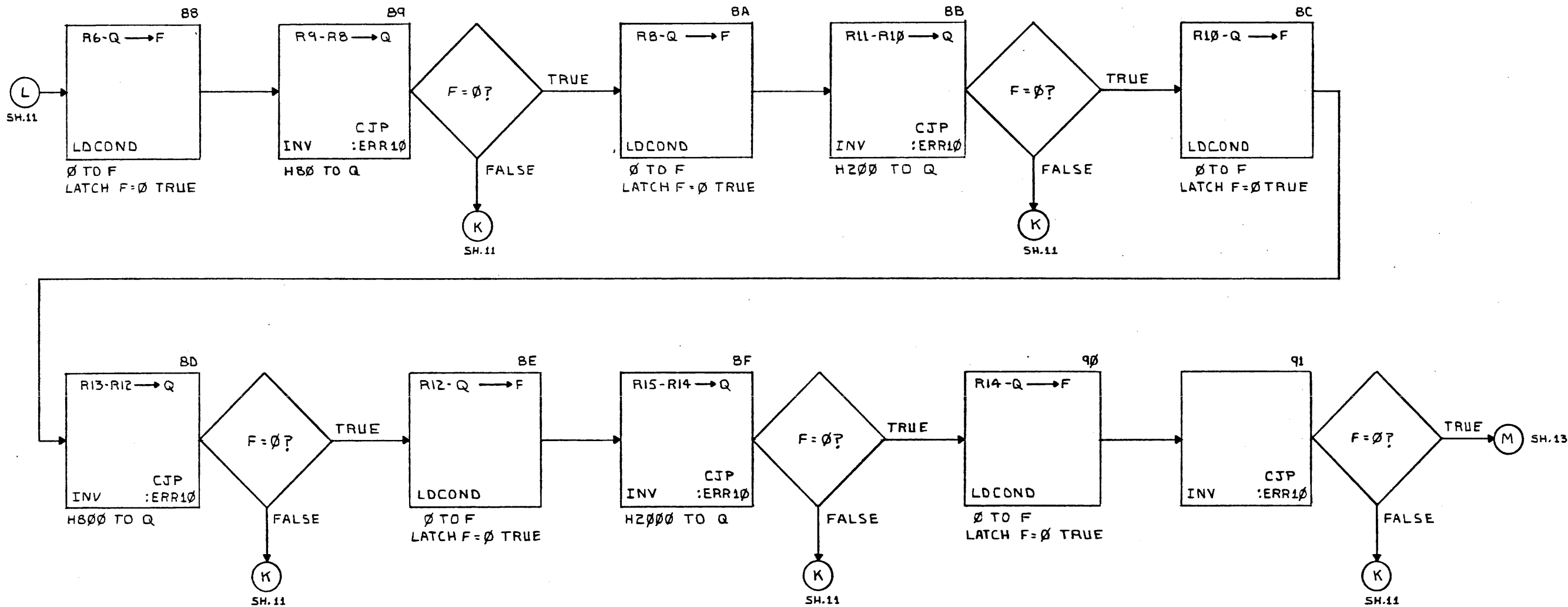
ERR10 14D  
JUMP  
TASKTERM:ERR10  
IF LATCHED CONDITION  
F=0 NOT SET ERROR, TASKTERM

DS21E1065  
B

CONTINUE ALU TEST,  
CHECK F=0 LATCHED CONDITION

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MATERIAL:			DECIMAL		
FINISH:			.XX = ±.01		
			.XXX = ±.005		
			.XXXX = ±.0010		
			FRACTIONAL = ± 1/64		
			ANGULAR = ± 1'00"		
DRAWN: O'Hearn 10-73			SYN	REVISION DESCRIPTION	APPD DATE
CHK			SEE SHEET 1		
ENGR			TITLE		
PROJ			GPU MICROPROGRAM		
MFG			FLOW CHARTS		
PART NUMBER			SCALE	DWG NO. DS21E1065	
NEXT ASSEMBLY			UNIT	SHEET 11 OF 30 SHEETS	
QTY			SIGNATURE DATE		
			REMOVE ALL BURRS AND SHARP EDGES		
COMPUTERVERSION CORP.					
201 Burlington Road					
Bedford, Massachusetts 01730					





DS21E1065

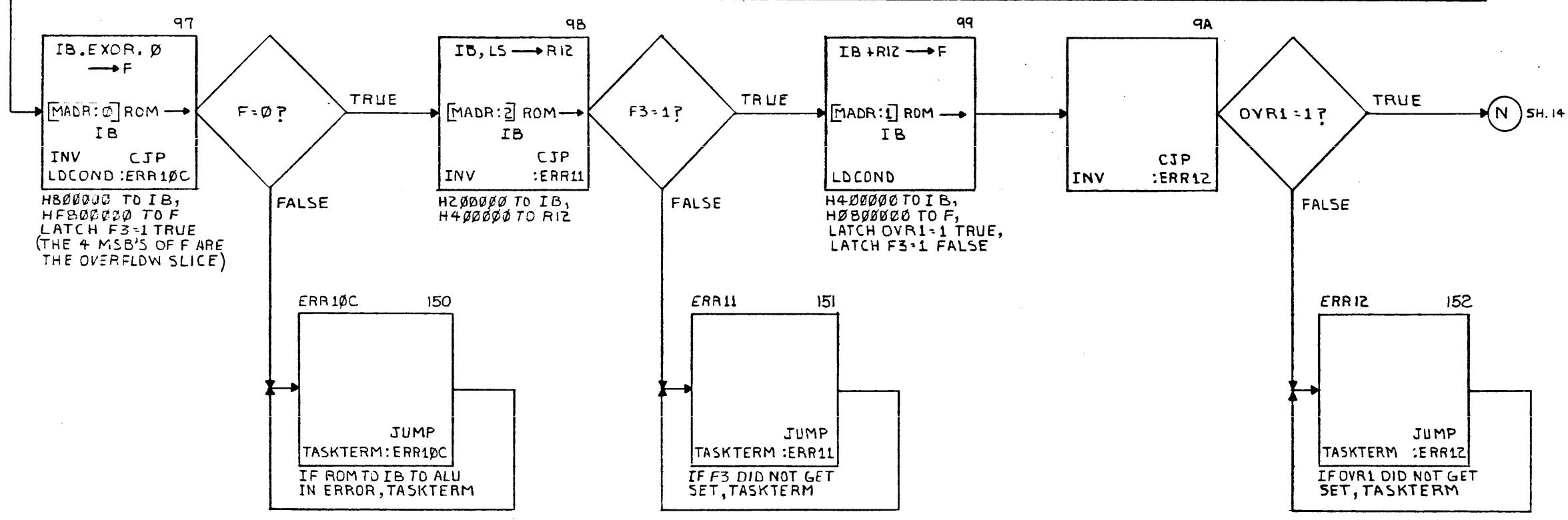
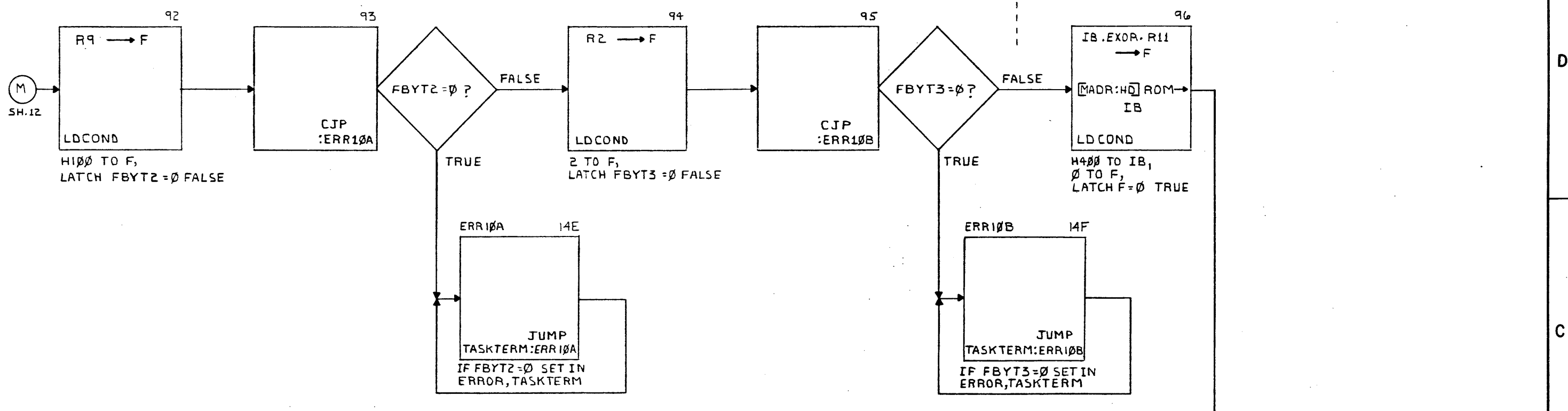
FINISH ALL ARITHMETIC TEST

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MATERIAL:		.XX	± .01	
FINISH:		.XXX	± .005	
		.XXX	± .0010	
		FRACTIONAL	± 1/64	
		ANGULAR	± 1°00'	
DRAWN: D. O'Hearn 10-73		SYN	REVISION DESCRIPTION	APPD DATE
CHK:		SEE SHEET 1		
ENGR:		GPU MICROPROGRAM FLOW CHARTS		
PROJ:				
PART NUMBER		NEXT ASSEMBLY	QTY	
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SCALE	DWG NO.	DS21E1065
SIGNATURE DATE		UNIT	SHEET 12 OF 30 SHEETS	
REMOVE ALL BURRS AND SHARP EDGES				

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

CHECK FBYT2 = 0 AND FBYT3 = 0

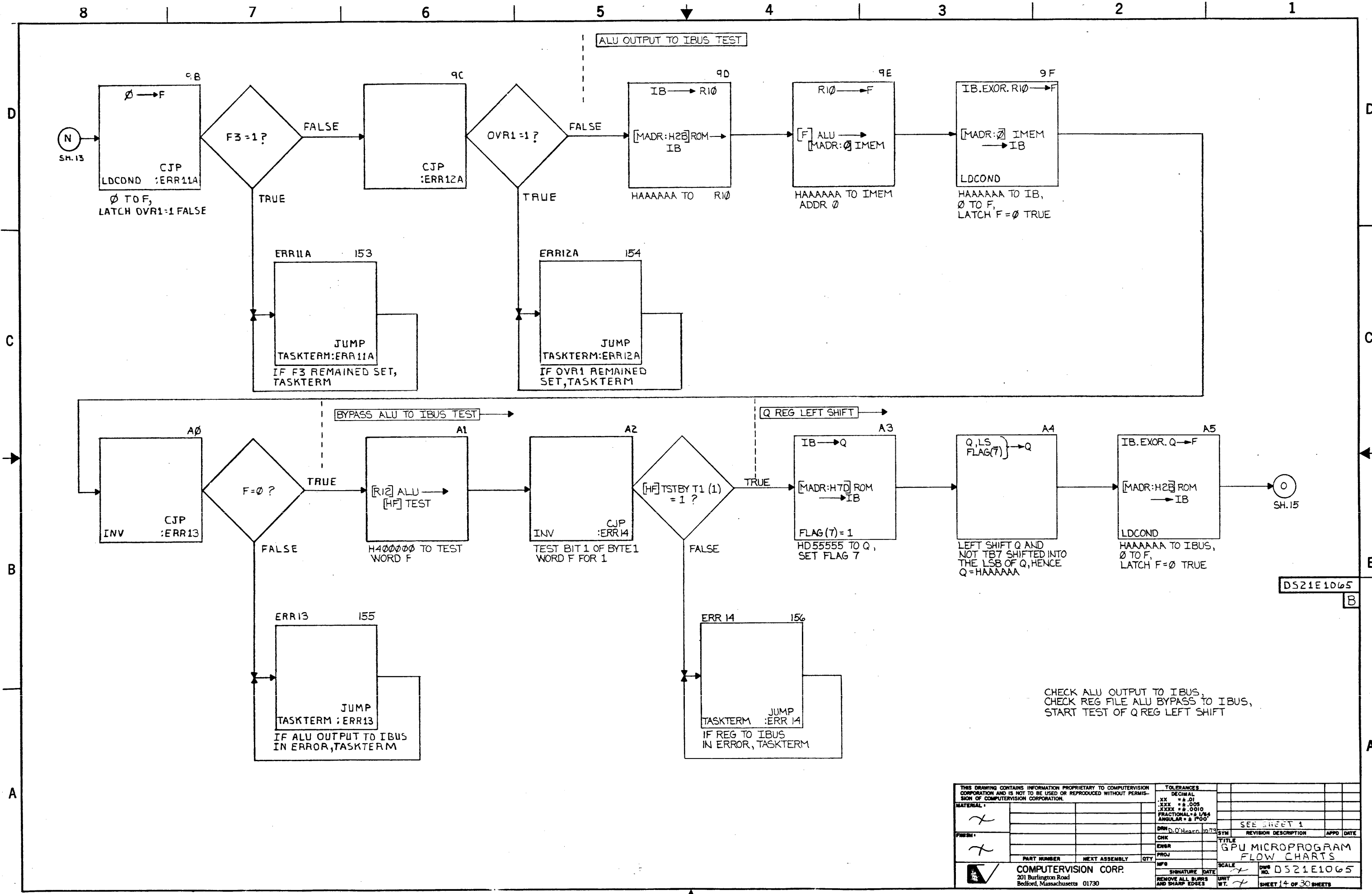
ROM TO IBUS TO ALU TESTS → CHECK F3 AND OVR1 LATCHED CONDITIONS



CHECK FBYT2 = 0 AND FBYT3 = 0 LATCH COND, CHECK F3 AND OVR1 LATCH COND BY USING ROM TO IBUS TO ALU DATA PATH

DS21E1065

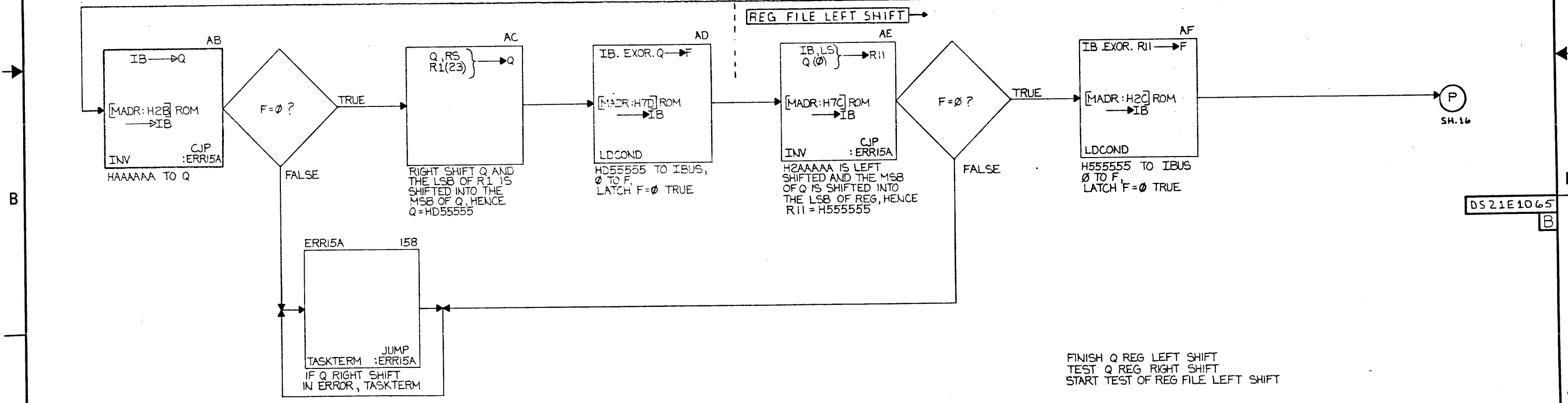
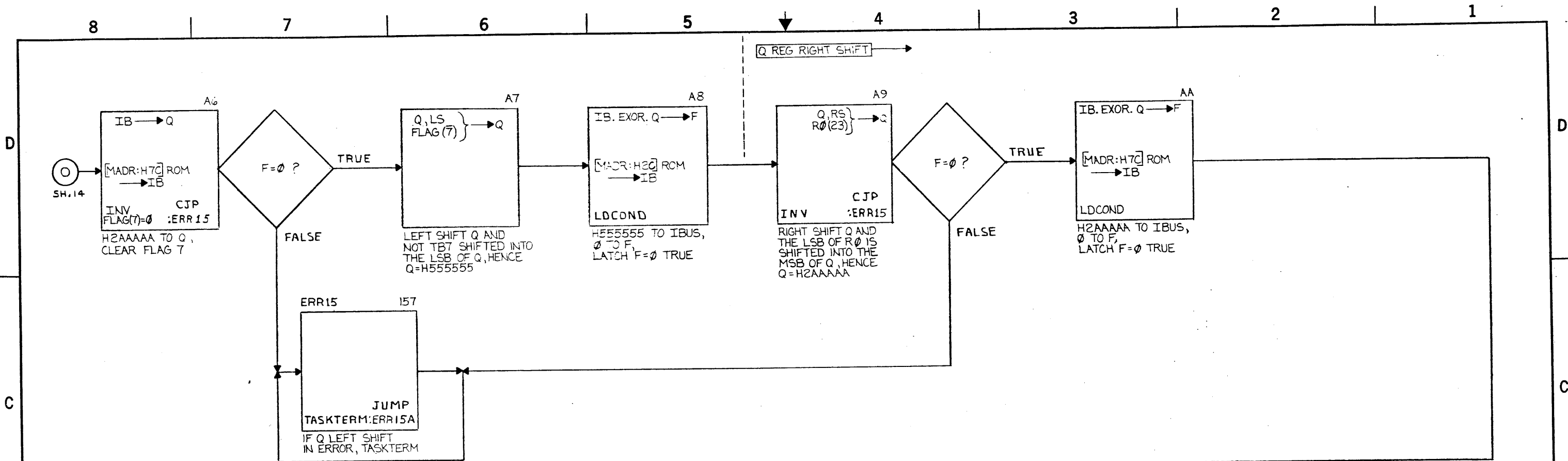
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MATERIAL:		DRN D. O'Hearn 10-79	SYM	SEE SHEET 1
FINISH:		CHK	REVISION DESCRIPTION	APPO DATE
		ENGR	TITLE	
		PROJ	GPU MICROPROGRAM FLOW CHARTS	
PART NUMBER	NEXT ASSEMBLY	QTY	SCALE	DWG NO. DS21E1065
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE DATE	UNIT WT.	SHEET 13 OF 30 SHEETS



DS21E1065

CHECK ALU OUTPUT TO IBUS,  
CHECK REG FILE ALU BYPASS TO IBUS,  
START TEST OF Q REG LEFT SHIFT

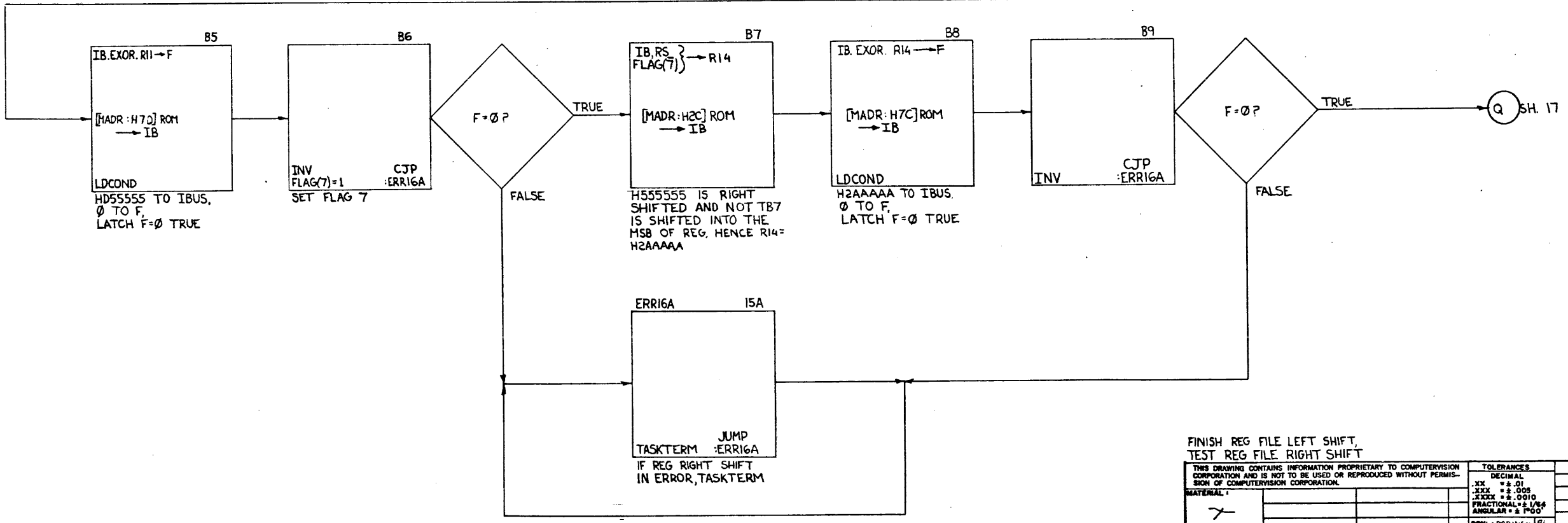
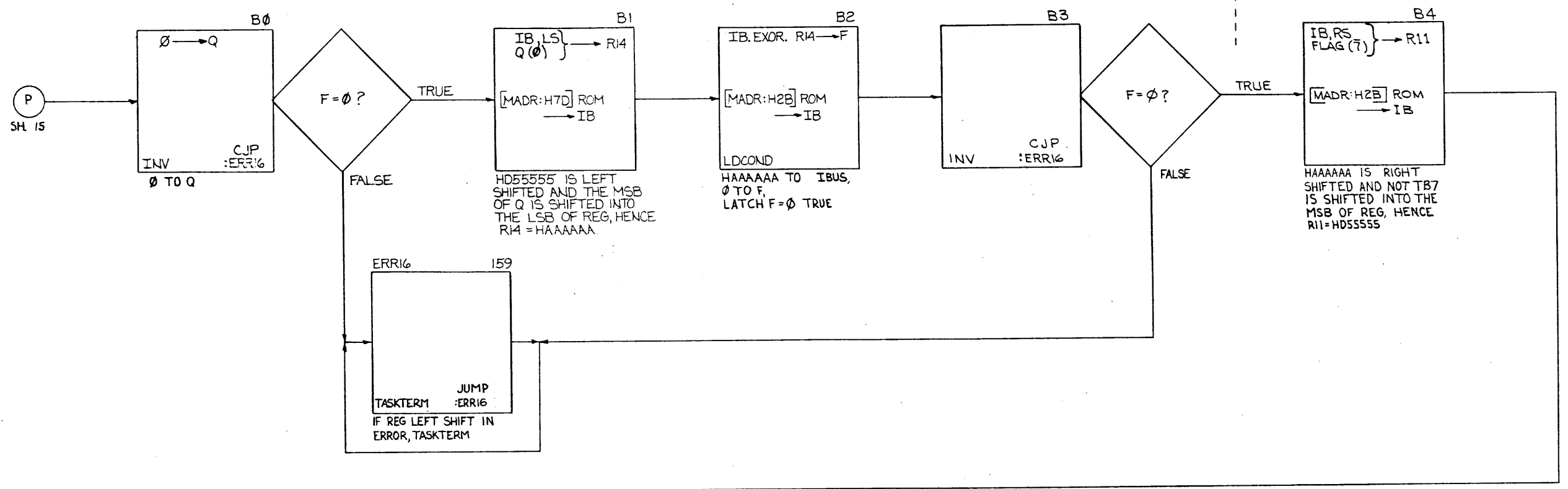
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.				TOLERANCES	
MATERIAL:				DECIMAL	
FINISH:				.XX = ±.01	
PART NUMBER		NEXT ASSEMBLY		.XXX = ±.005	
COMPUTERVISION CORP.		201 Burlington Road		FRACTIONAL = ± 1/64	
201 Burlington Road		Bedford, Massachusetts 01730		ANGULAR = ± .000	
DATE		SCALE		SEE SHEET 1	
SIGNATURE		DATE		SYN REVISION DESCRIPTION APPD DATE	
REMOVE ALL BURRS AND SHARP EDGES		UNIT		TITLE	
W.T.		SHEET 14 OF 30 SHEETS		GPU MICROPROGRAM FLOW CHARTS	
DWS NO. DS21E1065					



FINISH Q REG LEFT SHIFT  
 TEST Q REG RIGHT SHIFT  
 START TEST OF REG FILE LEFT SHIFT

DS21E1065

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		DECIMAL			
		.XX ± .01			
		.XXX ± .005			
		.XXXX ± .0010			
		FRACTIONAL ± 1/64			
		ANGULAR ± 1'00"			
MATERIAL		DRN D. Q. Hean 10-7		SEE SHEET 1	
FINISH		CHK		REVISION DESCRIPTION	
		ENGR		APPO DATE	
		PROJ		TITLE	
		PART NUMBER		GPU MICROPROGRAM	
		NEXT ASSEMBLY		FLOW CHARTS	
		QTY		SCALE	
		COMPUTERVISION CORP.		DWS NO. DS21E1065	
		201 Burlington Road		SCALE	
		Bedford, Massachusetts 01730		UNIT	
		SIGNATURE DATE		WT.	
		REMOVE ALL BURRS AND SHARP EDGES		SHEET 15 OF 30 SHEETS	



FINISH REG FILE LEFT SHIFT, TEST REG FILE RIGHT SHIFT

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MATERIAL					
FINISH					
PROJ					
PART NUMBER		NEXT ASSEMBLY	QTY		

TOLERANCES	DECIMAL		
	.XX	= ± .01	
	.XXX	= ± .005	
	.XXXX	= ± .0010	
	FRACTIONAL	= 1/64	
	ANGULAR	= ± 1'00"	

SEE SHEET 1

CHK	DRW	ROBINSON	9/75	
ENGR				

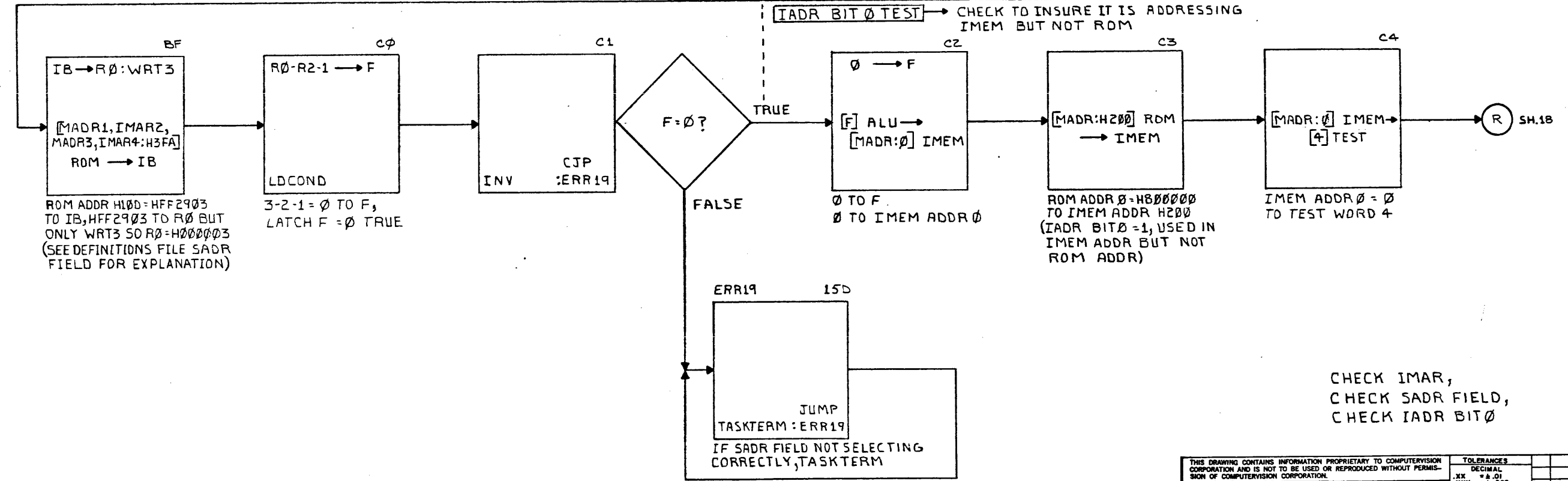
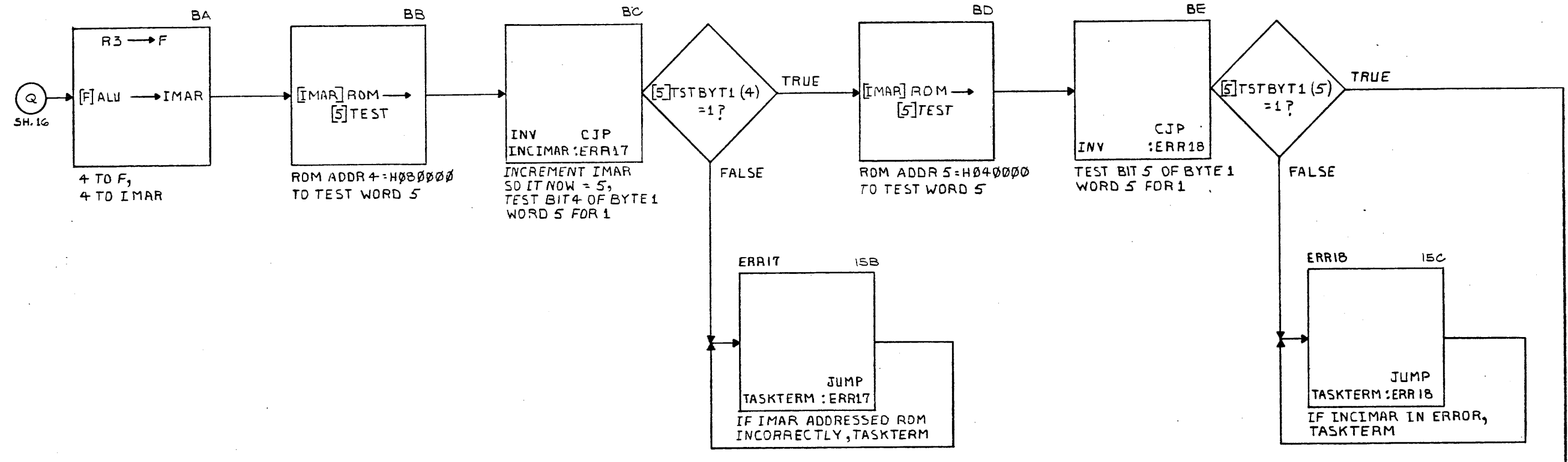
TITLE: GPU MICROPROGRAM FLOW CHARTS

COMPUTERVISION CORP.  
201 Burlington Road  
Bedford, Massachusetts 01730

SCALE:  $\approx$   
DWS: DS21E1065  
REMOVE ALL BURRS AND SHARP EDGES  
SHEET 16 OF 30 SHEETS

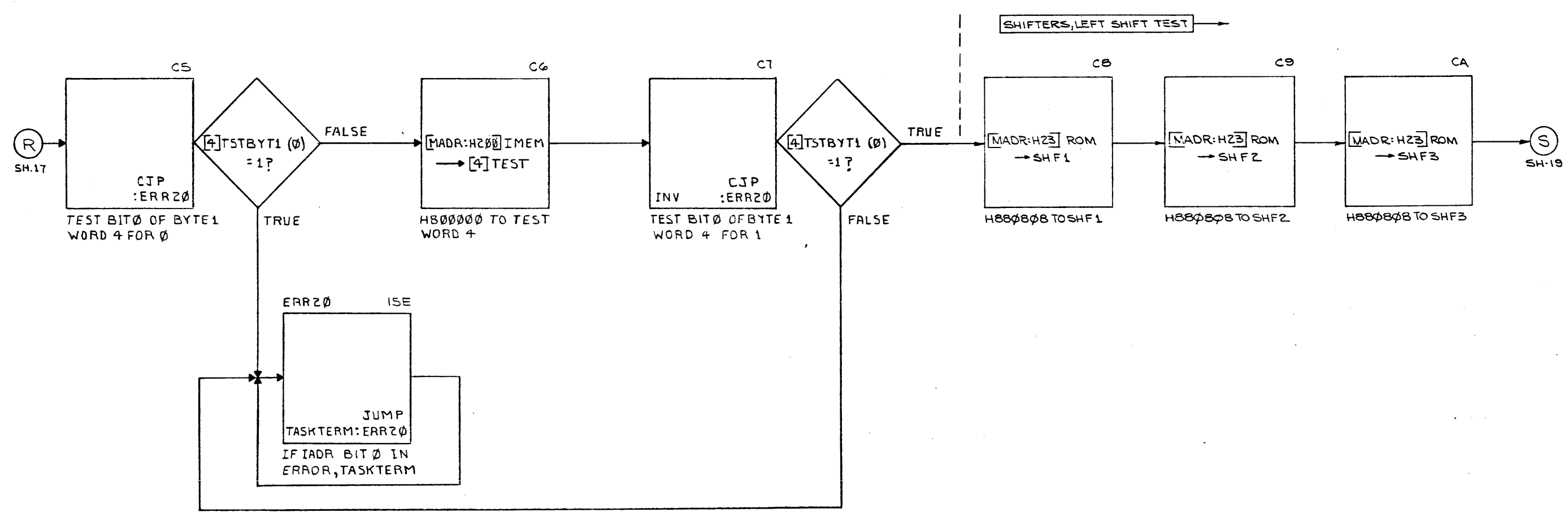
8 7 6 5 4 3 2 1

**IMAR AND SADR TEST** → LOAD THE IMAR AND ADDRESS THE ROM FROM IT,  
USING THE SADR FIELD SELECT A MADR-IMAR COMBINATION TO ADDRESS THE ROM



DS21E1065

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		DECIMAL					
		.XX = ±.01					
		.XXX = ±.005					
		.XXXX = ±.0010					
		FRACTIONAL = ± 1/64					
		ANGULAR = ± 1'00"					
MATERIAL:		DRN 0.0 Max 10.79		SYN	REVISION DESCRIPTION	APPD	DATE
FINISH:		ENGR		TITLE			
		PROJ		GPU MICROPROGRAM FLOW CHARTS			
PART NUMBER		NEXT ASSEMBLY		QTY		SCALE	
COMPUTERVISION CORP.		201 Burlington Road		Bedford, Massachusetts 01730		SIGNATURE DATE	
						REMOVE ALL BURRS AND SHARP EDGES	
						UNIT WT.	
						DWN NO. DS21E1065	
						SHEET 17 OF 30 SHEETS	

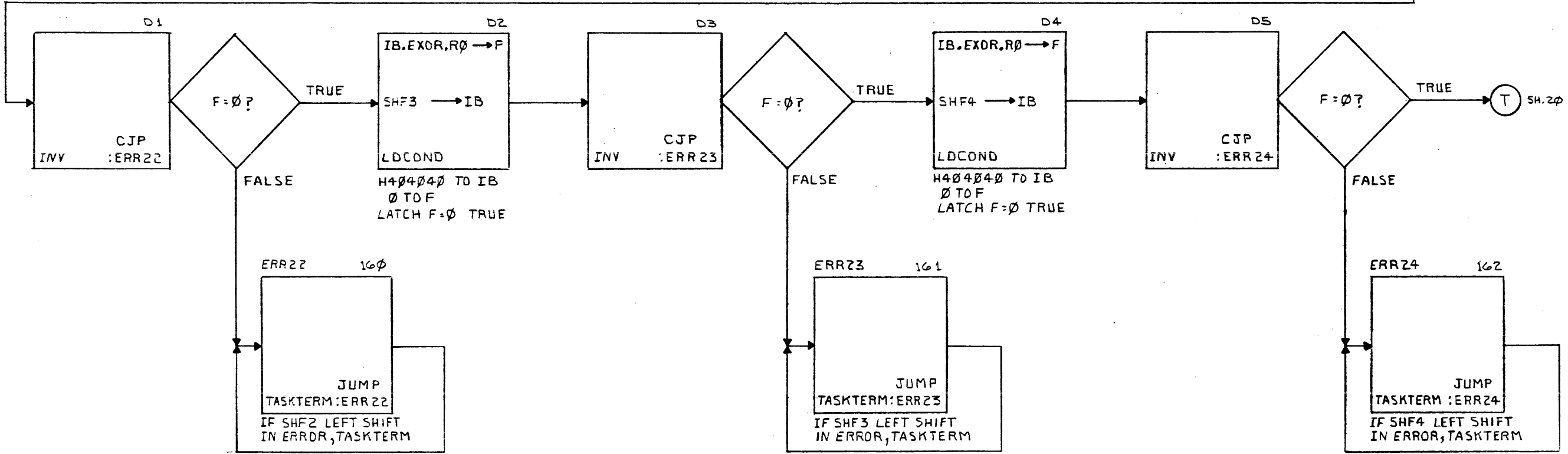
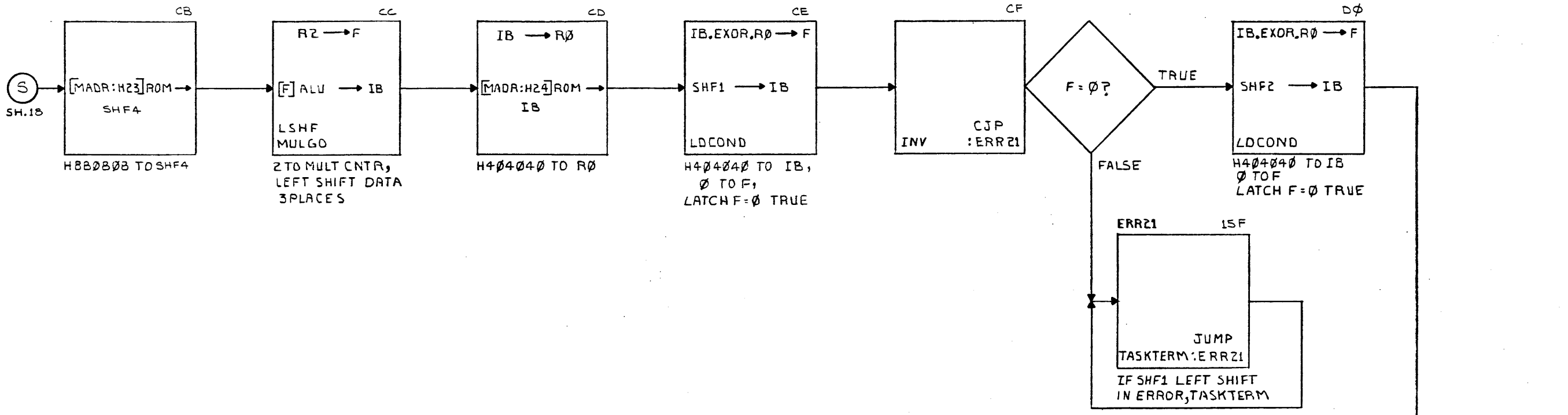


FINISH IADR BIT 0 TEST  
START SHIFTER LEFT SHIFT TEST

DS21E1065  
B

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		DECIMAL			
		.XX = ±.01			
		.XXX = ±.005			
		.XXXX = ±.0010			
		FRACTIONAL = ± 1/64			
		ANGULAR = ± 1°00'			
MATERIAL		DRN D.O. Hearn 10-75	SYM	REVISION DESCRIPTION	APPRO DATE
FINISH		ENGR		SEE SHEET 1	
PROJ		SCALE		TITLE	
PART NUMBER	NEXT ASSEMBLY	QTY		GPL MICROPROGRAM	
				FLOW CHARTS	
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE DATE	SCALE	DWG NO.	DS21E1065
		REMOVE ALL BURRS AND SHARP EDGES	UNIT	SHEET	8 OF 30 SHEETS



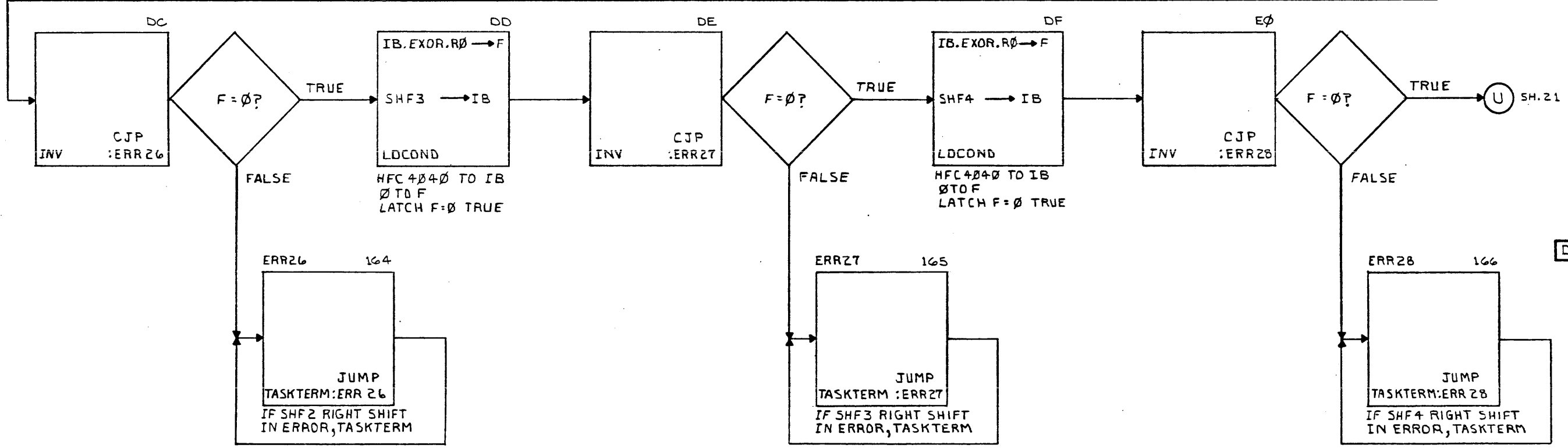
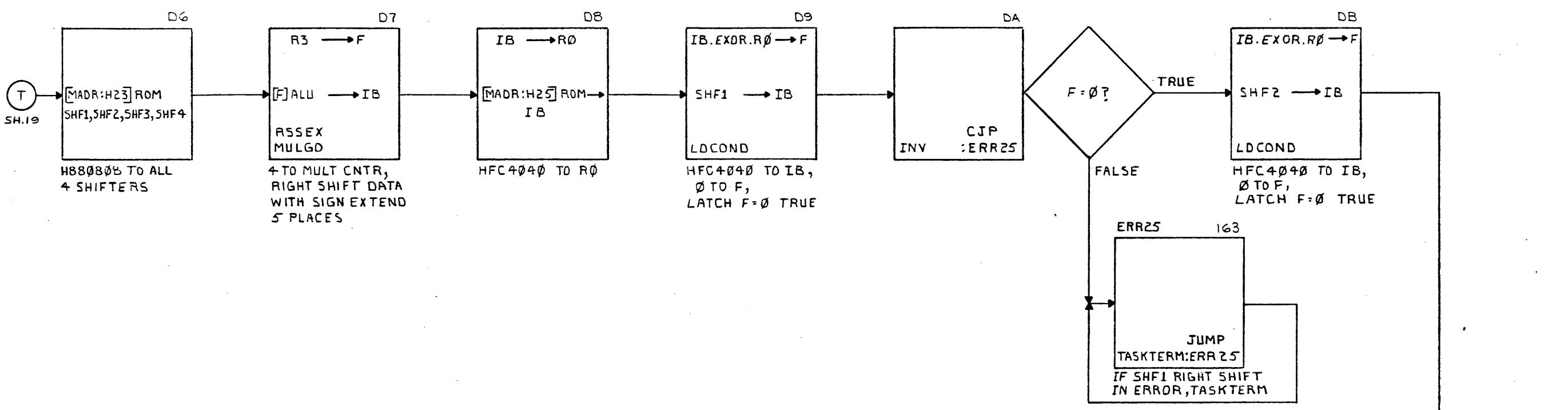


DS21E1065

TEST SHIFTERS, LEFT SHIFT

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MATERIAL:		DRN J.O'Hearn 10-79	SYN SEE SHEET 1
FINISH:		ENGR	REVISION DESCRIPTION
		PROJ	APPRO DATE
PART NUMBER	NEXT ASSEMBLY	QTY	TITLE GPU MICROPROGRAM FLOW CHARTS
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SCALE	DWG NO. DS21E1065
SIGNATURE DATE		UNIT	SHEET 13 OF 30 SHEETS
REMOVE ALL BURRS AND SHARP EDGES		WT.	

SHIFTERS, RIGHT SHIFT TEST

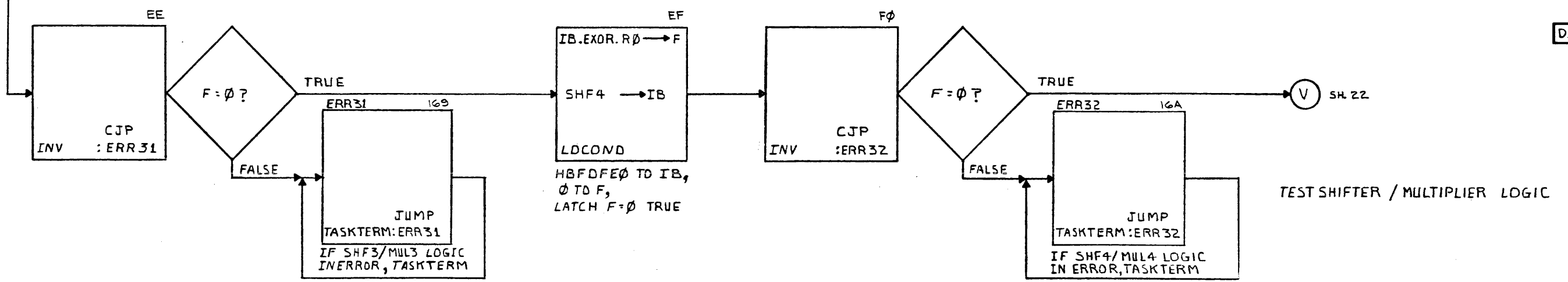
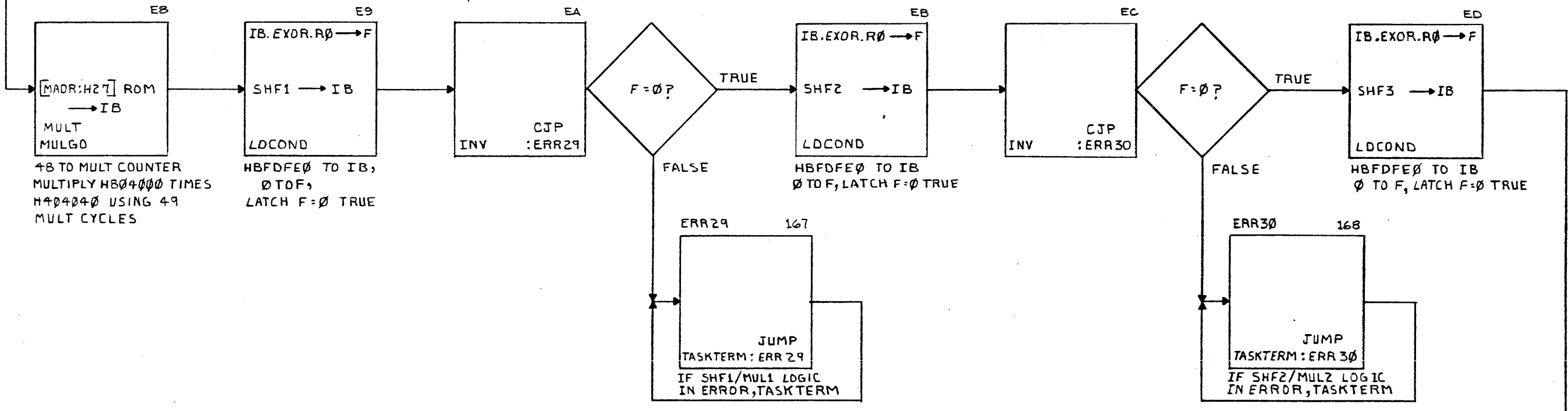
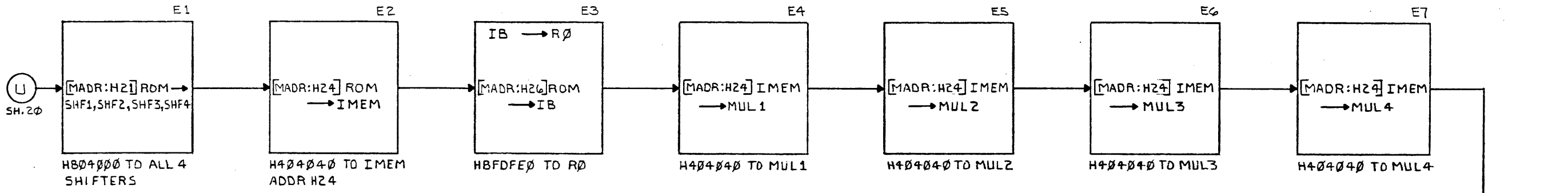


TEST SHIFTERS, RIGHT SHIFT WITH SIGN EXTEND

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		DECIMAL ± .01	
		.XX ± .005	
		.XXX ± .0010	
		FRACTIONAL ± 1/64	
		ANGULAR ± 1'00"	
MATERIAL:		DRN	REV
FINISH:		CHK	SYM
		ENGR	
		PROJ	
PART NUMBER		NEXT ASSEMBLY	QTY
COMPUTERVISION CORP.		SCALE	
201 Burlington Road		SIGNATURE DATE	
Bedford, Massachusetts 01730		REMOVE ALL BURRS AND SHARP EDGES	
		UNIT W.T.	
		DWN NO. DS21E1065	
		SHEET 20 OF 20 SHEETS	

DS21E1065

SHIFTER/MULTIPLIER TEST

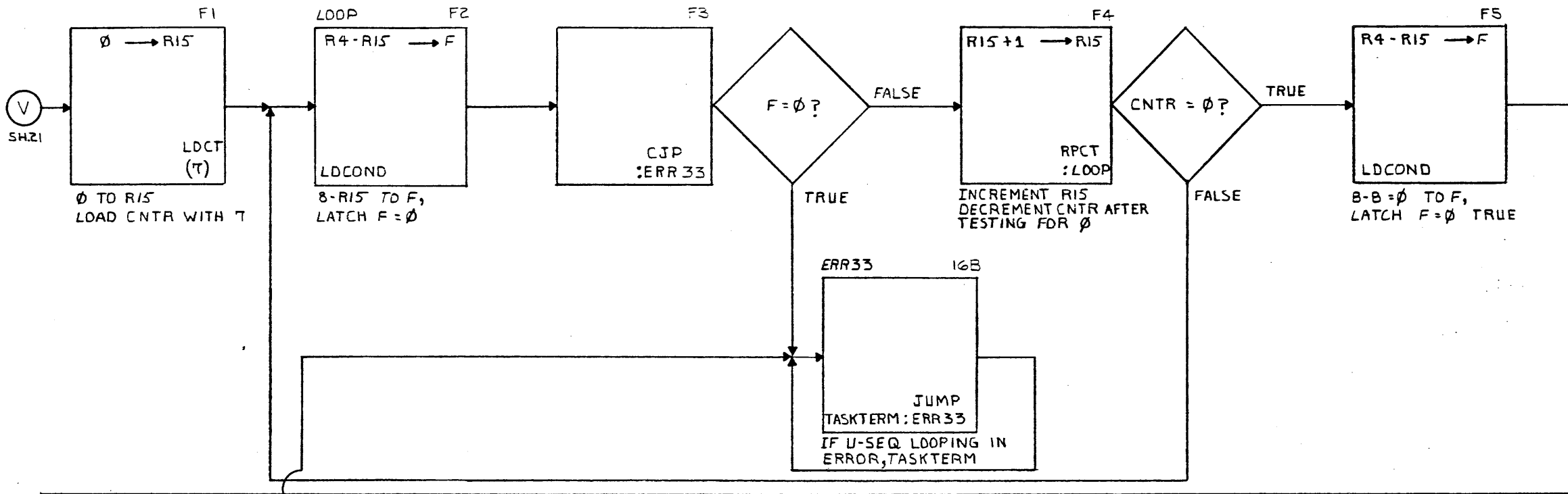


DS21E1065  
B

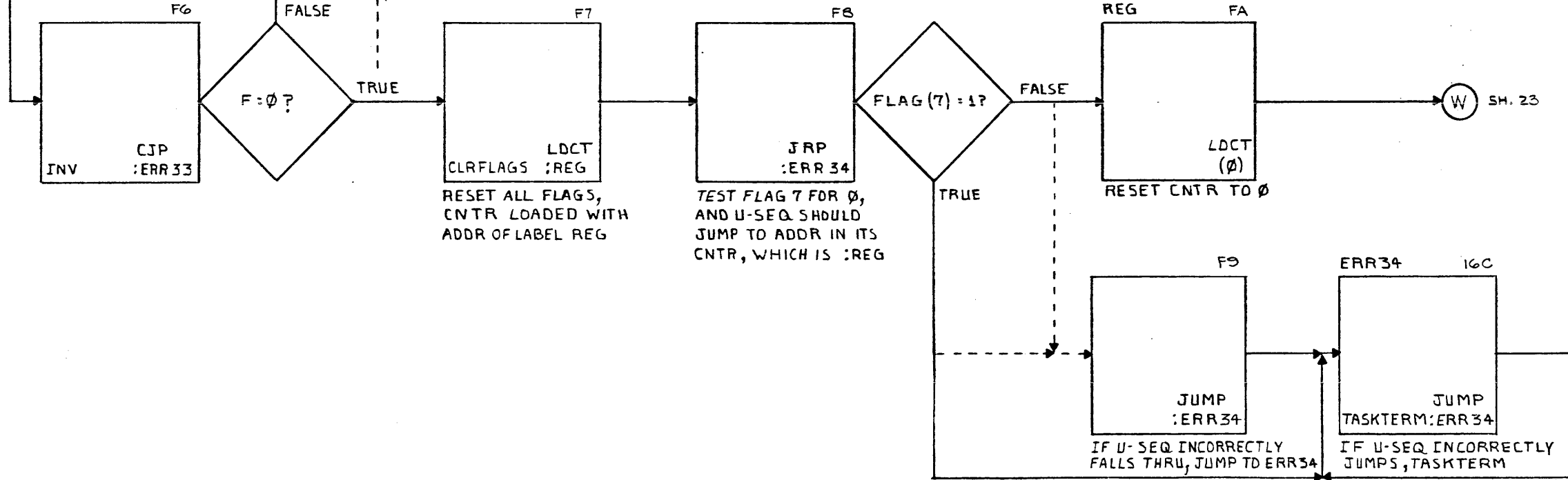
TEST SHIFTER / MULTIPLIER LOGIC

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 = ± 1/64 ANGULAR = ± 1°00'	
MATERIAL		DRW D. O'Hearn 10-79	SYN
CHK		ENGR	REVISION DESCRIPTION
PRJ		PROJ	APPD DATE
PART NUMBER	NEXT ASSEMBLY	QTY	TITLE GPU MICROPROGRAM FLOW CHARTS
COMPUTERVISION CORP. 201 Burlington Road Bedford, Massachusetts 01730		SCALE	DWG NO. DS21E1065
SIGNATURE DATE		UNIT	SHEET 21 OF 30 SHEETS
REMOVE ALL BURRS AND SHARP EDGES		WT.	

**U-SEQ LOOPING TEST** → CHECKS BRANCHING ON CNTR CONTENTS



**BRANCH VIA CNTR TEST** → CHECKS BRANCHING TO CNTR CONTENTS

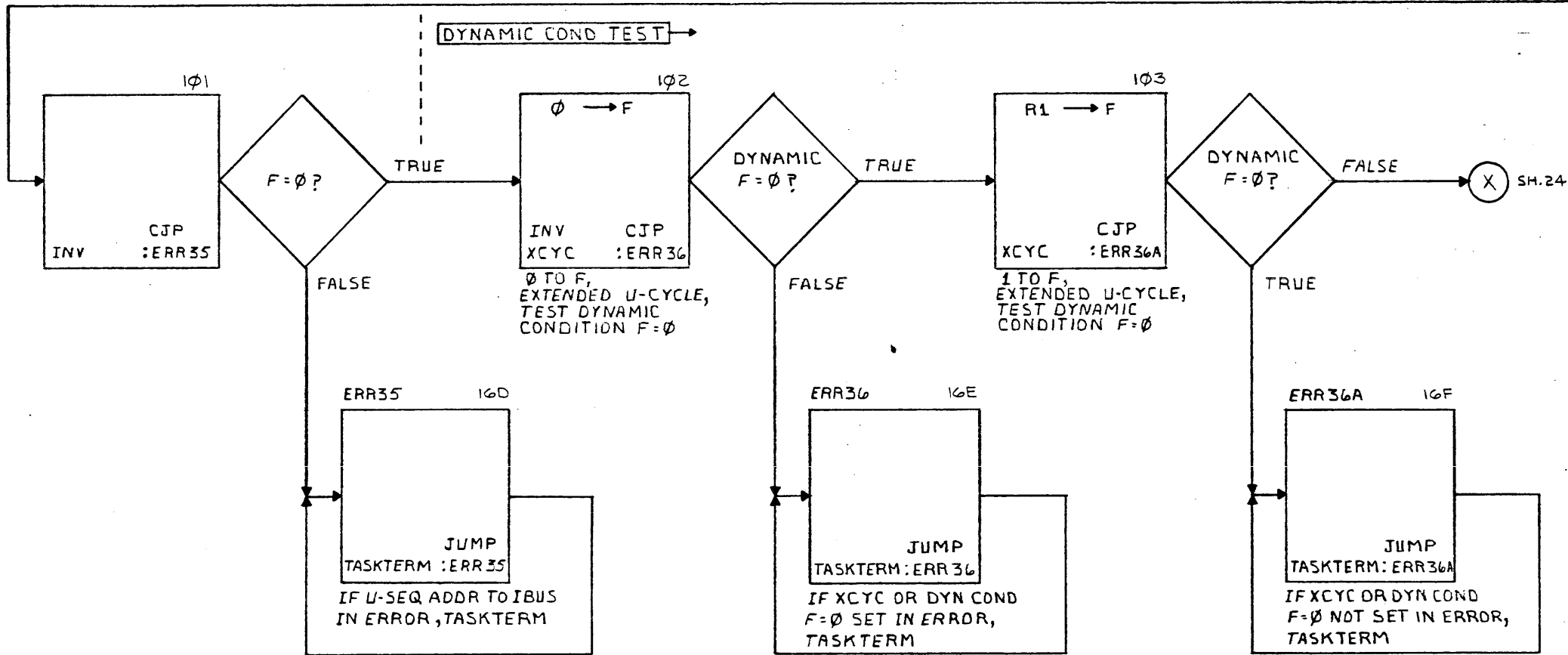
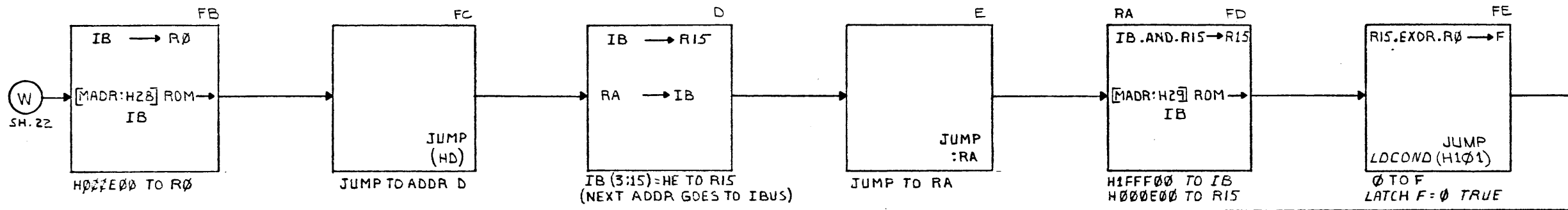


DS21E1065  
B

TEST U-SEQ LOOPING,  
TEST U-SEQ BRANCH  
VIA CNTR CONTENTS

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								
FINISH								
				DRAWN	D. O'Hearn	10-79		
				CHK				
				ENGR				
				PROJ				
				MFR				
				SIGNATURE		DATE		
				REMOVE ALL BURRS AND SHARP EDGES		UNT		
				SCALE				
				DWG NO.	DS21E1065			
				SHEET	22	OF	30	SHEETS

U-SEQ ADDR TO IBUS → READ NEXT ADDR ONTO IBUS

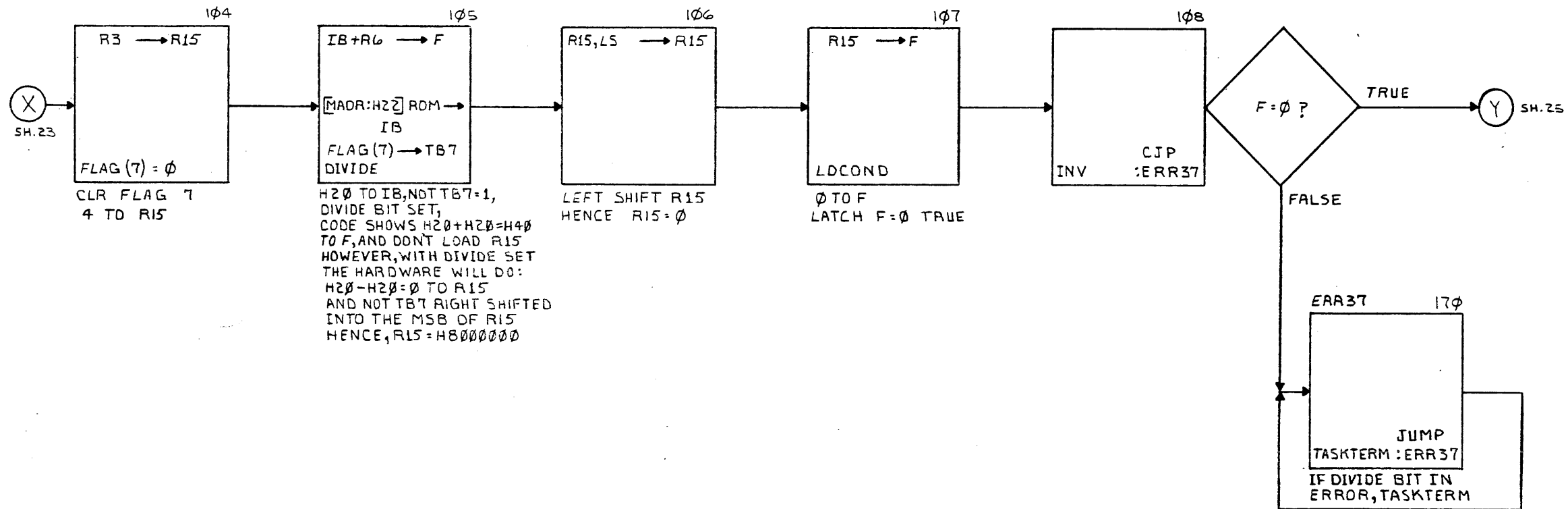


DS21E1065

CHECK READING U-SEQ ADDRESS ONTO IBUS,  
CHECK DYNAMIC CONDITIONS BYTE F=0 CONDITION

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 = ± .0010	
		FRACTIONAL ± 1/64	
		ANGULAR ± 1'00"	
MATERIAL:		DRN: D. Hegarty 10/73	SYM: SEE SHEET 1
FRSM:		CHK:	REVISION DESCRIPTION
		ENGR:	DATE
		PROJ:	APPRO DATE
PART NUMBER	NEXT ASSEMBLY	QTY	TITLE
			GPU MICROPROGRAM FLOW CHARTS
COMPUTERVISION CORP.		MFG	SCALE
201 Burlington Road		SIGNATURE	DATE
Bedford, Massachusetts 01730		REMOVE ALL BURRS AND SHARP EDGES	DWG NO. DS21E1065
		UNIT	SHEET 23 OF 30 SHEETS

**DIVIDE BIT TEST** → CHECK TO INSURE THAT THE DIVIDE BIT ALTERS THE FUNCTION OF THE ALU



H20 TO IB, NOT TB7=1,  
DIVIDE BIT SET,  
CODE SHOWS H20+H20=H40  
TO F, AND DONT LOAD R15  
HOWEVER, WITH DIVIDE SET  
THE HARDWARE WILL DO:  
H20-H20=0 TO R15  
AND NOT TB7 RIGHT SHIFTED  
INTO THE MSB OF R15  
HENCE, R15=H8000000

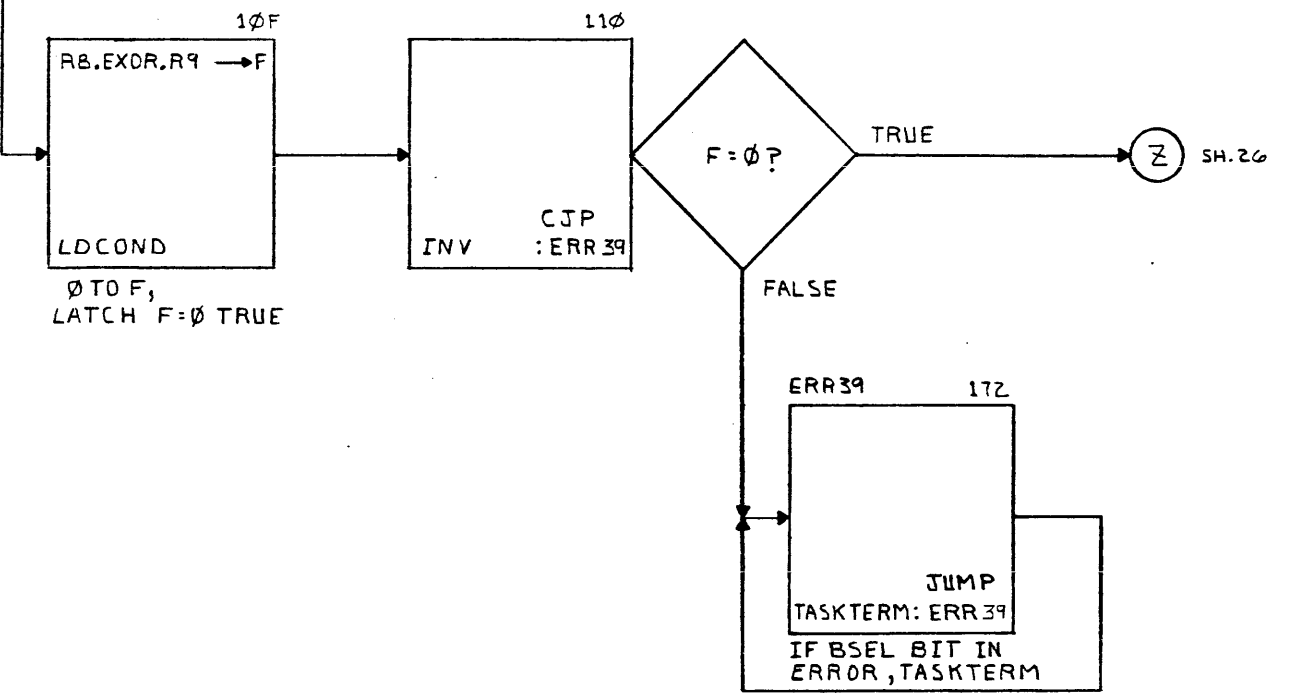
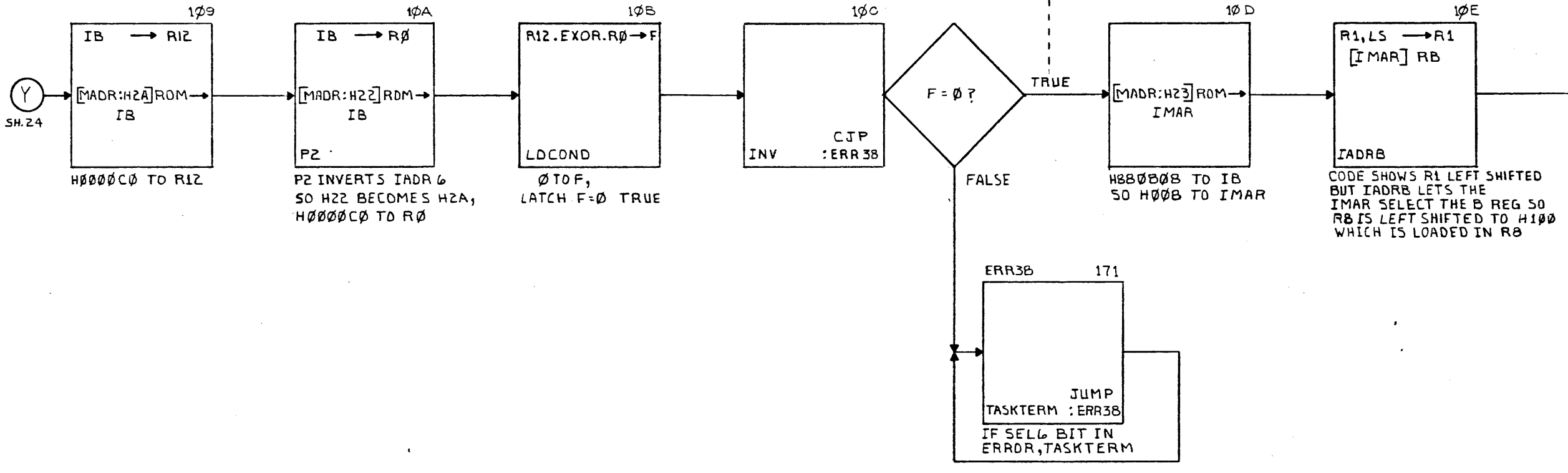
DS21E1065  
B

CHECK DIVIDE BIT

THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.		TOLERANCES	
MATERIAL:		DECIMAL	
FINISH:		.XX	±.01
		.XXX	±.005
		.XXX	±.0010
		FRACTIONAL	± 1/64
		ANGULAR	± 1°00'
DRN	J. O'Hearn	DATE	10.79
CHK		SYM	REVISION DESCRIPTION
ENGR		APPR	DATE
PROJ		TITLE	
PART NUMBER	NEXT ASSEMBLY	QTY	GPU MICROPROGRAM FLOW CHARTS
COMPUTERVISION CORP.		SCALE	DWG NO. DS21E1065
201 Burlington Road		SIGNATURE	DATE
Bedford, Massachusetts 01730		UNWT	WT.
REMOVE ALL BURRS AND SHARP EDGES		SHEET 24 OF 30 SHEETS	

SEL6 BIT TEST →

BSEL BIT TEST →



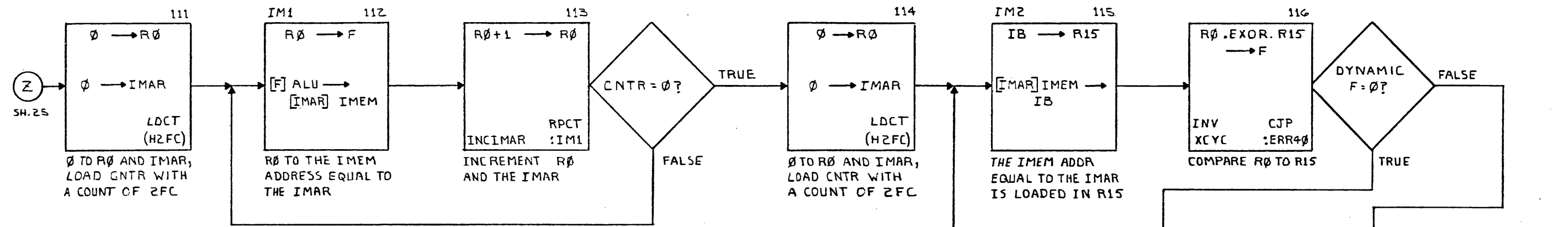
DS21E1065  
B

CHECK SEL6 BIT,  
CHECK BSEL BIT

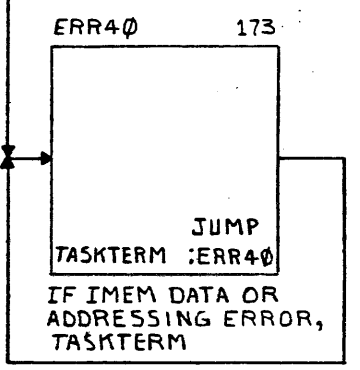
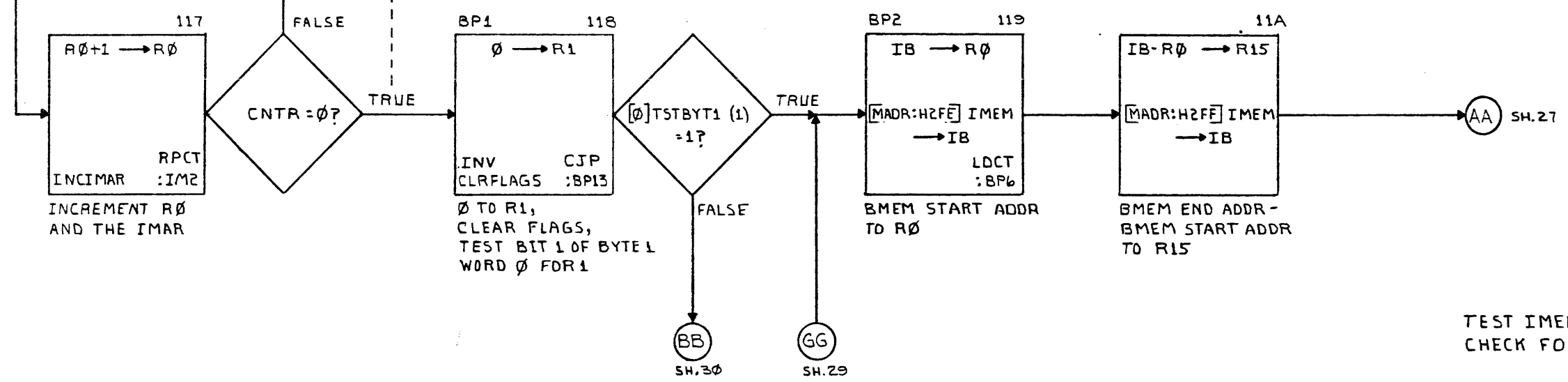
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO COMPUTERVISION CORPORATION AND IS NOT TO BE USED OR REPRODUCED WITHOUT PERMISSION OF COMPUTERVISION CORPORATION.				TOLERANCES				
				DECIMAL				
				.XX ±.01				
				.XXX ±.005				
				.XXXX ±.0010				
				FRACTIONAL ± 1/64				
				ANGULAR ± 1'00"				
MATERIAL:				DRN: D. O'Hearn 12-79		SYM		SEE SHEET 1
FINISH:				CHK		REVISION DESCRIPTION		APPRO DATE
				ENGR		TITLE		
				PROJ		GPU MICROPROGRAM		
PART NUMBER				NEXT ASSEMBLY		QTY		
COMPUTERVISION CORP.				SIGNATURE		SCALE		DWG NO. DS21E1065
201 Burlington Road				DATE		UNIT		SHEET 25 OF 30 SHEETS
Bedford, Massachusetts 01730				REMOVE ALL BURRS AND SHARP EDGES		WT.		



**IMEM TEST** → TEST THE IMEM BY WRITING EACH ADDRESS WITH DATA EQUAL TO ITS OWN ADDRESS



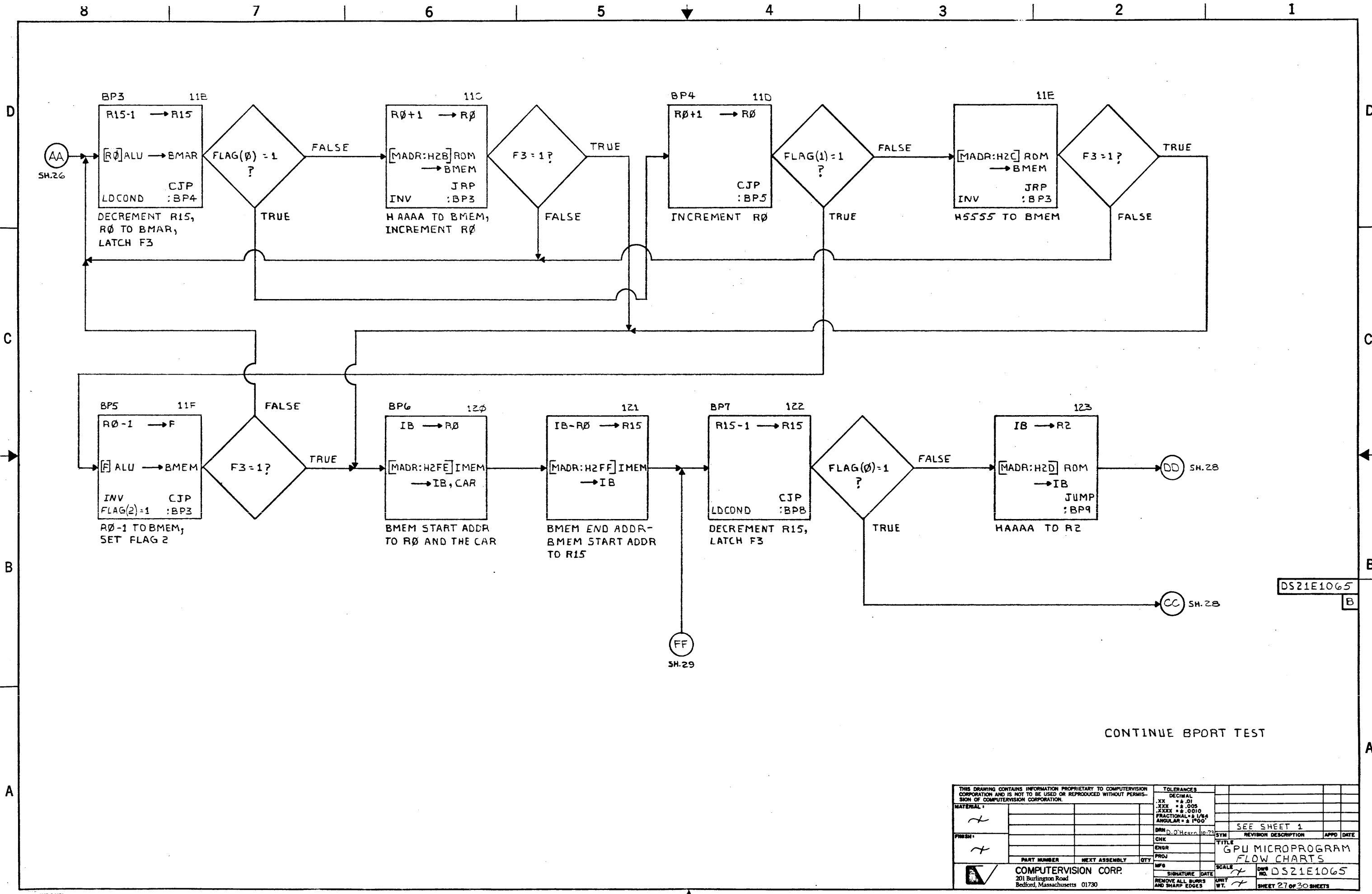
**BPORT TEST** → TESTS THE BPORT LOGIC INCLUDING THE INFIFO AND THE CAR AND ALSO THE BMEMORY ITSELF



TEST IMEM,  
CHECK FOR BPORT TEST

DS21E1065  
B

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				DECIMAL			
				.XX ± .01			
				.XXX ± .005			
				.XXXX ± .0010			
				FRACTIONALS 1/64			
				ANGULAR ± 1°00'			
MATERIAL:				DRN J. O'Hearn 0/73			
FINISH:				SYM REVISION DESCRIPTION APPD DATE			
CHK				TITLE			
ENGR				GPU MICROPROGRAM			
PROJ				FLOW CHARTS			
PART NUMBER		NEXT ASSEMBLY		QTY		SCALE	
						DWS NO. DS21E1065	
COMPUTERVISION CORP.				SIGNATURE DATE			
201 Burlington Road				UNIT WT.			
Bedford, Massachusetts 01730				REMOVE ALL BURRS AND SHARP EDGES			
				SHEET 26 OF 30 SHEETS			

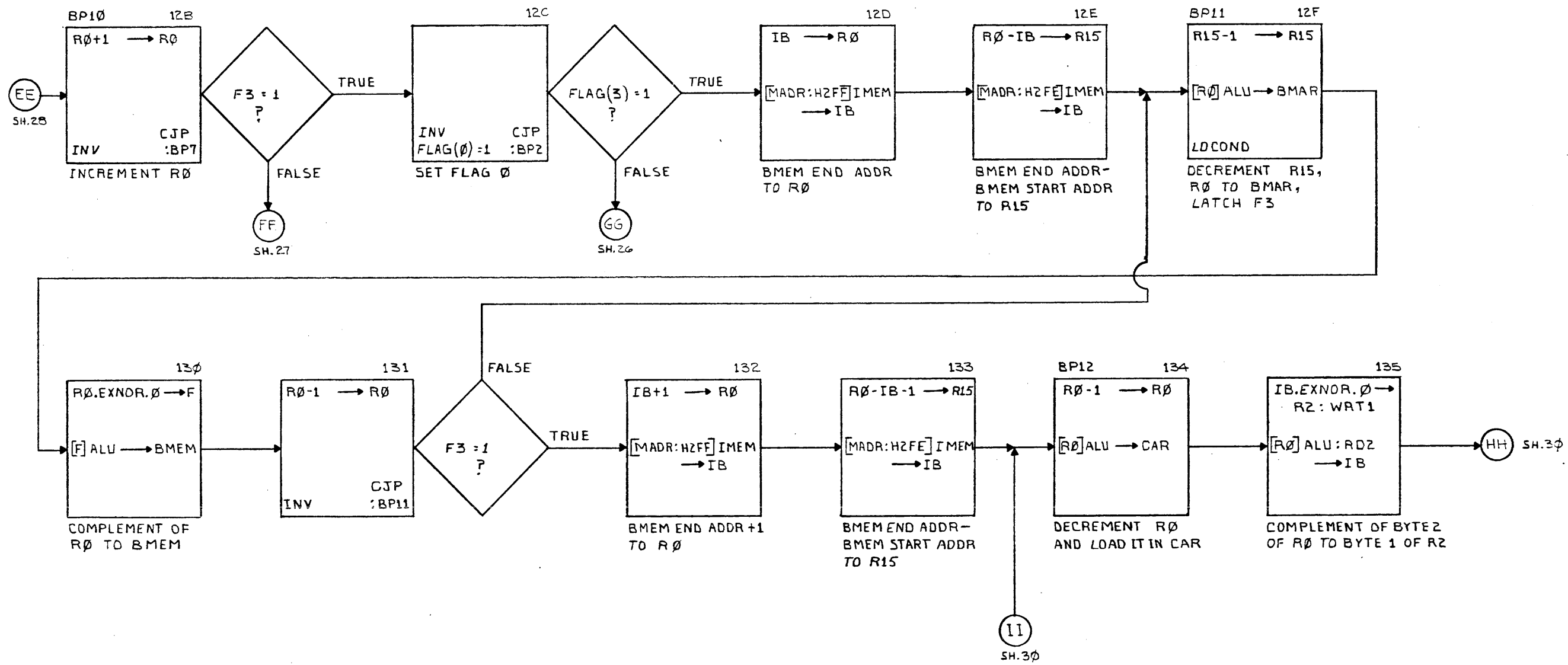


DS21E1065  
B

CONTINUE BPORT TEST

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				DECIMAL					
				.XX = ±.01					
				.XXX = ±.005					
				.XXXX = ±.0010					
				FRACTIONAL = 1/8"					
				ANGULAR = ± 1°00'					
MATERIAL:				DRN D. O'Hara 10-73		SYM		REVISION DESCRIPTION	
CHK:				ENGR		MFG		APPD DATE	
PROJ:				PART NUMBER		NEXT ASSEMBLY		QTY	
MFG:				SIGNATURE		DATE		SCALE	
REMOVE ALL BUMPS AND SHARP EDGES				UNIT		WT.		DWS NO. DS21E1065	
								SHEET 27 OF 30 SHEETS	





DS21E1065

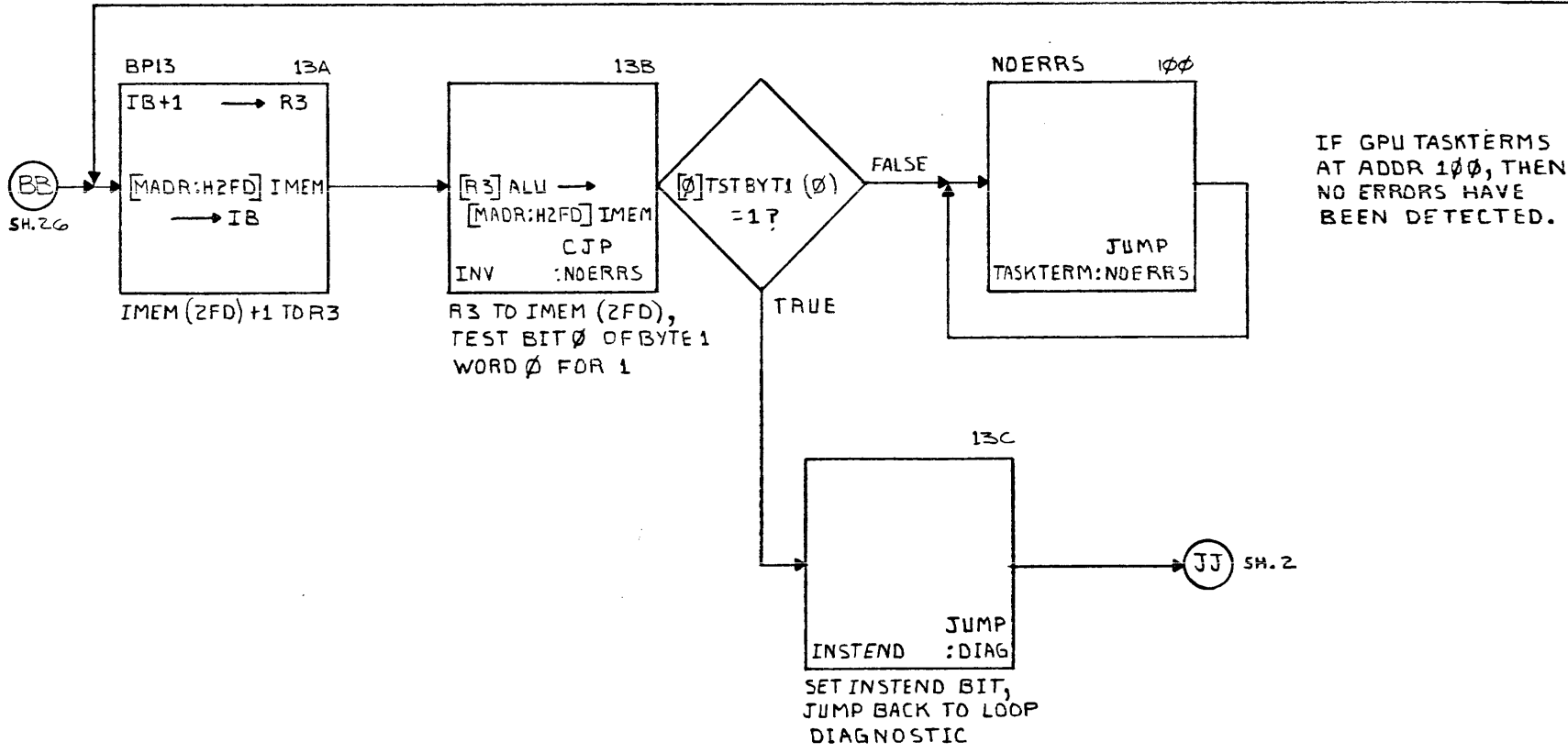
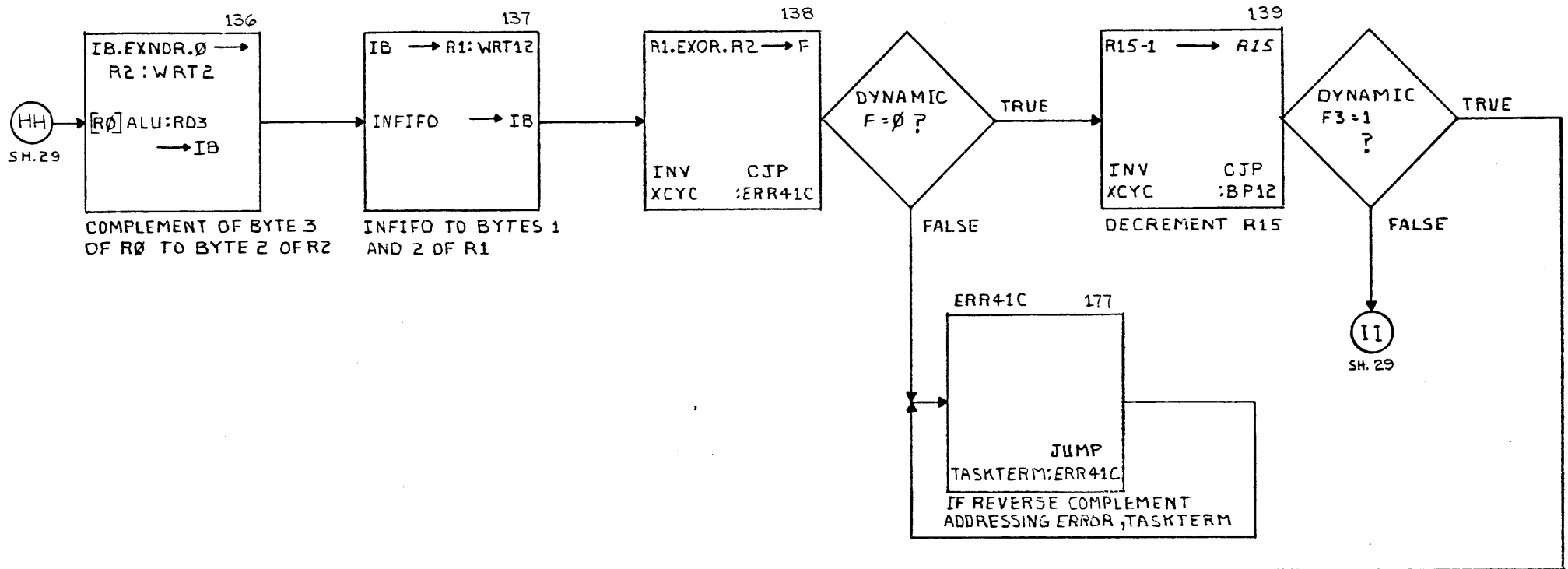
CONTINUE BPORT TEST

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				DECIMAL					
				.XX	± 0.01				
				.XXX	± 0.005				
				.XXXX	± 0.0010				
				FRACTIONAL	± 1/64				
				ANGULAR	± 1'00"				
MATERIAL:									
FINISH:									
PART NUMBER				NEXT ASSEMBLY	QTY				
COMPUTERVISION CORP.				201 Burlington Road Bedford, Massachusetts 01730		SIGNATURE		DATE	DWG NO.
						SCALE		UNIT	SHEET 23 OF 30 SHEETS
						REMOVE ALL BURRS AND SHARP EDGES		W.T.	

GPU MICROPROGRAM FLOW CHARTS  
DS21E1065

D  
C  
B  
A

D  
C  
B  
A



DS21E1065

FINISH BPORT TEST,  
CHECK FOR LOOPING  
THE DIAGNOSTIC

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MATERIAL:		DECIMAL			
CHK:		.XX = ±.01			
ENGR:		.XXX = ±.005			
PROJ:		.XXX = ±.0010			
PART NUMBER:		FRACTIONAL = ± 1/64			
NEXT ASSEMBLY:		ANGULAR = ± .000			
QTY:		DRM(D) Hearn 10-79	SYM	REVISION DESCRIPTION	APPD DATE
MFG:				SEE SHEET 1	
SIGNATURE DATE:				TITLE	
REMOVE ALL BURRS AND SHARP EDGES				GPU MICROPROGRAM	
UNIT:				FLOW CHARTS	
SCALE:				PART NUMBER	
W.T.:				COMPUTERVISION CORP.	
				201 Burlington Road	
				Bedford, Massachusetts 01730	
				DWG NO.	DS21E1065
				SHEET	30 OF 30 SHEETS

**REMARKS FORM**

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

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

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

ADDRESS \_\_\_\_\_

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

*Please cut along this line*

C

4  
5  
6

C

C

C

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C