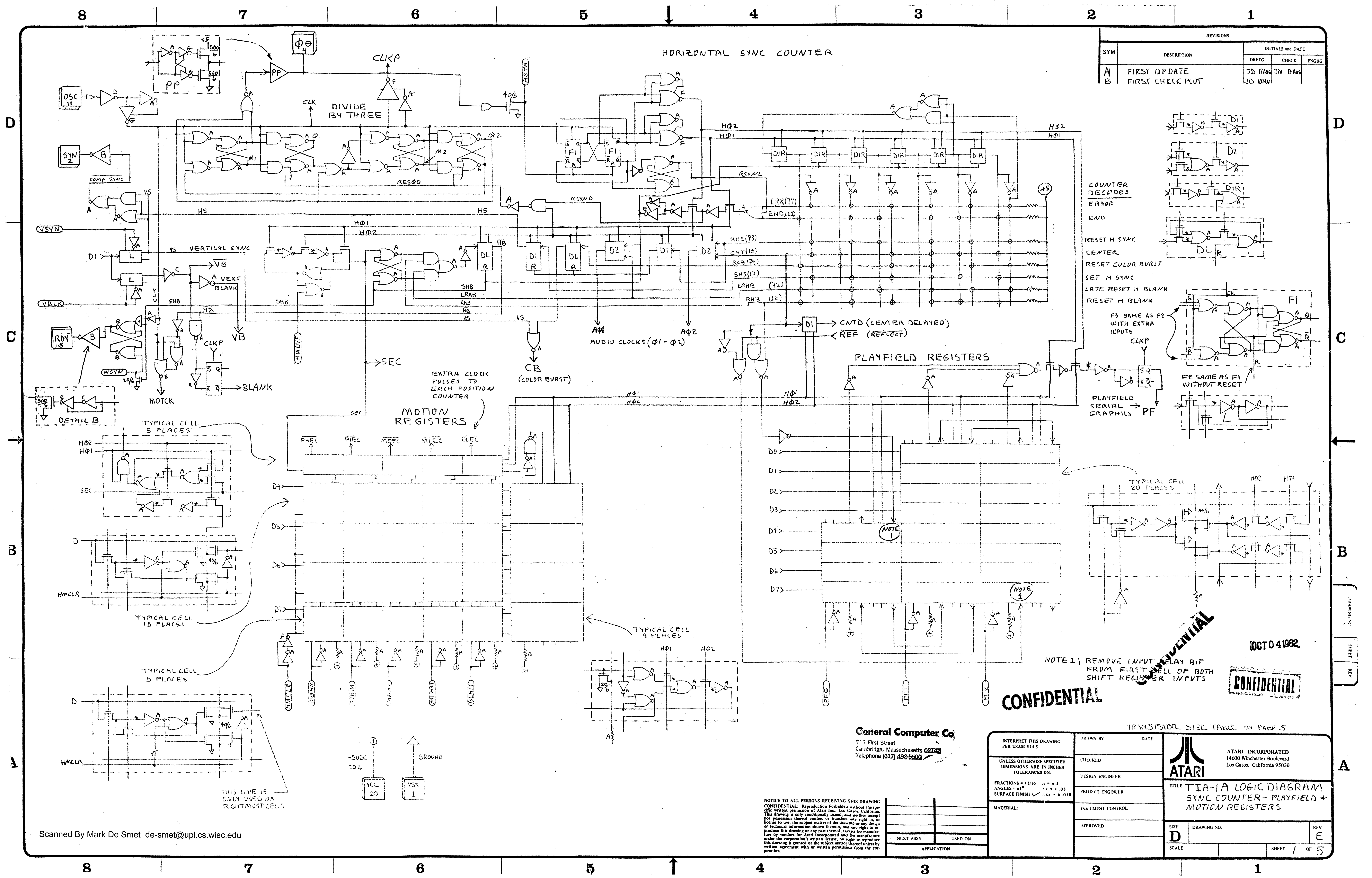
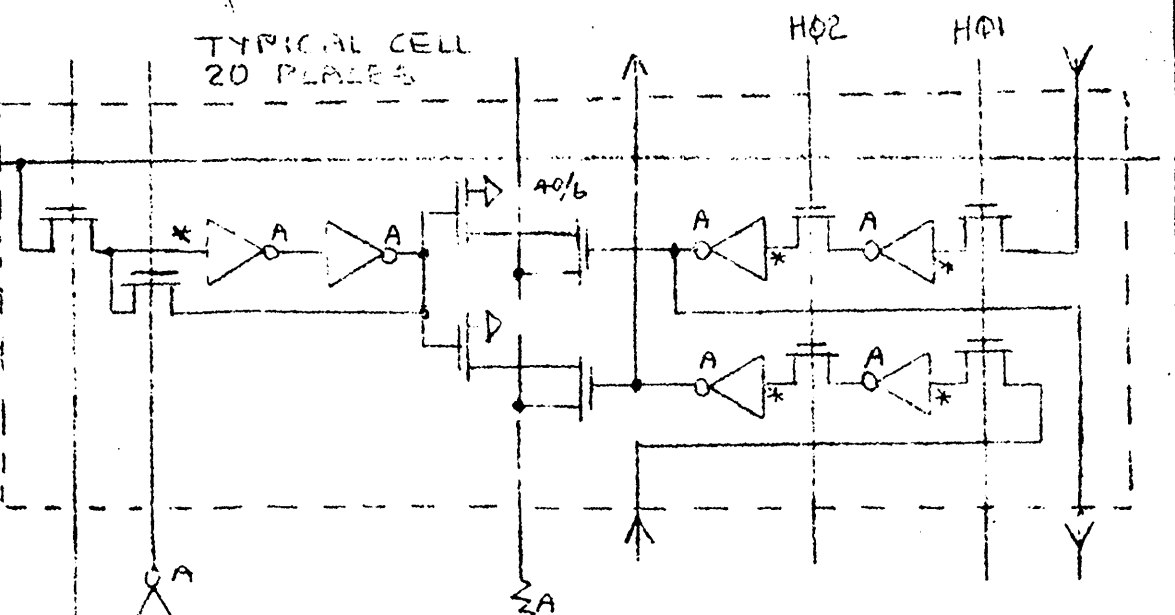
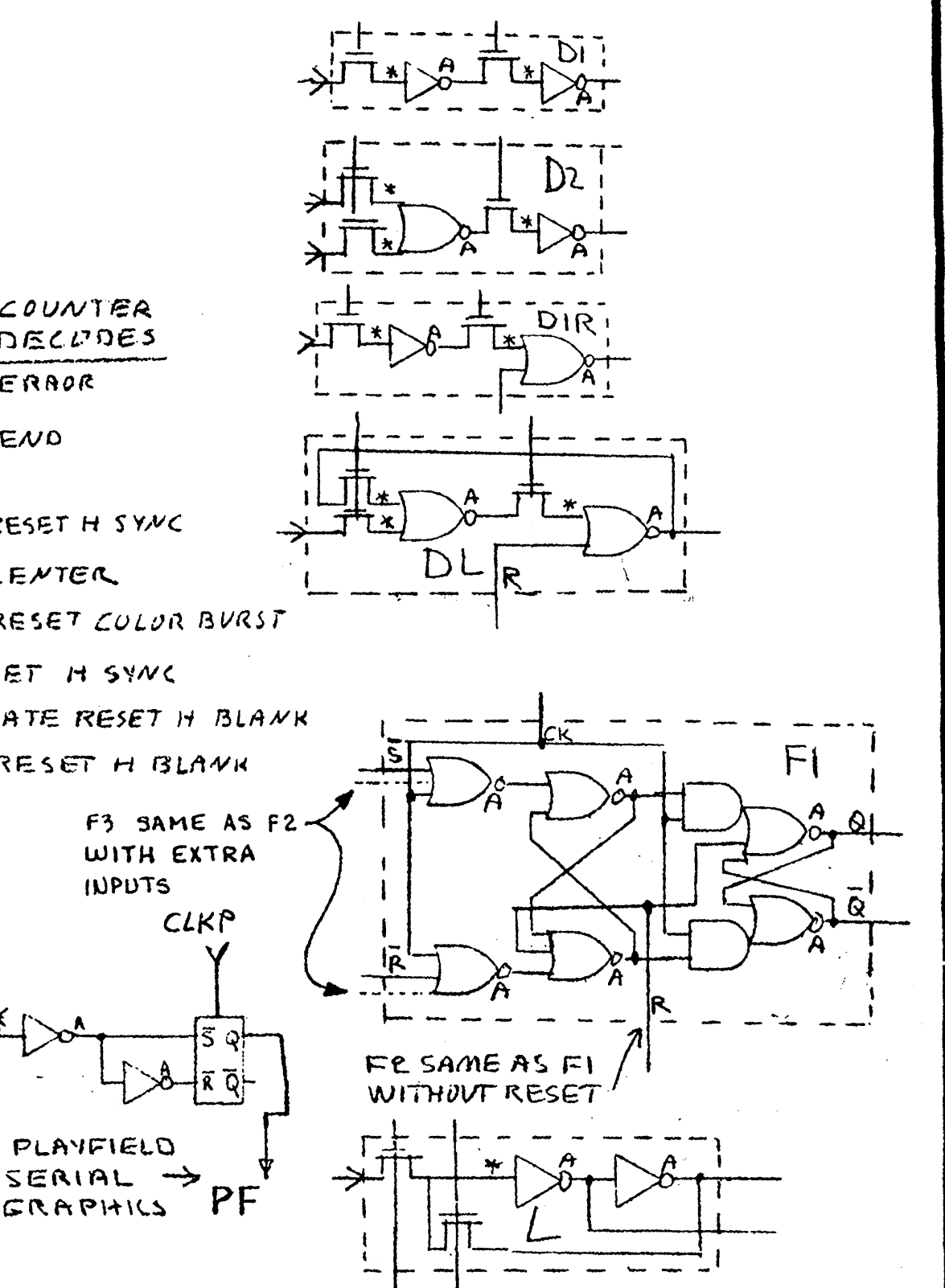




REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
A	FIRST UPDATE	DRFTG	CHECK	ENGRG
B	FIRST CHECK PLOT	JD 17/04	JM 18/04	



NOTE 1: REMOVE INPUT DELAY BIT FROM FIRST CELL OF BOTH SHIFT REGISTER INPUTS

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General Computer Co
213 First Street
Cambridge, Massachusetts 02142
Telephone (617) 492-5500

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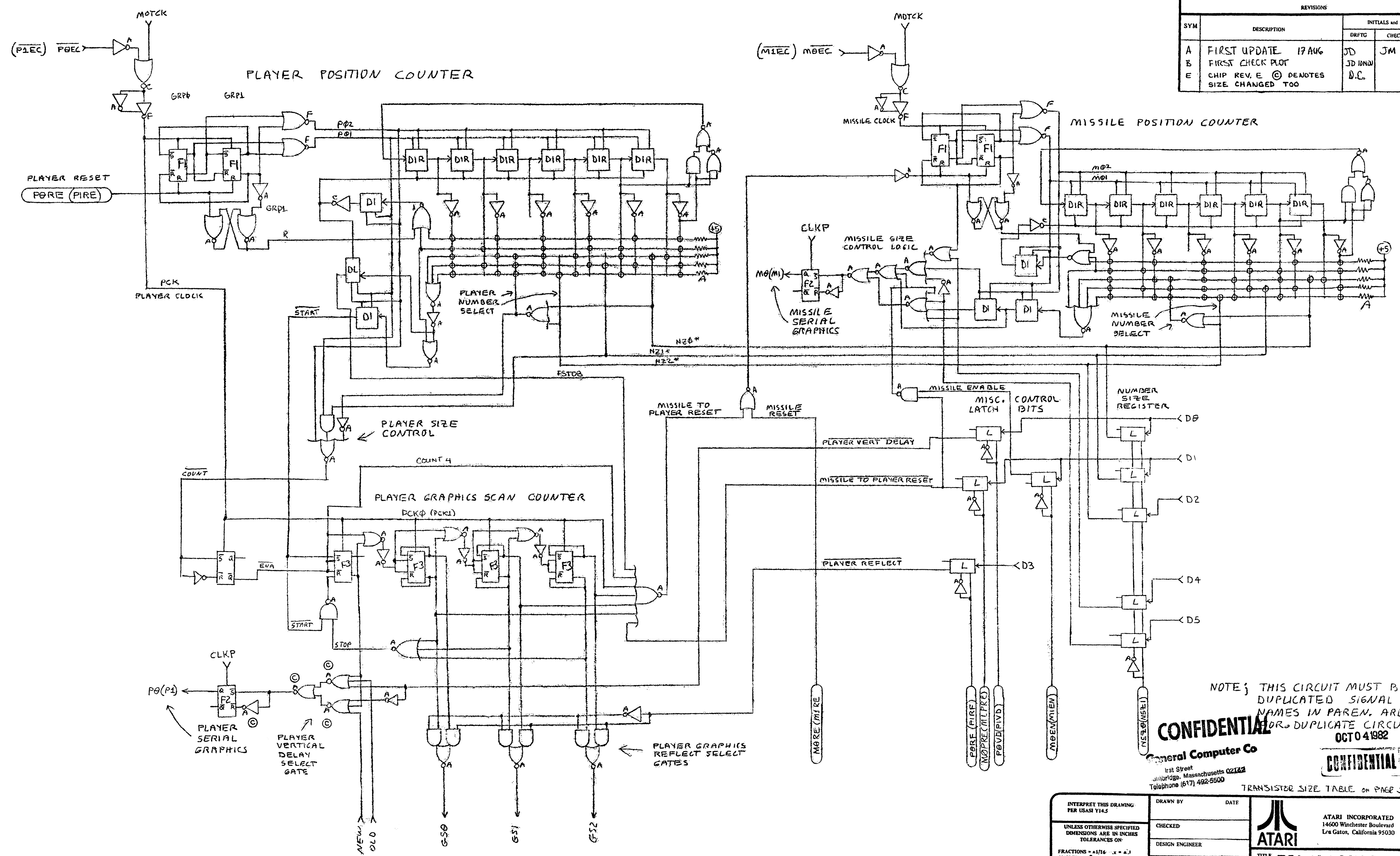
INTERPRET THIS DRAWING PER USAS 114.5		DRAWN BY		DATE	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:		CHECKED			
FRACTIONS = ±1/16		DESIGN ENGINEER			
ANGLES = ±1°		PROJECT ENGINEER			
SURFACE FINISH = ±.010		DOCUMENT CONTROL			
MATERIAL:		APPROVED			
NEXT ASSY		USED ON			
APPLICATION					

ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030	
TITLE TIA-1A LOGIC DIAGRAM SYNC COUNTER - PLAYFIELD & MOTION REGISTERS	
SIZE D	DRAWING NO.
SCALE	SHEET 1 OF 5

8 7 6 5 4 3 2 1

REVISIONS				
SYM	DESCRIPTION	INITIALS and DATE		
		DRFTG	CHECK	ENGRG
A	FIRST UPDATE 17 AUG	JD	JM	
B	FIRST CHECK PLOT	JD	JD	
E	CHIP REV. E © DENOTES SIZE CHANGED TOO	D.C.		

D
C
B
A



NOTE: THIS CIRCUIT MUST BE
DUPLICATED SIGNAL
NAMES IN PAREN. ARE
OR DUPLICATE CIRCUIT
OCT 0 4 1982

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1st Street
Amherst, Massachusetts 02142
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TRANSISTOR SIZE TABLE ON PAGE 5

Scanned By Mark De Smet de-smet@upl.cs.wisc.edu

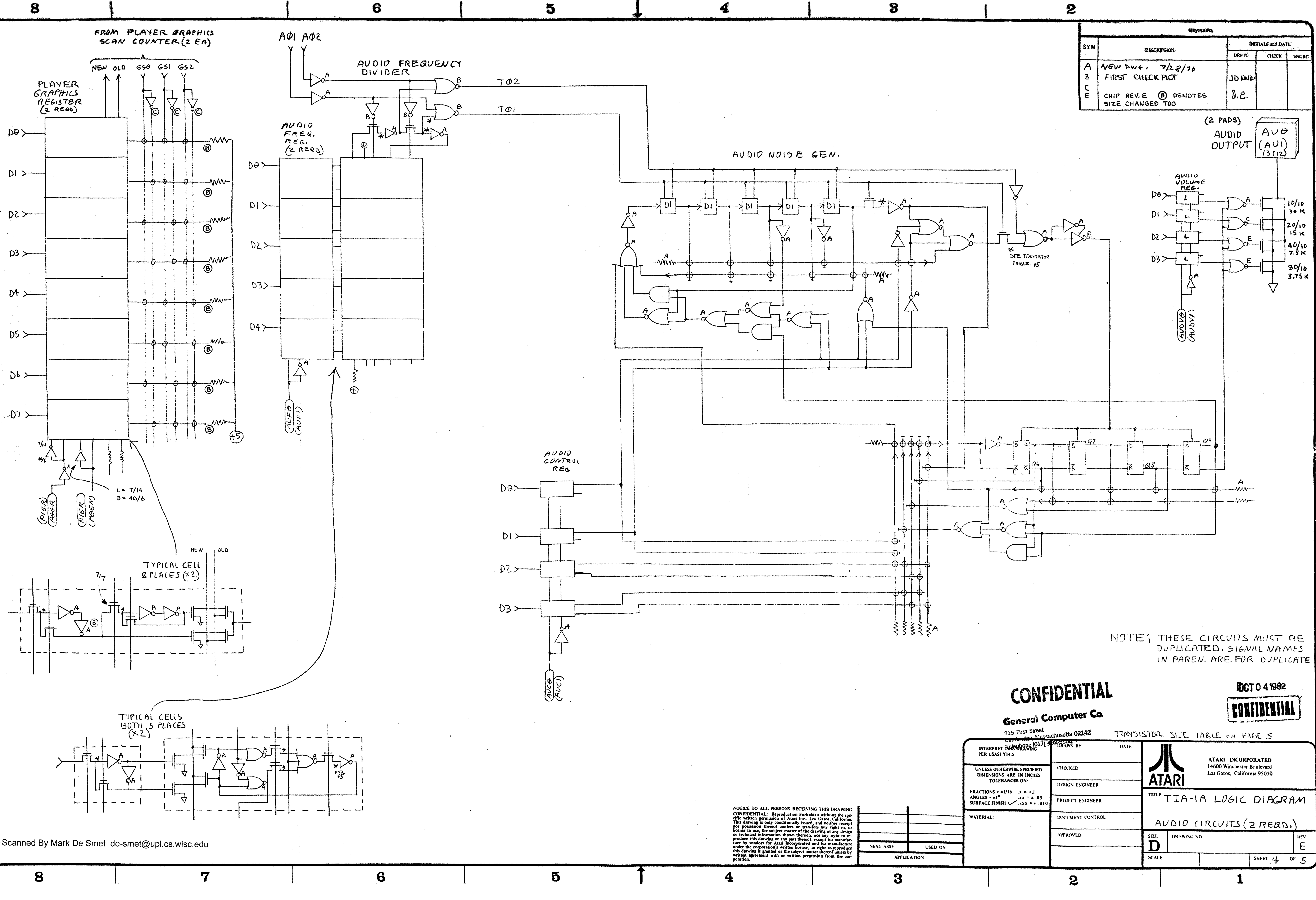
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INTERPRET THIS DRAWING PER USAS 114.5	DRAWN BY	DATE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED	
FRACTIONS = 1/16" - 1/8" = 1/16"	DESIGN ENGINEER	
ANGLES = 1/4" - 1/8" = 1/8"	PROJECT ENGINEER	
SURFACE FINISH = 1/16" - 1/8" = 1/8"	DOCUMENT CONTROL	
MATERIAL:	APPROVED	
NEXT ASSY		
USED ON		
APPLICATION		

INTERPRET THIS DRAWING PER USAS 114.5	DRAWN BY	DATE
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON:	CHECKED	
FRACTIONS = 1/16" - 1/8" = 1/16"	DESIGN ENGINEER	
ANGLES = 1/4" - 1/8" = 1/8"	PROJECT ENGINEER	
SURFACE FINISH = 1/16" - 1/8" = 1/8"	DOCUMENT CONTROL	
MATERIAL:	APPROVED	
NEXT ASSY		
USED ON		
APPLICATION		

ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030	
TITLE TIA-1A LOGIC DIAGRAM OBJECT, MISSILE MOTION COUNTERS (2 REQUIRED)	
SIZE D	DRAWING NO.
SCALE	REV E
SHEET 3 OF 5	

8 7 6 5 4 3 2 1



REVISIONS			INITIALS and DATE		
SYM	DESCRIPTION		DRFTG	CHECK	ENGRG
A	NEW DWG. 7/22/76		JD WMD		
B	FIRST CHECK PLOT				
C	CHIP REV. E (B) DENOTES		D.E.		
E	SIZE CHANGED TOO				

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215 First Street Cambridge, Massachusetts 02142 Telephone (617) 452-2500 FAX (617) 452-2501 PER USASI Y14.5		DRAWN BY DATE	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS - +1/16 .x = +.1 ANGLES - ±1° .xx = ±.03 SURFACE FINISH - .xxx = ±.010		CHECKED DESIGN ENGINEER PROJECT ENGINEER INSTRUMENT CONTROL APPROVED	
MATERIAL:		ATARI INCORPORATED 14600 Winchester Boulevard Los Gatos, California 95030	
NEXT ASSY USED ON APPLICATION		TITLE TIA-1A LOGIC DIAGRAM AUDIO CIRCUITS (2 REQS.) SIZE D DRAWING NO SCALE SHEET 4 OF 5	

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8

7

6

5

4

3

2

1

ALL
OBJECT
SERIAL
GRAPHICSPS
M6
P1
M1
PF
BLPRIORITY
ENCODERBLANK-LUM-COLOR
OUTPUTS

1 PLACE

4 PLACES

EMH. PULL UPS

TYPICAL CELL
14 PLACES

COLOR PHASE SHIFT DELAY

COLOR SELECT DECODE

DEL 10

COLOR
DELAY
ADJUST

TRANSISTOR SIZES

SYMBOL	DEPLETION PULL UP		ENHANCEMENT PULL DOWN		DRAWN RATIO W1/L1	LOAD CURRENT TYP. mA	L1 IF PULLUP DRIVER
	W1	L1	W2 (GATE CAP) W2 (μ)	L2			
A	7	18	20 (0.05)	40 (1.0 pf)	6	8.57	0.080
B	7	15	24 (0.06)	48 (1.2 pf)	6	8.57	0.097
C	7	12	30 (0.075 pf)	60 (1.5 pf)	6	8.57	0.122
D	7	12	70 (1.75 pf)	140 (3.5 pf)	6	17.14	0.122
E	8	10	40 (1.0 pf)	80 (2.0 pf)	6	8.57	0.168
F	13	10	70 (1.75 pf)	140 (3.5 pf)	6	8.75	0.237
G	20	10	110 (2.75 pf)	220 (5.5 pf)	6	8.75	0.389

*1 MAKE PULLDOWN 45μ IF DRIVEN BY SERIES GATE
*2 MAKE PULLDOWN 45μ IF DRIVEN BY SERIES GATE

BALL POSITION COUNTER

BALL GRAPHICS
+ VERT. DELAY

BALL SIZE LOGIC

BALL
SERIAL
GRAPHICSCONFIDENTIAL
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS ± 1/16 ANGLES ± 1° SURFACE FINISH XXX ± .010	DESIGN ENGINEER T. MIMER 7/22/76	TITLE TIA-1A LOGIC DIAG. COLOR-LUM-PRIORITY CIRCUITS BALL MOTION COUNTER
MATERIAL:	DOCUMENT CONTROL	SIZE D
APPROVED	REVISIONS	DRAWING NO. REV B
NEXT ASSY	USED ON	SCALE
APPLICATION		SHEET 5 OF 5

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