Theory of Operations Manual

MODEL 9000

GRAPHIC DISPLAY SYSTEM

VOLUME II

NOTE

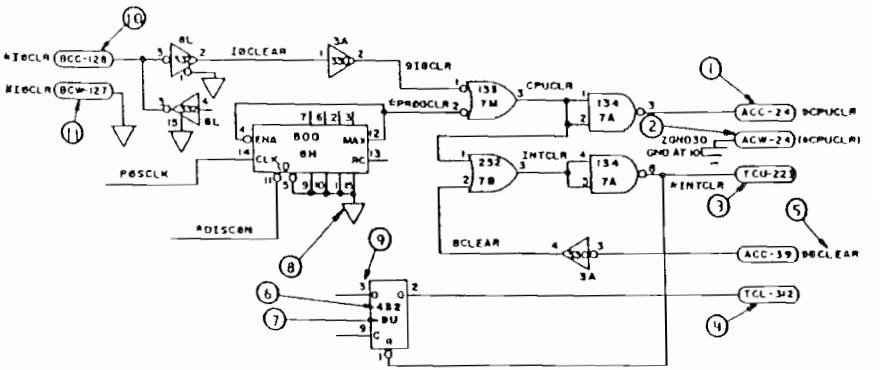
THE INDEX OF DRAWINGS IS ON PAGE 13-9

RAMTEK CORPORATION • 585 NORTH MARY AVENUE • SUNNYVALE, CA. 94086

PRINTED - AUGUST - 1977

NOTE

Section 13.0 of Volume I is repeated here, in Volume II, as a guide to the user.



LEGEND:

(1) "A" connector component side, pin number.

(2) "A" connector non-component side, pin number.

(3) Test connector upper, pin number.

(4) Test connector lower, pin number.

(5) Term name.

(6) Device type number, refer to Table 13-1.

(7) Device location, refer to Figure 13-2.

(8) Signal ground.

(9) Pin number on device.

(10) "B" connector component side, pin number.

(11) "B" connector non-component side, pin number.

FIGURE 13-1 SCHEMATIC NOTES

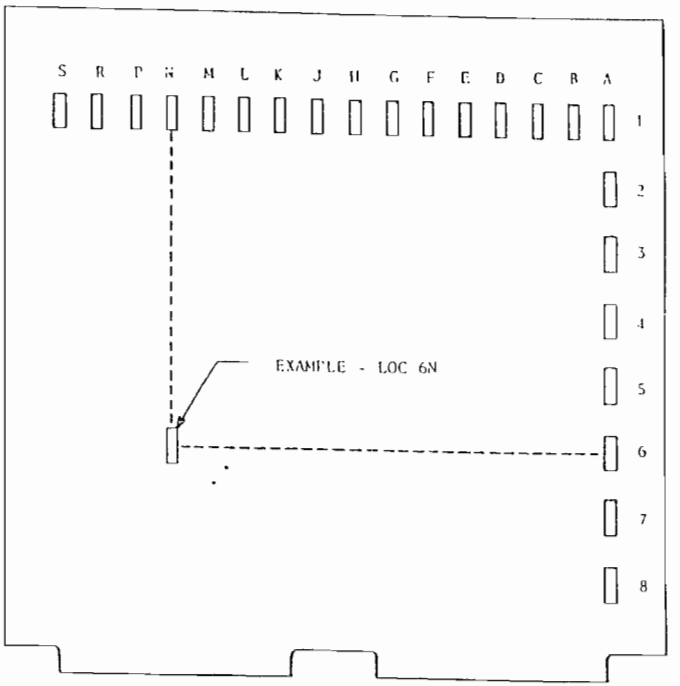


FIGURE 13-2 TYPICAL DEVICE LOCATION DESIGNATOR

TABLE 13-1 NUMERICAL LISTING OF IC TYPES

REFERENCE	RAMTEK PART NO.	DESCRIPTION	MFR.	MFR. PART NO.
001	1301001	IC: Dual 2 input AND gate open collector driver	01295	SN75451B
002	1301002	IC: Quad 2 input AND gate	01295	SN7408N
024	1301024	IC: Dual 4 input AND gate	01295	SN74H21N
030	1301030	IC: Quad 2 input AND gate	01295	SN74S08N
031	1301031	IC: Quad 2 input AND gate	01295	SN74LS08N
032	1301032	IC: Dual 4 input AND gate	01295	SN74S21N
033	1301033	IC: Dual 4 input AND gate	01295	SN74LS21N
034	1301034	IC: Quad 2 input AND gate open collector	01295	SN74LS09N
100	1301100	IC: Quad 2 input NAND gate open collector	01295	SN7401N
101	1301101	IC: Quad 2 input NAND gate driver	01295	SN7437N
102	1301102	IC: Quad 2 input NAND gate	01295	SN7400N
103	1301103	IC: Triple 3 input NAND gate	01295	SN7412N
104	1301104	IC: Dual 4 input NAND gate	01295	SN7420N
105	1301105	IC: Quad 2 input NAND gate driver (open collector)	01295	SN7438N
106	1301106	IC: Quad 2 input NAND gate driver	01295	SN7439N
107	1301107	IC: Dual peripheral positive NAND gate driver (open collector)	01295	SN75452B
108	1301108	IC: 8 input NAND gate	01295	SN7430N
112	1301112	IC: Quad 2 input NAND gate open collector	01295	SN7403N
132	1301132	IC: Quad 2 input NAND gate	01295	SN74S00N
133	1301133	IC: Quad 2 input NAND gate	01295	SN74LS00N
134	1301131	IC: Quad 2 input NAND gate driver	01295	SN74S37N
135	1301135	IC: Dual 4 input NAND gate	01295	SN74S20N
136	1301136	IC: Dual 4 input NAND gate	01295	SN74LS20N
137	1301137	IC: 12 input NAND gate with tristate control	01295	SN74S134N
138	1301138	IC: Dual 2 input 50 ohm NAND gate driver	01295	SN74S140N
139	1301139	IC: Triple 3 input NAND gate	01295	SN74H10N
140	1301140	IC: Quad 2 input NAND gate	01295	SN74H00N
141	1301141	IC: Dual 4 input NAND gate	01295	SN74H20N
142	1301142	IC: Quad 2 input NAND Schmitt triggers	01295	SN74LS132N
143	1301143	IC: Quad 2 input NAND (open collector)	01295	SN74LS03N
200	1301200	IC: Dual 2 input OR gate peripheral driver	01295	SN75453B
231	1301231	IC: Quad 2 input OR gate	01295	SN74S32N
232	1301232	IC: Quad 2 input OR gate	01295	SN74LS32N
300	1301300	IC: Hex inverter	01295	SN7404N
301	1301301	IC: Hex inverter	01295	SN74L04N
302	1301302	IC: Quad 2 input NOR gate	01295	SN7402N
303	1301303	IC: Triple 3 input NOR gate	01295	SN7427N
304	1301301	IC: Quad MOS clock driver	32295	IM5003
305	1301305	IC: Differential line receiver	01295	SN75182N
306	1301306	IC: TTL to ECL translator	01295	SN10124N
307	1301307	IC: ECL to TTL translator	01295	SN10125N
308	1301308	IC: Differential line receiver	01295	SN75107N
309	1301309	IC: Differential line driver	01295	SN75183N

TABLE 13-1 NUMERICAL LISTING OF IC TYPES (CONT'D)

REFERENCE	RAMTEK PART NO.	DESCRIPTION	MFR.	MFR. PART NO.
310	1301310	IC: Hex inverter open collector	01295	SN7405N
311	1301311	IC: Hex inverting Schmitt trigger	01295	SN7414N
312	1301312	IC: Dual line driver	18324	8T13
313	1301313	IC: Differential line driver	01295	SN75110N
314	1301314	IC: Hex inverter open collector driver	01295	SN7406N
315	1301315	IC: Hex inverter open collector, high voltage	01295	SN7416N
316	1301316	IC: Hex inverter	01295	SN74H04N
317	1301317	IC: Dual 2 input NOR gate peripheral driver	01295	SN75454B
318	1301318	IC: Video operational amplifier/driver	27014	LH0002C
319	1301319	IC: MOS clock driver TO-8 package	27014	MH0026CG
320	1301320	IC: Dual differential line driver	18324	DM8830
321	1301321	IC: Voltage follower 14 pin DIP	27014	LH110D
322	1301322	IC: Dual line driver	01295	SN75150N
323	1301323	IC: Operational amplifier	27014	LM301N
324	1301324	IC: Voltage regulator	27014	LM305N
325	1301325	IC: 5 volt regulator	27014	LM309N
326	1301326	IC: Voltage follower	27014	LM310N
327	1301327	IC: Audio power amplifier	27014	LM380N
328	1301328	IC: Quad amplifier	27014	LM3900N
329	1301329	IC: 5 volt regulator TO-0 package	27104	LM309H
330	1301330	IC: Hex inverter	01295	SN74LS04N
331	1301331	IC: Hex inverter	01295	SN74S04N
332	1301332	IC: Tristate line driver/receiver	18324	8T26
333	1301333	IC: Quad 2 input NOR gate	01295	SN74S02N
334	1301334	IC: Quad 2 input NOR gate	01295	SN74LS02N
335	1301335	IC: Triple 3 input NOR gate	01295	SN74S27N
336	1301336	IC: Triple 3 input NOR gate	01295	SN74LS27N
337	1301337	IC: Dual 5 input NOR gate	01295	SN74S260N
338	1301338	IC: RS232 line driver	01295	SN75188N
339	1301339	IC: RS232 line receiver	01295	SN75189N
340	1301340	IC: High speed hex inverter	18324	8H90A
341	1301341	IC: Noninverting hex buffer, high voltage (open collector)	01295	SN7417N
342	1301342	IC: Quad comparator	18324	LH139N
343	1301343	IC: Precision operational amplifier	27014	LM50
350	1301350	IC: Dual MOS clock driver	27014	DS0026CN
365	1301365	IC: Hex non-inverting bus drivers (tri-state)	01295	SN74365N
366	1301366	IC: Hex inverting bus drivers (tri-state)	01295	SN74366N
367	1301367	IC: Hex non-inverting bus drivers (tri-state)	01295	SN74367N
368	1301368	IC: Hex inverting bus drivers (tri-state)	01295	SN74368N
369	1301369	IC: Hex non-inverting bus drivers (tri-state)	01295	SN74LS365N
400	1301400	IC: Quad 80 bit shift register	34649	3409
401	1301401	IC: 256 x 1 bipolar RAM	01295	SN74S200N

TABLE 13-1 NUMERICAL LISTING OF IC TYPES (CONT'D)

REFERENCE	RAMTEK PART NO.	DESCRIPTION	MFR.	MFR. PART NO.
402	1301402	IC: Quad 256 bit MOS shift register	34335	2802DC
403	1301403	IC: 1k x 1 bit shift register	32293	7722
404	1301404	IC: Dual one shot	01295	SN74123N
405	1301405	IC: 4 bit latch	07263	9314
406	1301406	IC: 16 x 4 bit bipolar RAM	01295	SN7489N
407	1301407	IC: Dual 480 bit shift register	31471	51685
408	1301408	IC. 8 bit parallel in-serial out shift register	01295	SN74164N
409	1301409	IC. 8 bit serial in-parallel out shift register	01295	SN74166N
410	1301410	IC: Hex D flip-flop	01295	SN74174N
411	1301411	IC 4 bit left-right shift register	01295	SN74194N
412	1301412	IC. 256 x 1 MOS RAM	18324	2501
413	1301413	IC: 1024 bit MOS shift register	18324	2525
414	1301414	IC: 1024 x 1 bit MOS dynamic RAM	50364	NMS260
415	1301415	IC: 256 bit bipolar RAM	32293	TS523
416	1301416	IC: 1024 bit dynamic shift register	18324	2512
417	1301417	IC: 4 bit shift register with JK inputs	01295	SN74195N
418	1301418	IC: Dual one shot	07263	9602
419	1301419	IC: Dual D flip-flop	01295	SN74H74N
424	1301424	IC: 64 x 4 RAM	01295	SN74S189N
426	1301426	IC: 256 x 4 static RAM	34335	AM9112C
430	1301430	IC: Dual JK flip-flop	01295	SN74S112N
431	1301431	IC: Hex D flip-flop	01295	SN74S174N
432	1301432	IC: Hex D flip-flop	01295	SN74LS174N
433	1301433	IC: Left-right shift register	01295	SN74LS194N
434	1301434	IC: Dual D flip-flop	01295	SN74S74N
435	1301435	IC: Dual JK flip-flop	01295	SN74LS109N
436	1301436	IC: Left-right shift register	01295	SN74S194N
437	1301437	IC: Dual JK flip-flop	01295	SN74LS112N
438	1301438	IC: 8 bit serial in-parallel out shift	01295	SN74LS166N
439	1301439	IC: Dual JK flip-flop	01295	SN74S109N
440	1301440	IC: 4 bit D-type register (tri-state)	01295	SN74173N
441	1301441	IC: 1k x 1 static RAM	32293	IMS5S18CJE
442	1301442	IC: 256 x 1 RAM	34335	AM27LS00PC
443	1301443	IC: 1k x 1 RAM	07263	9342SAXC
441	1301444	IC: 8 bit D-type latch	01295	SN74S374
445	1301445	IC: 4 bit register file	01295	SN74170N
446	1301446	IC: 256 x 4 static RAM	34335	AM9112
447	1301447	IC: 256 x 4 bi-polar RAM (separate I/O)	07263	93L422
448	1301448	IC: Dual JK flip-flop	01295	SN74LS107N
449	1301449	IC: Mono stable multivibrator	01295	SN74LS123N
450	1301450	IC: 4k x 1 dynamic RAM	07263	4096SDC
451	1301451	IC: Dual D type flip-flop	01295	SN74LS74N
452	1301452	IC: 256 x 4 static RAM	34649	8111-2
453	1301453	IC. 1k x 1 static RAM	34335	AM9102EPC
454	1301454	IC: 8 bit SI-PO shift register	01295	SN74LS164N
500	1301500	IC: 4 bit up-down counter	01295	SN74191N

TABLE 13-1 NUMERICAL LISTING OF IC TYPES (CONT'D)

REFERENCE	RAMTEX PART NO.	DESCRIPTION	MFR.	MFR. PART NO.
501	1301501	IC: 4 bit adder	01295	SN74283N
502	1301502	IC: 9 line to BCD encoder	01295	SN74147N
503	1301503	IC: Quad 2 input multiplexer with storage	01295	SN74298N
504	1301504	IC: UART	52840	TR1602A
505	1301505	IC: 4 to 10 line decoder	01295	SN7442N
506	1301506	IC: 4 bit binary up-down counter	01295	SN74LS193N
507	1301507	IC: 2 section - 4 input selector	01295	SN74LS153N
508	1301508	IC: 4 bit binary adder (not recommended for use dur to pwr, gnd arrangement)	01295	SN7483N
509	1301509	IC: 4 bit up-down binary counter	01295	SN74193N
510	1301510	IC: 4 bit up-down BCD counter	01295	SN74192N
511	1301511	IC: BCD to 7 segment decoder/driver	01295	SN7447N
513	1301513	IC: BCD counter	07263	93L16
514	1301514	IC: 8 to 1 line selector	01295	SN74151N
515	1301515	IC: 2 section - 4 input selector	01295	SN74153N
516	1301516	IC: Quad 2-line-to-1-line selector	01295	SN74157N
517	1301517	IC: 4 bit binary counter	07263	9316
518	1301518	IC: 4 bit comparator	01295	SN7485N
519	1301519	IC: Quad 2 input exclusive OR gate	01295	SN7486N
520	1301520	IC: 4 AND/NOR gate	01295	SN74H55N
521	1301521	IC: Keyboard encoder ROM	11711	AY-5-3600-XXX
522	1301522	IC: Baud rate clock generator, MOS	27014	MM5307AA/N
523	1301523	IC: Dual voltage controlled oscillators	01295	SN74S124N
524	1301524	IC: Phase frequency detector	04713	MC0444P
525	1301525	IC: Timer	18324	NE555Y
526	1301526	IC: Timer	18324	NE556A
527	1301527	IC: Timer	18324	NE565A
528	1301528	IC: 4 bit binary counter	01295	SN74LS93N
529	1301529	IC: Look ahead carry generator	01295	SN74S182N
530	1301530	IC: 4 bit comparator	01295	SN7485N
531	1301531	IC: Quad exclusive OR gate	01295	SN74S86N
532	1301532	IC: 3 to 8 decoder/demultiplexer	01295	SN74S138N
533	1301533	IC: 8 input selector	01295	SN74S15N
534	1301534	IC: 2 section - 4 input selector	01295	SN74S153N
535	1301535	IC: 4 section - 2 input selector	01295	SN74S157N
536	1301536	IC: 4 bit binary counter	01295	SN74S161N
537	1301537	IC: 3 to 8 decoder/demultiplexer	01295	SN74138N
538	1301538	IC: 5 x 7 font ASCII character generator	18321	2513N/CM2140
539	1301539	IC: 4 section - 2 input selector	01295	SN74S158N
540	1301540	IC: 4 AND NOR gate	01295	SN74S64N
541	1301541	IC: Dual 2 AND/NOR gate	01295	SN74LS51N
542	1301542	IC: Arithmetic logic unit/function generator	01295	SN74S181N
543	1301543	IC: Synchronous 4 bit up-down counter	01295	SN74S169N
544	1301544	IC: 8 input selector	01295	SN74LS151N
545	1301545	IC: 4 section - 2 input selector	01295	SN74LS157N
546	1301546	IC: 4 section - 2 input selector	01295	SN74LS158N
547	1301548	IC: 4 bit binary counter	01295	SN74LS161N

TABLE 13-1 NUMERICAL LISTING OF IC TYPES (CONT'D)

REFERENCE	RAMTEK PART NO.	DESCRIPTION	MFR.	MFR. PART NO.
548	1301548	IC: Quad 2 input multiplexer with D storage	01295	SN74LS298N
549	1301549	IC: 3-to-8 decoder/demultiplexer	01295	SN74LS138N
550	1301550	IC: Decode counter	18324	N7490
551	1301551	IC: BCD to 7 segment decoder/driver	01295	SN7448N
552	1301552	IC: Synchronous up/down decode counter	01295	SN74S168N
554	1301554	IC: Synchronous up/down binary counter	01295	SN74S169N
555	1301555	IC: Arithmetic logic unit	01295	SN74181N
556	1301556	IC. 1 of 16 decoder/demultiplexer	01295	SN74150N
558	1301558	IC: Synchronous 4 bit binary counter	01295	SN74163N
559	1301559	IC: Synchronous 4 bit decode counter	01295	SN74160N
560	1301560	IC: Quad 2 to 1 selector/multiplexer	01295	SN74S257N
561	1301561	IC: Dual 4 to 1 selector/multiplexer (open collector)	01295	SN74S253N
562	1301562	IC: Dual 2 to 4 decoder/demultiplexer	01295	SN74S139
536	1301563	IC: 8 bit I/O port	34649	8212
564	1301564	IC: Priority encoder	01295	SN74148N
565	1301565	IC: Programmable communication interface (USART)	34649	8251
566	1301566	IC: Programmable bit rate generator	07263	F4702
600	1301600	IC: 8080 microprocessor (325 ns cycle time)	34335	9080A-1
602	1301602	IC: 8080 microprocessor (480 ns cycle time)	34335	8080A
603	1301603	IC: Z80 microprocessor (250 ns cycle time)		MK3880-44
608	1301608	IC: Bit slice bi-polar microprocessor	34335	AM2901
609	1301609	IC: Microprocessor sequencer	34335	AM2909
700	1301700	IC: ECL JK flip-flop	04713	MC10231P

13.1 DRAWING INDEX

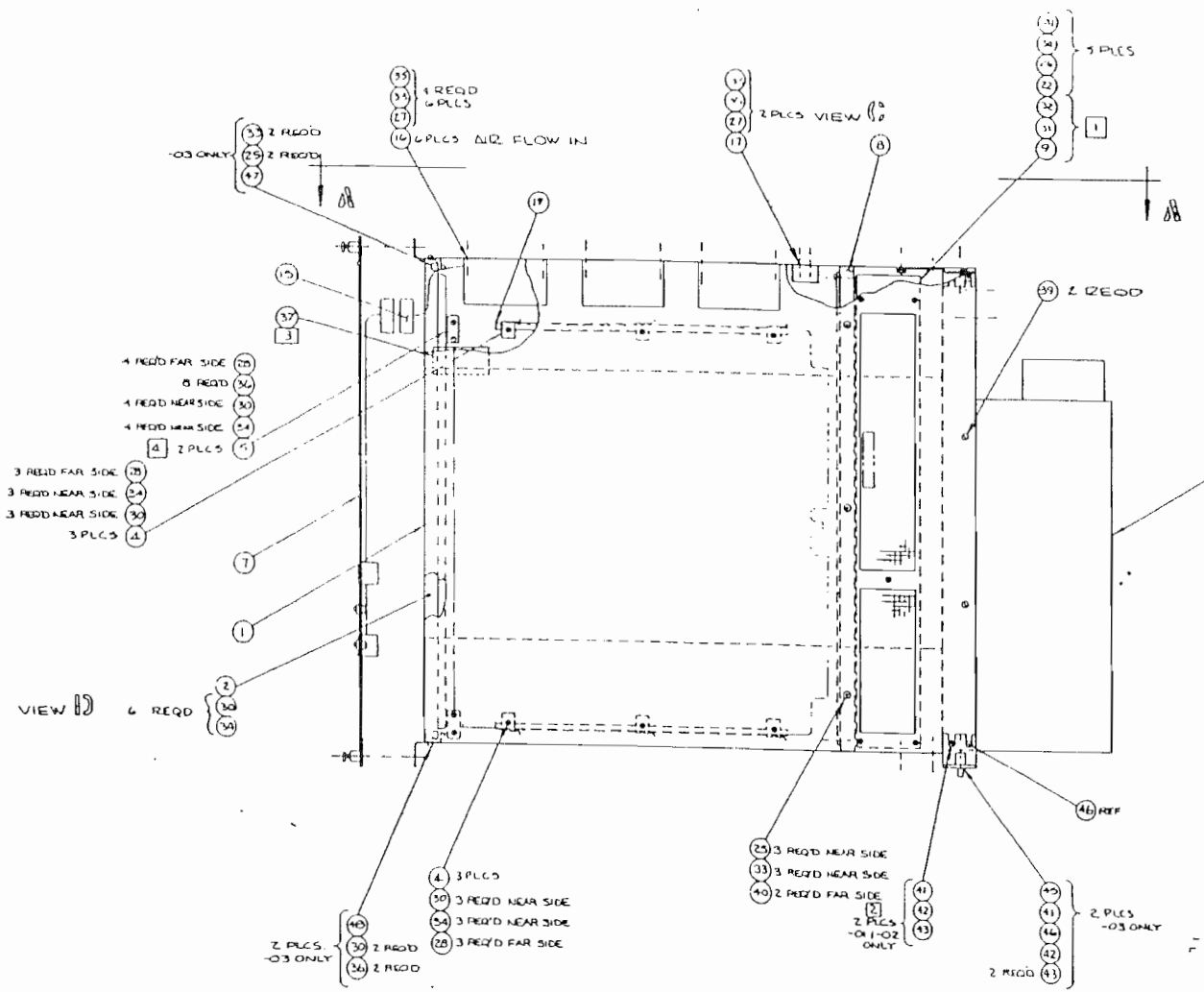
13.1.1 CONFIGURATION DRAWINGS

13.1.2 SYSTEM ASSEMBLIES

13.1.3 INTERFACE AND OPTIONAL ASSEMBLIES

CONFIGURATION DRAWINGS

502344-	4 sheets
502318	1 sheet
502312	1 sheet
502340-	1 sheet
502315	1 sheet
502419	4 sheets
502422	1 sheet
502421	2 sheets
502651	1 sheet
502423	1 sheet
502420	2 sheets
502803	1 sheet



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B	REV PER ECO # 506973		
C	REV PER ECO # 506978		
D	REV PER ECO # 506986		
E	REV PER ECO # 507171		
F	REV PER ECO # 507200		
G	REV PER ECO # 507291		
H	REV PER ECO # 507533		

NOTES: UNLESS OTHERWISE SPECIFIED:

1. BOARD SELECTION TO BE ACCOMPLISHED BY MARKETING.
2. ATTACH [illegible] FOR REAR PANEL PANEL [illegible].
3. PLACE LABEL TO ALLOW VIEWING OF MODEL AND SERIAL NUMBER WITH DOOR OFF.
4. NUT TO BE INSTALLED ON INSIDE OF BRACKET
5. CONNECTOR ENDS OF ITEM NUMBER 14 (SYNC TIMING INTERCONNECT CABLE) ARE IDENTICAL AND INTERCHANGABLE

CONTACT POLARITY MUST BE OBSERVED TO PREVENT DAMAGE TO THE EQUIPMENT.

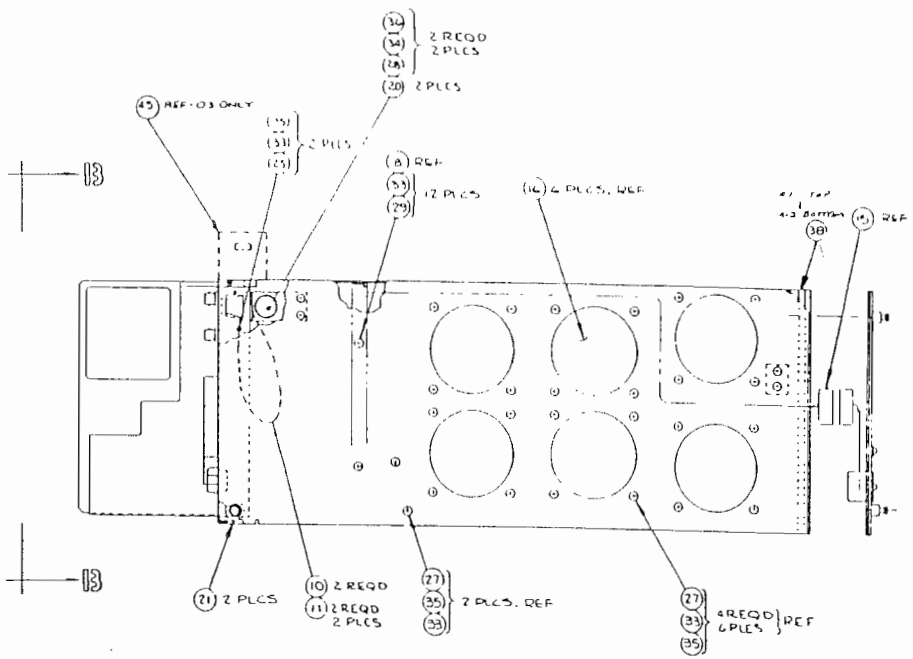
-1 : 9100
-2 : 9200
-3 : 9100-INTERNAL PANEL (ROLLER ASSEMBLY

SEE SEPARATE L/M

QTY PER UNIT	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
FINAL	DWN		ASSY, MAIN
	CHK		CHASSIS - 9100
	ENG		
NEXT ASSY	APVD		SIZE D SCALE 1/2 DWG NO SD2344-__ REV H



VIEW

REVISIONS			
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QTY REQD	PART NO.	ITEM DESCRIPTION	ITEM NO.

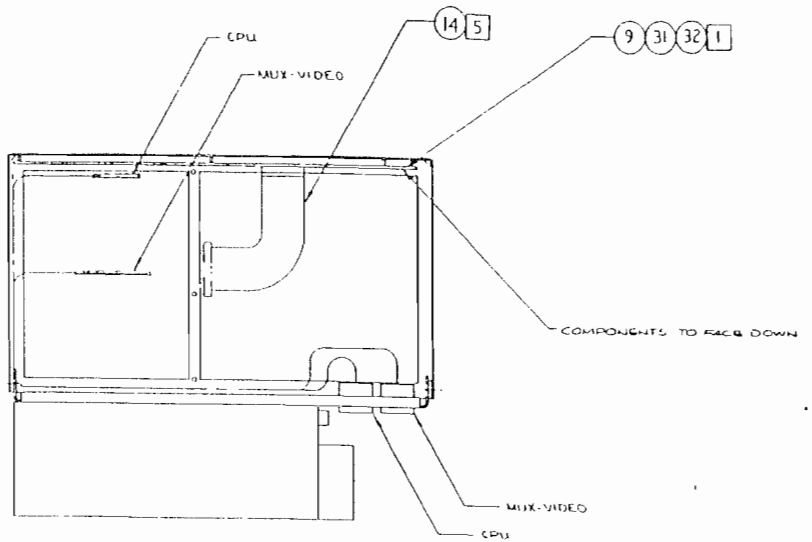
LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING
	SIGNATURES / DATE
DWN	Mark Mellinger 8/1/96
CHK	
ENG	
APVD	

RAMTEK

ASSY, MAIN CHASSIS -9100

SIZE D | SCALE 1/2 | SHT 2 OF 4 | DWG NO 502340-__ | REV H



VIEW B-B
FOR ROUTING OF MUX-VIDEO AND CPU CABLE

REVISIONS

LTR	DESCRIPTION	APVD	DATE

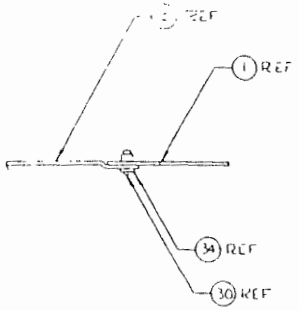
LIST OF MATERIALS

QTY AND U/M	PART NO	ITEM DESCRIPTION	REF NO

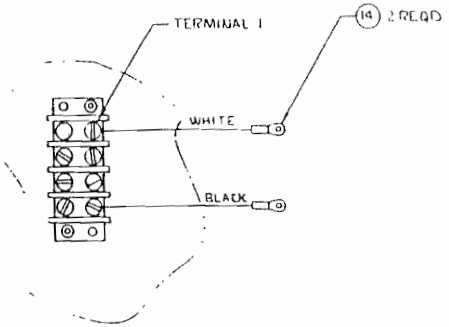
RAMTEK

ASSY, MAIN CHASSIS
9100

SIZE H | SCALE - | DWG NO 502344 | REV



VIEW (D)



VIEW (C)

REVISIONS

LTR	DESCRIPTION	APVD	DATE

LIST OF MATERIALS

QTY PER UNIT	PART NO.	ITEM DESCRIPTION	ITEM NO.

TOLERANCES

DO NOT SCALE DRAWING

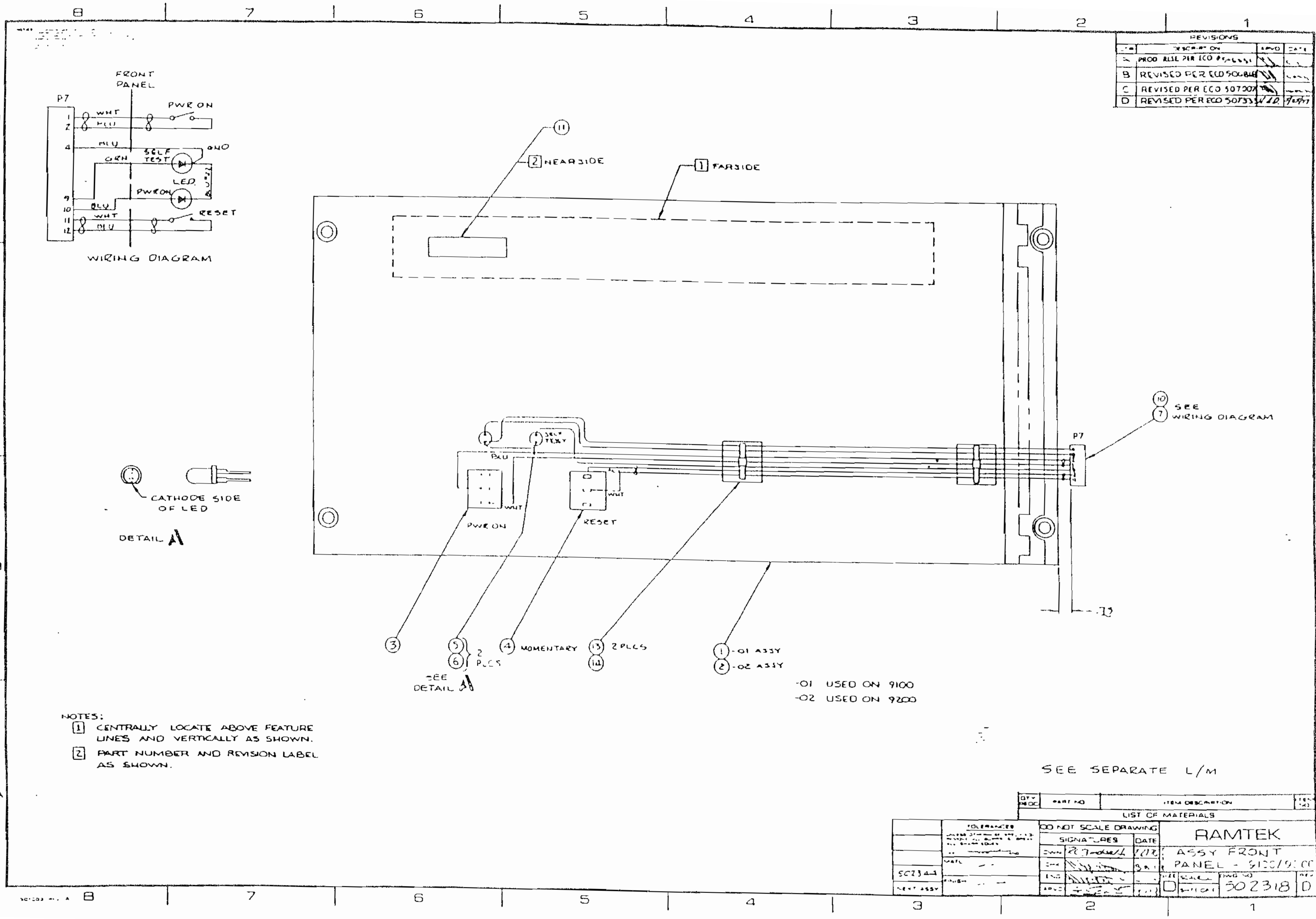
SIGNATURES		DATE
DWN		
CHK		
ENG		
APVD		

RAMTEK

ASSY MAIN CHASSIS 9100

SCALE 1/2 | DWG NO. 502344 | REV H

SHEET 1 OF 1


REVISIONS
A PROD REL PER ECO
B REVISED PER ECO 506848
C REVISED PER ECO 507207
D REVISED PER ECO 507335
P7
FRONT PANEL
WHT
BLU
PWR ON
SELF TEST
GRN
GND
LED
PWR ON
RESET
WIRING DIAGRAM
2 NEARSIDE
1 FARSIDE
SEE WIRING DIAGRAM
SELF TEST
PWR ON
RESET
CATHODE SIDE OF LED
DETAIL A
MOMENTARY
2 PLCS
2 PLCS
SEE DETAIL A
-01 ASSY
-02 ASSY
-01 USED ON 9100
-02 USED ON 9200
NOTES:
1 CENTRALLY LOCATE ABOVE FEATURE LINES AND VERTICALLY AS SHOWN.
2 PART NUMBER AND REVISION LABEL AS SHOWN.
SEE SEPARATE L/M
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
ASSY FRONT PANEL
502318
D

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
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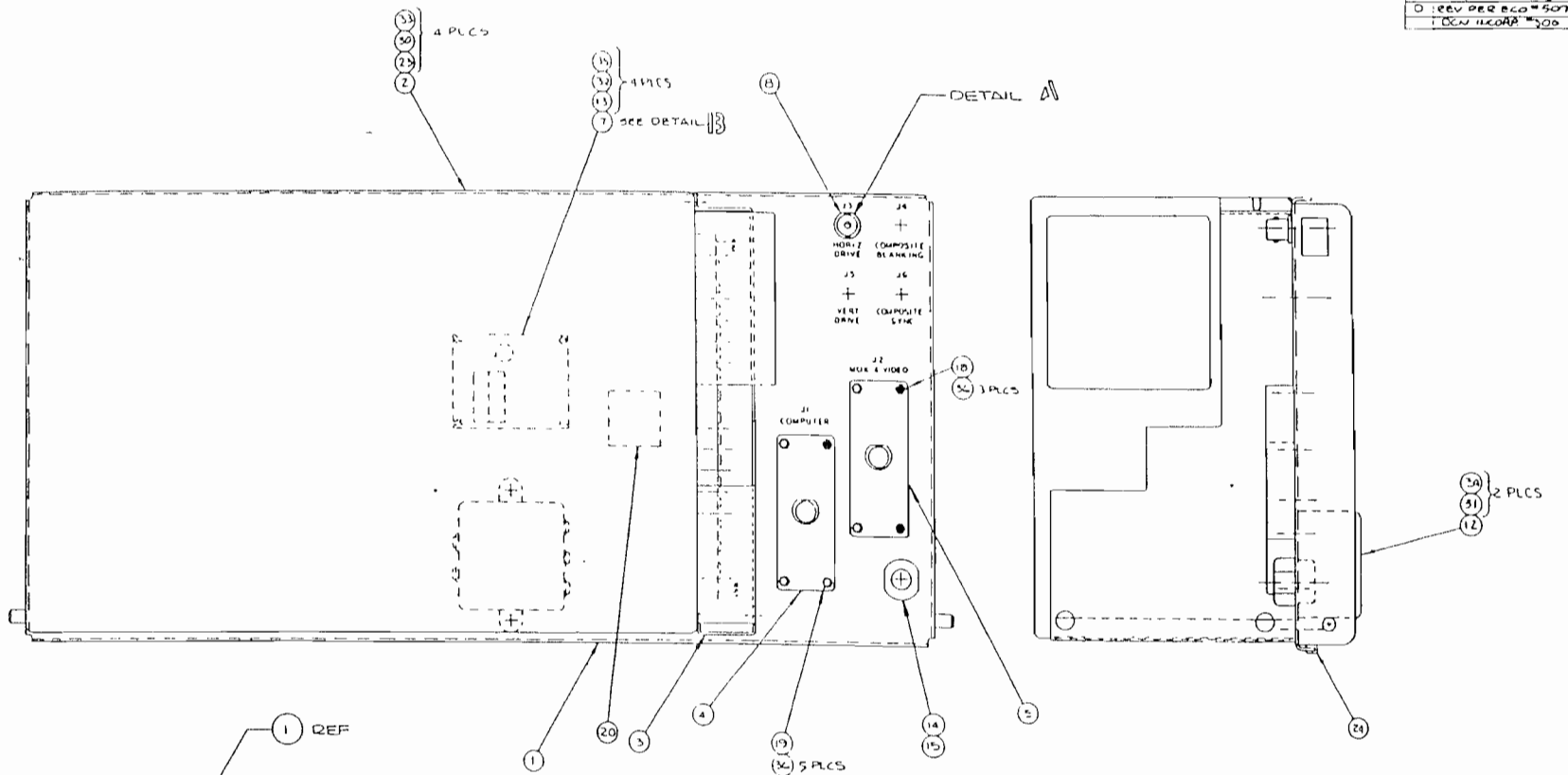
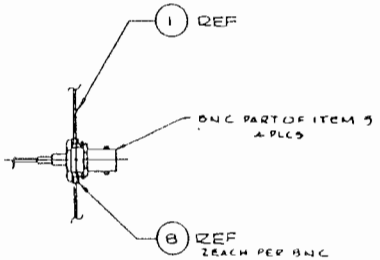
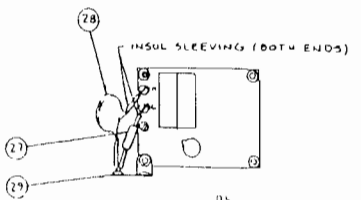




DETAIL A



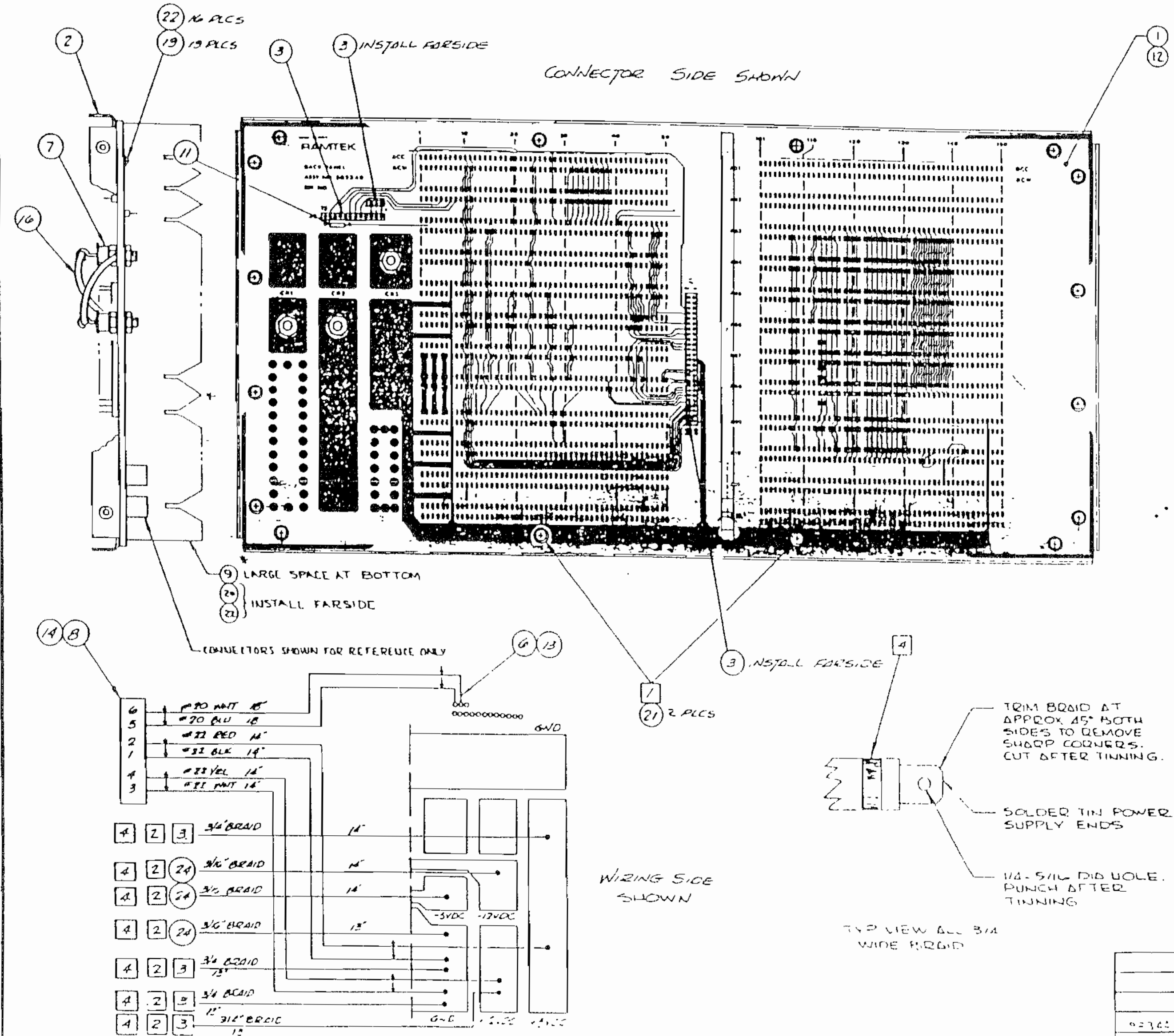
DETAIL B
TOP VIEW 2W2 CONT 3D

SEE SEPARATE L/M

QTY REQ	PART NO	ITEM DESCRIPTION	REF DES
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING	RAMTEK	
	SIGNATURES / DATE	ASSY, REAR PANEL 9100	
SIZE	SCALE	DRAWING NO	REV
D	SHT 1 OF 1	502312	D

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	REL PER ECO 5047[illegible]		
B	REL PER ECO 5069[illegible]		
C	REVISED PER ECO 507885		
D	REV. PER ECO 5073[illegible]		



NOTES;

1. THESE MUST BE NYLON FLATWASHERS!
2. ALL BRAID TO BE CENTRALLY LOCATED & SOLDERED TO THEIR RESPECTIVE PADS. BRAIDS TO RUN FROM PAD TO BOTTOM OF BOARD. COIL & TIE. SEE DWG 502346 FOR TERMINATING INFORMATION.
3. PUNCH 1/4 DIA HOLE THIS END
4. FOR IDENTIFICATION, BAND ALL FLAT BRAID WIRE AT BOTH ENDS WITH 1" WIDE COLORED SHRINK TUBING; GROUND-BLACK, +12V WHITE, -12V-YEL, +5V-RED, -5V-BLUE

-01: 9100
-02: 9200

QTY REQD	PART NO	ITEM DESCRIPTION	ITEM NO
LIST OF MATERIALS			

DO NOT SCALE DRAWING	RAMTEK
SIGNATURES / DATE	320 x 256 BACKPLANE ASSY
DWG NO	502346

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	RELEASE PER ECO 507005	[illegible]	[illegible]

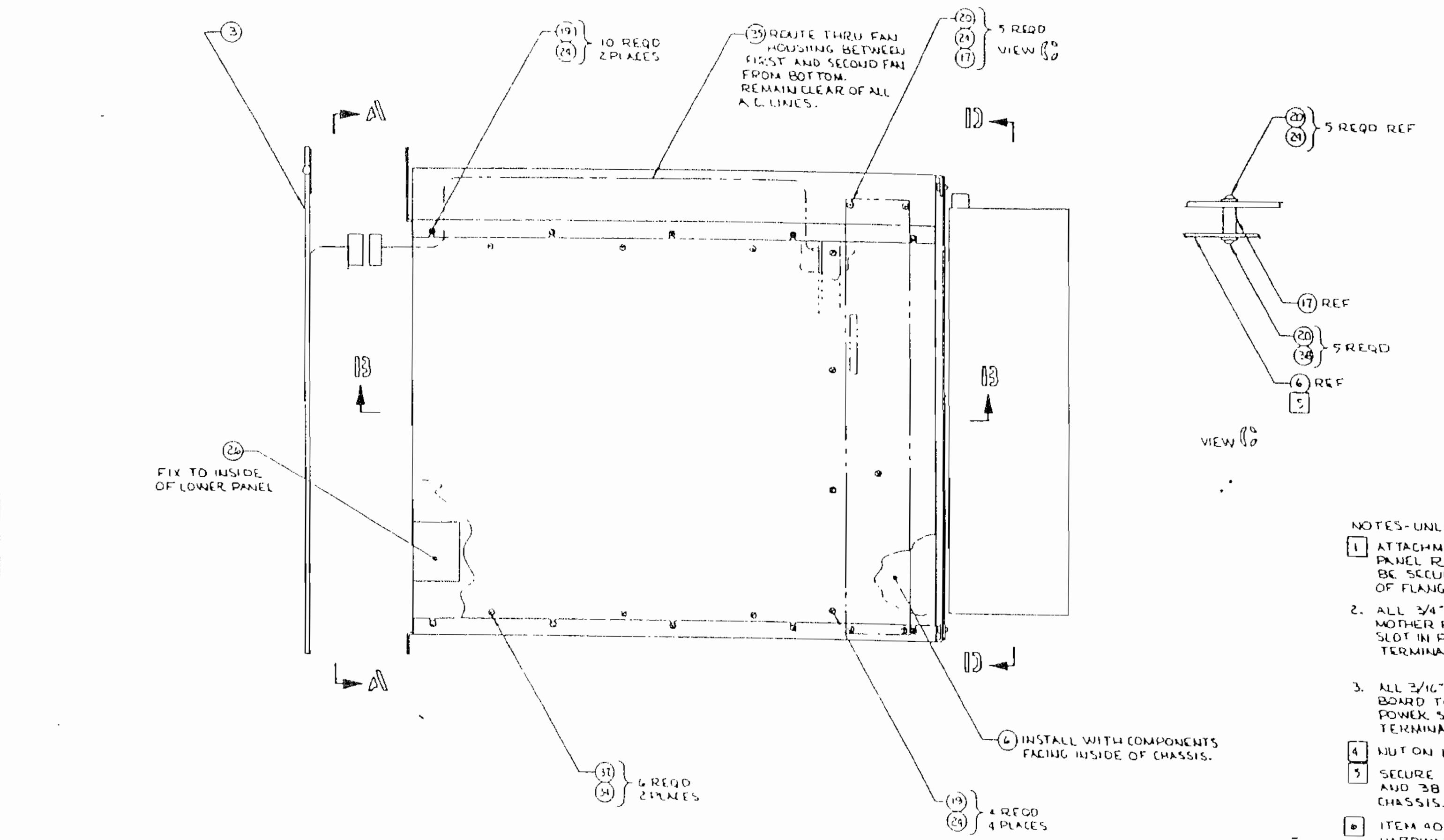
A01	INTERFACE BOARD (MAY BE WIREWRAPPED)	[1]
A02		
A03	CONTROL BOARD 502450	
A04	MEMORY EXPANSION BOARD 502440	
A05	SERIAL LINK BOARD NO 1 502641	
A06	SERIAL LINK BOARD NO 2 502641	
A07	VIDEO BOARD NO. 1	[1]
A08	VIDEO BOARD NO 2	[1]
A09	MEMORY BOARD 502332	
A10	MEMORY BOARD 502332	
A11	MEMORY BOARD 502332	
A12	MEMORY BOARD 502332	

NOTES-UNLESS OTHERWISE SPECIFIED:

[1] PART NUMBER TO BE DETERMINED BY APPLICATION OF UNIT.

QTY PER ASSY	PART NO.	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

	TOLERANCES	DO NOT SCALE DRAWING	RAMTEK
		SIGNATURES / DATE	
502299	MATL	DWN	BOARD LOADING DIAGRAM
	FINISH	CHK	9100/9200
NEXT ASSY		ENG S. Gyer 7/8/76	SIZE D SCALE NON DWG NO 502315 REV A
		APVD	SHT 1 OF 1



LTR	DESCRIPTION	APVD	DATE
A	RELEASE PER ECO		
B	CHANGED PER ECO 507010		
C	CHANGED PER ECO		
D	REVISED PER ECO 507069		
E	REV PER ECO 507203	PC	

NOTES-UNLESS OTHERWISE SPECIFIED

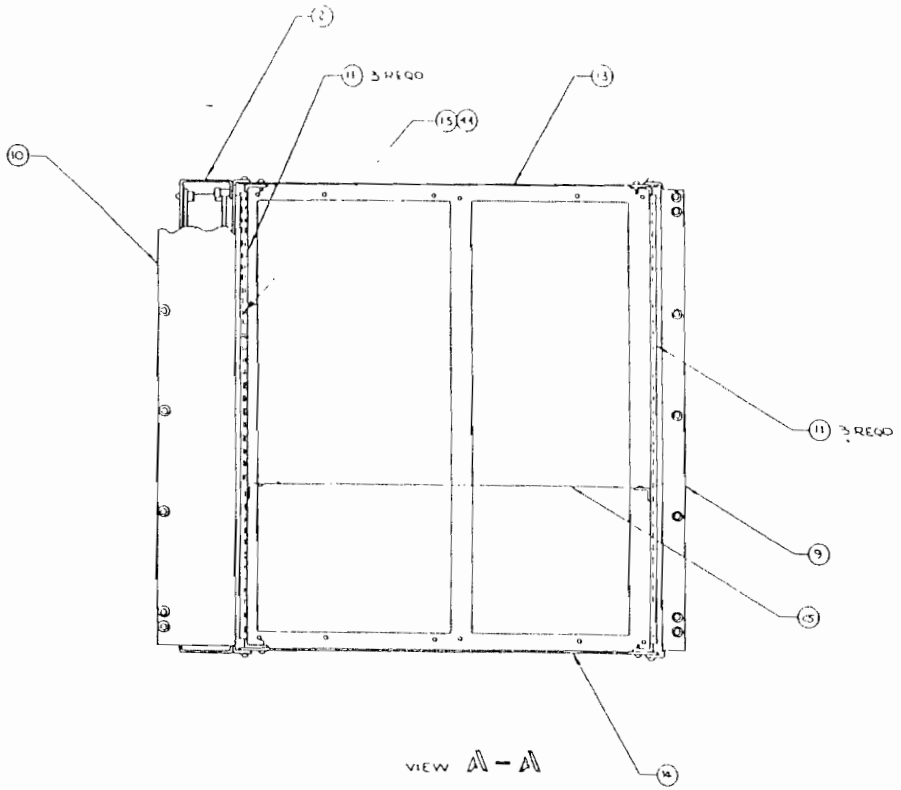
1. ATTACHMENT POINTS FOR POWER SUPPLY PANEL RESTRAINTS. ALL TERMINAL LUGS TO BE SECURED TO BACK OF PANEL OR INSIDE OF FLANGE, 2 PLACES.
2. ALL 3/4" BRAID TO BE ROUTED DOWN MOTHER BOARD TO CHASSIS BOTTOM, THRU SLOT IN POWER SUPPLY PANEL TO RESPECTIVE TERMINATION.
3. ALL 3/16" BRAID TO BE ROUTED DOWN MOTHER BOARD TO CHASSIS BOTTOM, THRU SLOT IN POWER SPLY PANEL TO RESPECTIVE TERMINATION, CUT AND CRIMP ON ITEM 33.
4. NUT ON INSIDE OF BRACKET.
5. SECURE ITEM 17 TO ITEM 6 USING ITEM 20 AND 38 PRIOR TO INSTALLING ITEM 6 IN CHASSIS. SECURE IN CHASSIS WITH ITEM 20 AND 24.
6. ITEM 40 AND ALL RELATED CABLES AND HARDWARE ARE AN OPTION AND THEIR USE IS DICTATED BY MARKETING.
7. CUT ITEM 30 AND INSTALL TO CORRESPOND TO THE NUMBERING OF DRAWING 502323

QTY REQD	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

DO NOT SCALE DRAWING	RAMTEK
SIGNATURES / DATE	FINAL ASSY 9300
DWN	
CHK	
ENG	
APVD	
SIZE D	DWG NO 5C2419
NEXT ASSY: FINAL	REV E

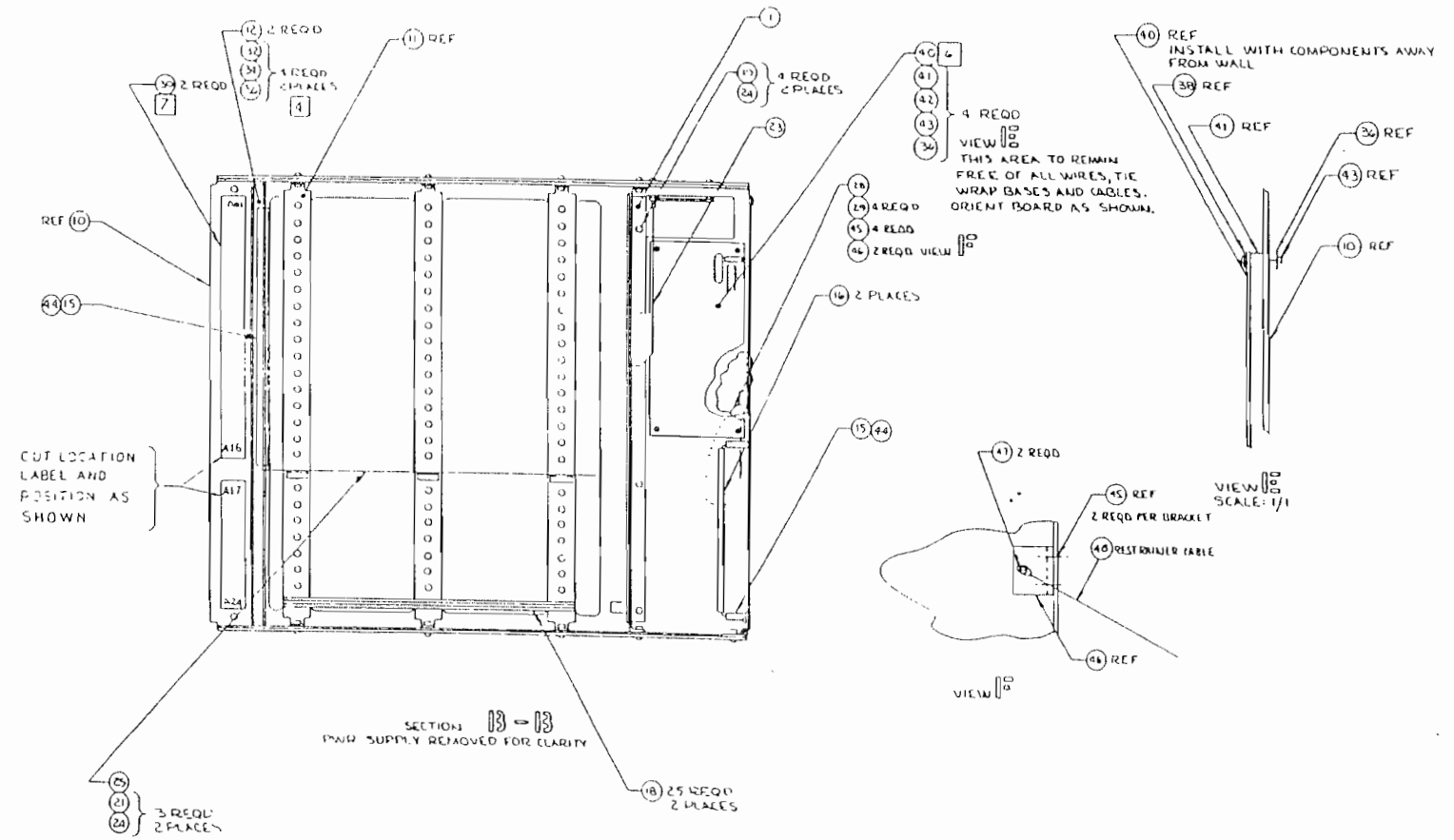
REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		



VIEW A – A

QTY REQD	PART NO.	ITEM DESCRIPTION	ITEM NO.
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING		RAMTEK
	SIGNATURES	DATE	
MATL	DWN IZUMI	3-19-96	FINAL ASSY 9300
FINISH	CHK		
NEXT ASSY	ENG		
	APVD		SIZE D SCALE 1/1 SHT 2 OF 9 DWG NO. 502419 REV E



REVISIONS			
	JCO SHEET 1		

QTY PER	PART NO	ITEM DESCRIPTION	

LIST OF MATERIALS

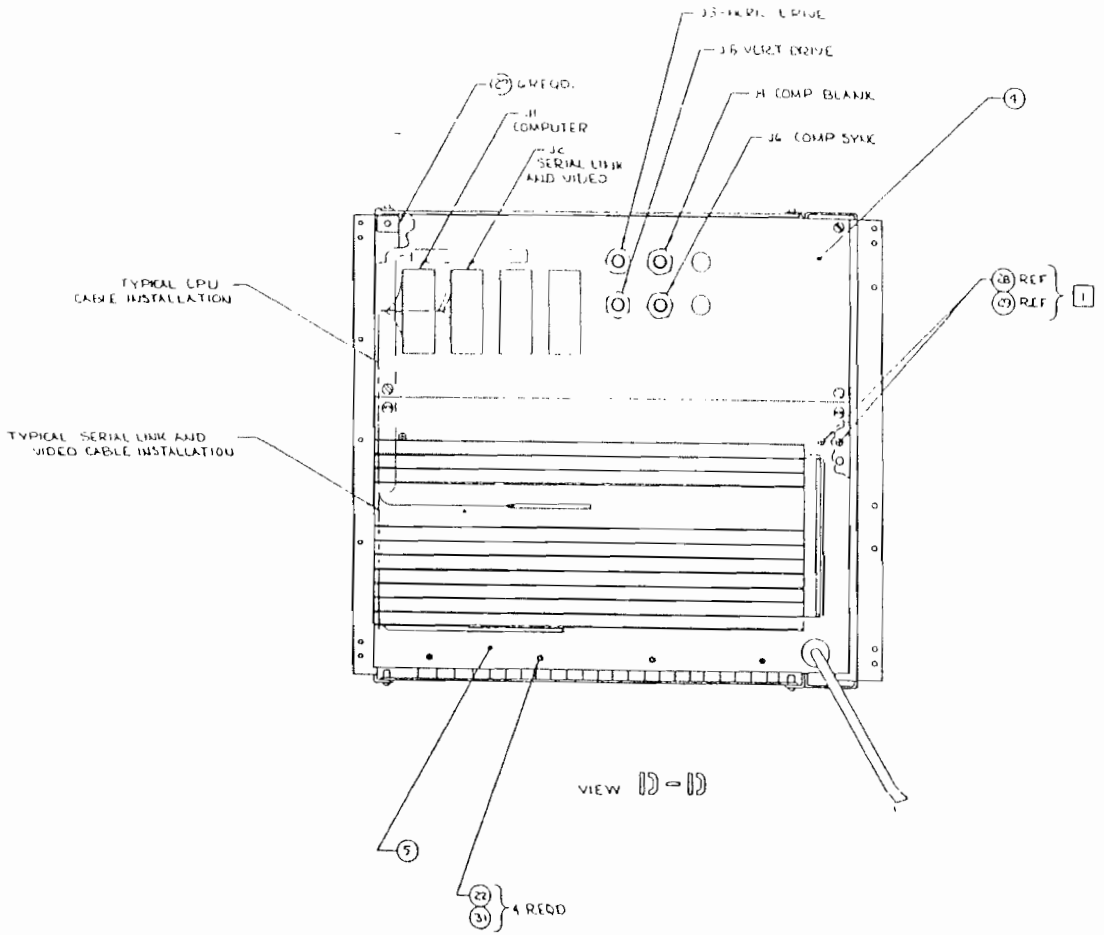
TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES		DATE
	DWN	IZUMI	3/19/90
	CHK		
	ENG		
	APVD		

RAMTEK

FINAL ASSY 9300

SIZE	SCALE 1/2	DWG NO	REV
D	SHT 3 OF 4	502419	E

REVISIONS			
ITR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		



QTY REQD	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

TOLERANCES UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES ALL ANGULAR DIMENSIONS ARE ± 1 DEGREE

MATL

FINISH

NEXT ASSY

DO NOT SCALE DRAWING

SIGNATURES		DATE
DWN	ILUM1	3-19-84
CHK		
ENG		
APVD		

RAMTEK

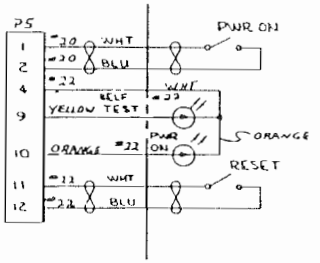
FINAL ASSY

9300

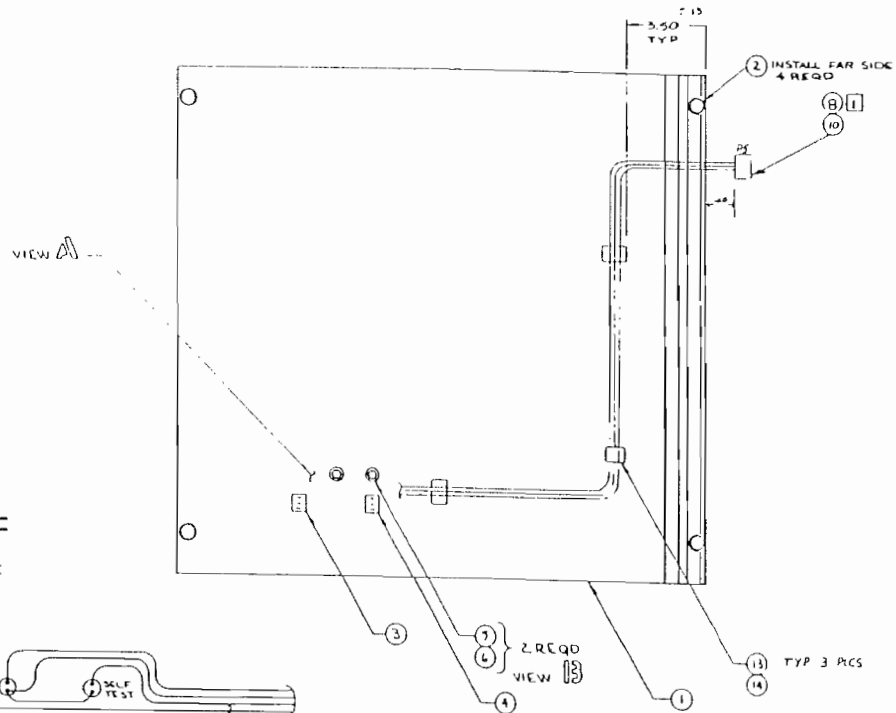
SIZE D | SCALE 1/2 | SHEET 1 OF 2 | DWG NO. 502419 | REV E

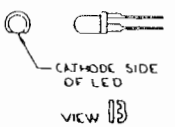
REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	RELEASE PER ECO [illegible]		
B	REV PER ECO # 507077	MTA	[illegible]
C	REV PER ECO # 507247	MF	[illegible]
D	REV PER ECO # 507286	KJB	[illegible]

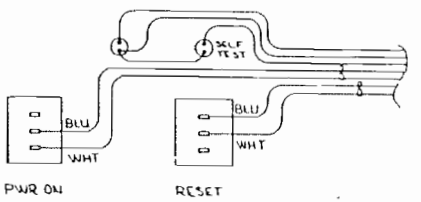
FRONT PANEL



WIRING DIAGRAM







VIEW A

NOTE:
1. IDENTIFY CONN WITH CONN DESIGNATION AS SHOWN.

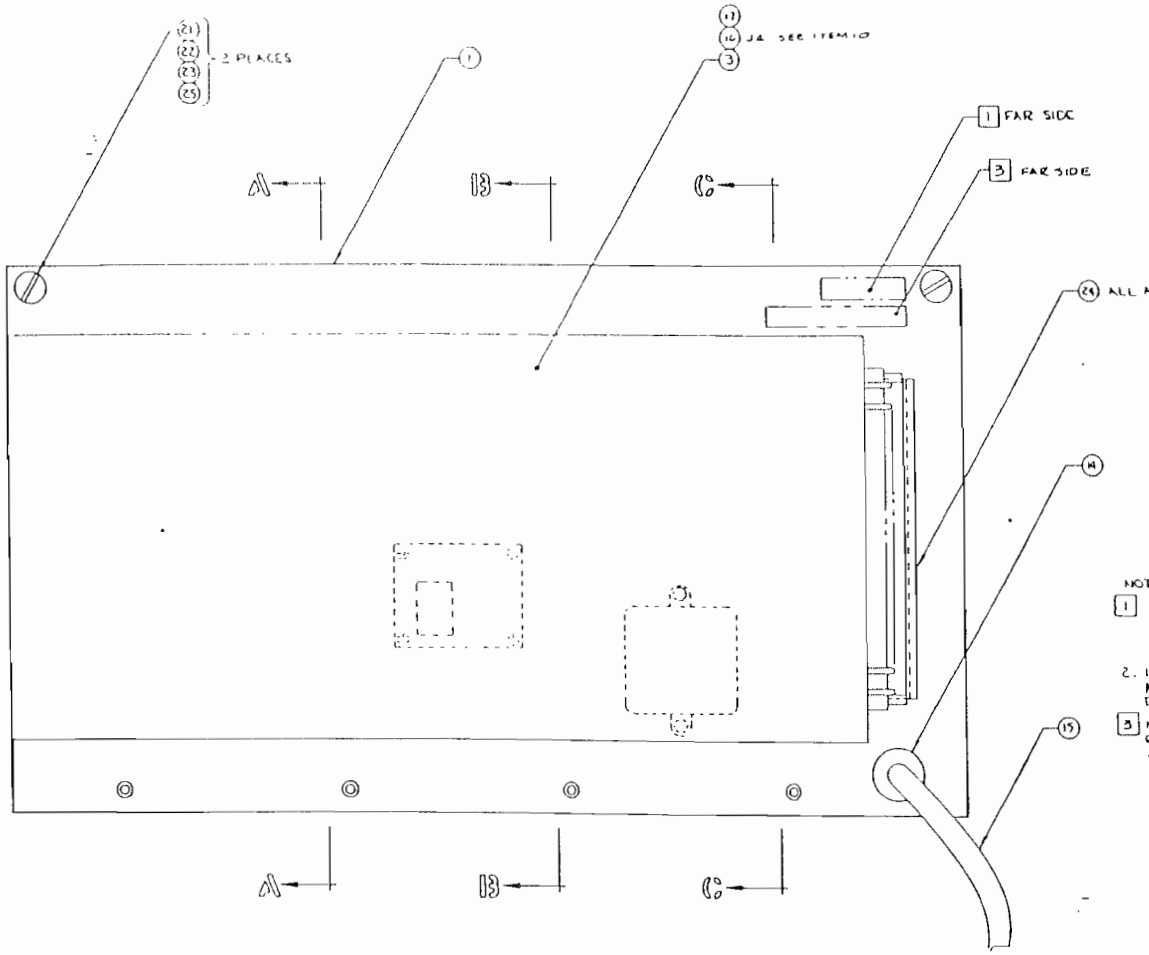
SEE SEPARATE LM

QTY USED	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING	RAMTEK	
502419	SIGNATURES / DATE	FRONT PANEL ASSY 9300	
NEXT ASSY	DWN / CHK / ENG / APVD	SIZE D / SCALE 1/1 / SHT 1 OF 1	DWG NO 502422 / REV D

REVISIONS			
ITR	DESCRIPTION	APVD	DATE
A	REL 2868 PER ECO [illegible]	[illegible]	[illegible]
B	REV PER ECO # 507203	[illegible]	[illegible]



NOTES- UNLESS OTHERWISE SPECIFIED:

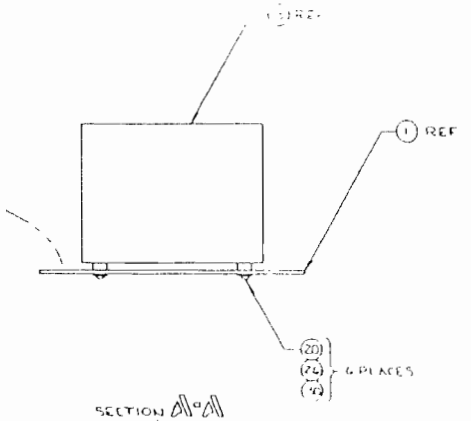
1. MARK WITH ASSEMBLY NUMBER AND REV LEVEL TO WHICH MANUFACTURED USING DYNO LABEL APPROX WHERE SHOWN.
2. IMPORTANT- DO NOT BUNDLE OR ROUTE ANY AC WIRES OR CABLES WITH ANY DC WIRE OR CABLES.
3. MARK, ITEM 10, DWG NO. & CURRENT REV LEVEL " WIRED PER 502438 REV APPROX WHERE SHOWN.

SEE SEPARATE LM

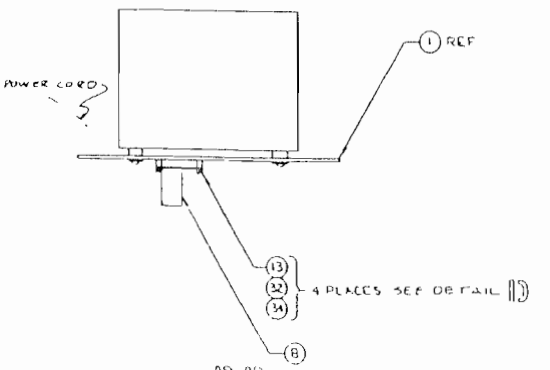
QTY PER ASSY	PART NO.	ITEM DESCRIPTION	REF DES
LIST OF MATERIALS			

TOLERANCES	DO NOT SCALE DRAWING	RAMTEK	
	SIGNATURES / DATE	REAR PANEL ASSY 9300	
MATL —	DWN	SIZE D	DWG NO 502421
FINISH —	CHK	SCALE 1:1	REV 8
502419	ENG	SHT 1 OF 1	
NEXT ASSY	APVD		

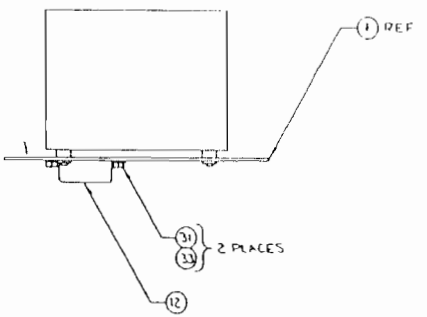
REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		



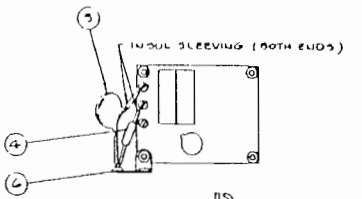
SECTION A-A
SCALE: 1/2
ROTATED 90° CW



SECTION B-B
SCALE 1/2
ROTATED 90° CW



SECTION C-C
SCALE: 1/2
ROTATED 90° CW



DETAIL D
TOP VIEW PWR CONT BD

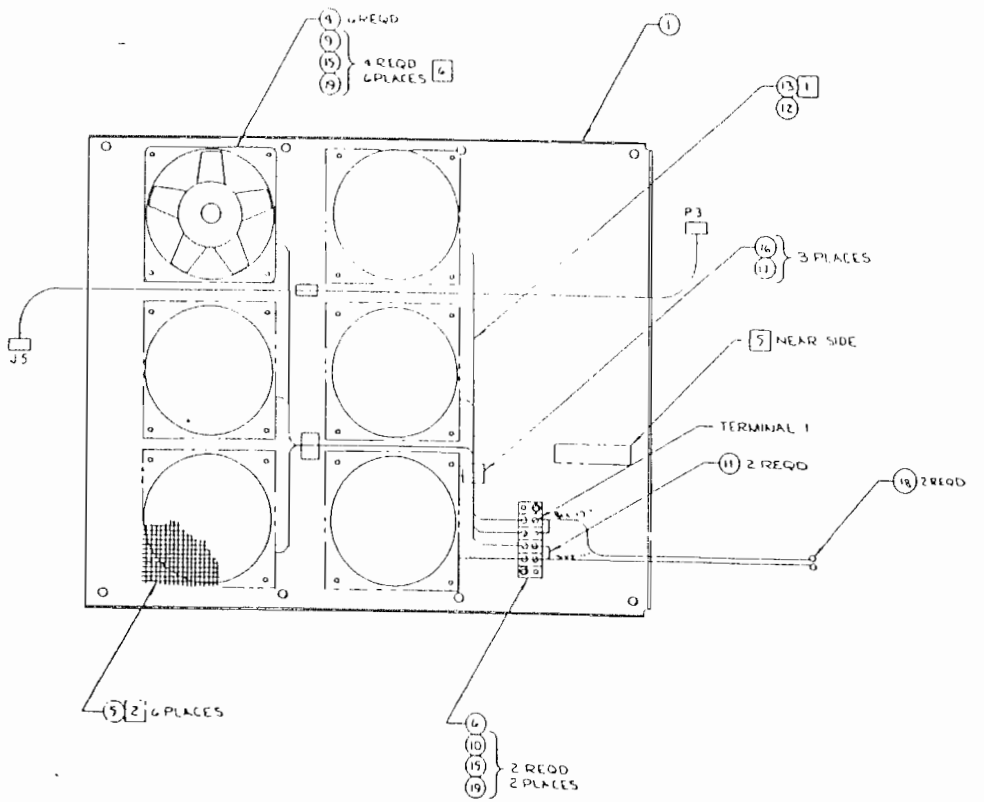
QTY PROD	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

	TOLERANCES	DO NOT SCALE DRAWING	AAMTEK		
		SIGNATURES	DATE		
		DWN		REAR PANEL ASSY	
		CHK		9300	
502419	MATL	ENG			
NEXT ASSY	FINISH	APVD		SIZE B SCALE 1/1 SHT 1 OF 1	DWG NO 502421 REV B

NEXT ASSY 502419

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	RELEASE PER ECO 307049		
B	REV PER ECO 307099		



NOTES: UNLESS OTHERWISE SPECIFIED:

1. TWISTED PAIR FOR EACH FAN. TERMINATE AT TERMINAL BLOCK USING ITEM 14.
2. LOCATE BETWEEN FAN HOUSING AND FAN.
3. USE THREE REMAINING TIE WRAPS TO BUNDLE WIRES. LOCATION OPTIONAL.
4. REF WIRING DIAGRAM 502438.
5. MARK WITH ASSEMBLY NUMBER AND REV LEVEL TO WHICH MANUFACTURED USING DYMO LABEL APPROX WHERE SHOWN.
6. AIR FLOW IN.

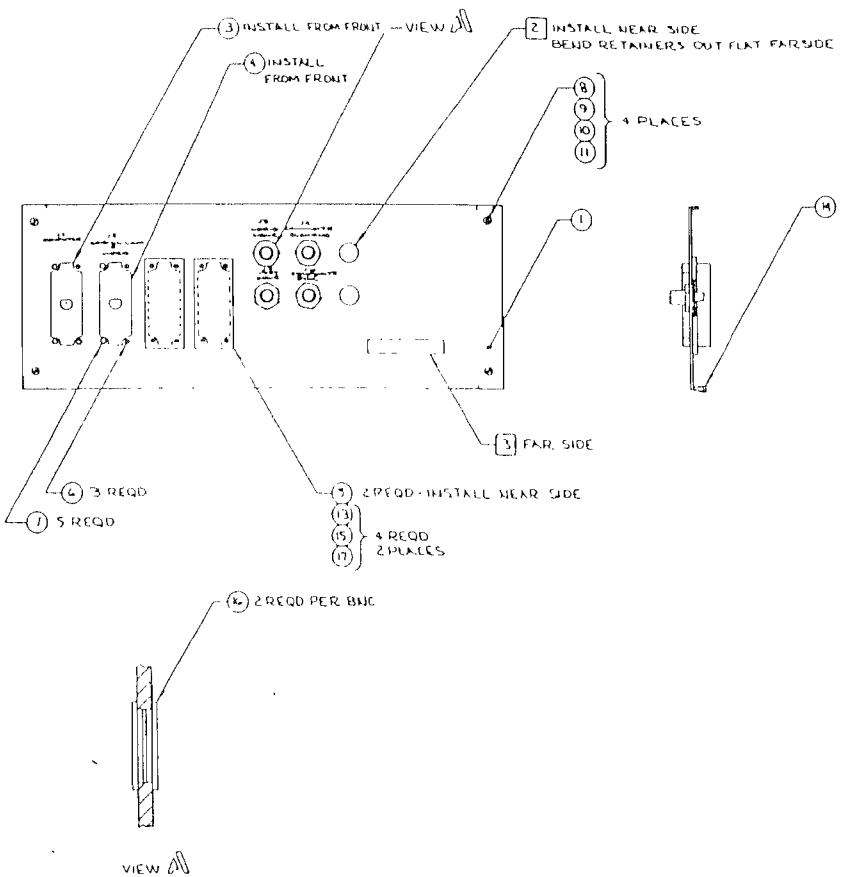
SEE SEPARATE LM

QTY PER	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
MATL	DWN		FAN HOUSING ASSEMBLY 9300
FINISH	CHK		
502419	ENG		
NEXT ASSY	APVD		SIZE D SCALE 1/2 SHT 1 OF 1 DWG NO 502651 REV B

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	RELEASE PER ECO [illegible]	[illegible]	[illegible]



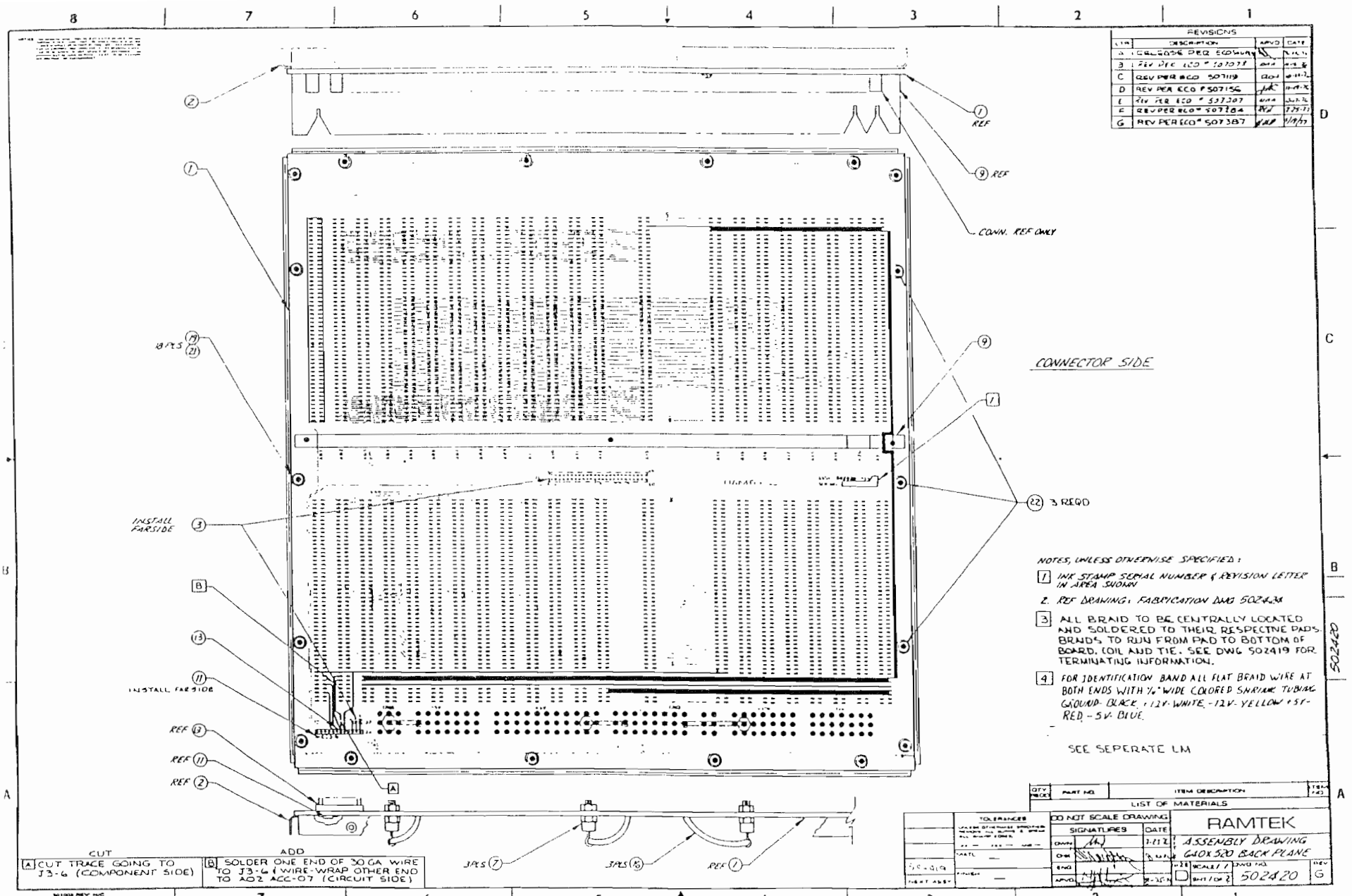
NOTES - UNLESS OTHERWISE SPECIFIED:
1. ALL BNC CONNECTORS INSTALL FROM BACK OF PANEL.
2. PLUG ALL UNUSED BNC HOLES WITH ITEM 12.
3. MARK WITH ASSEMBLY NUMBER AND REV LEVEL TO WHICH MANUFACTURED USING DYMO LABEL APPROX WHERE SHOWN.

SEE SEPARATE LM

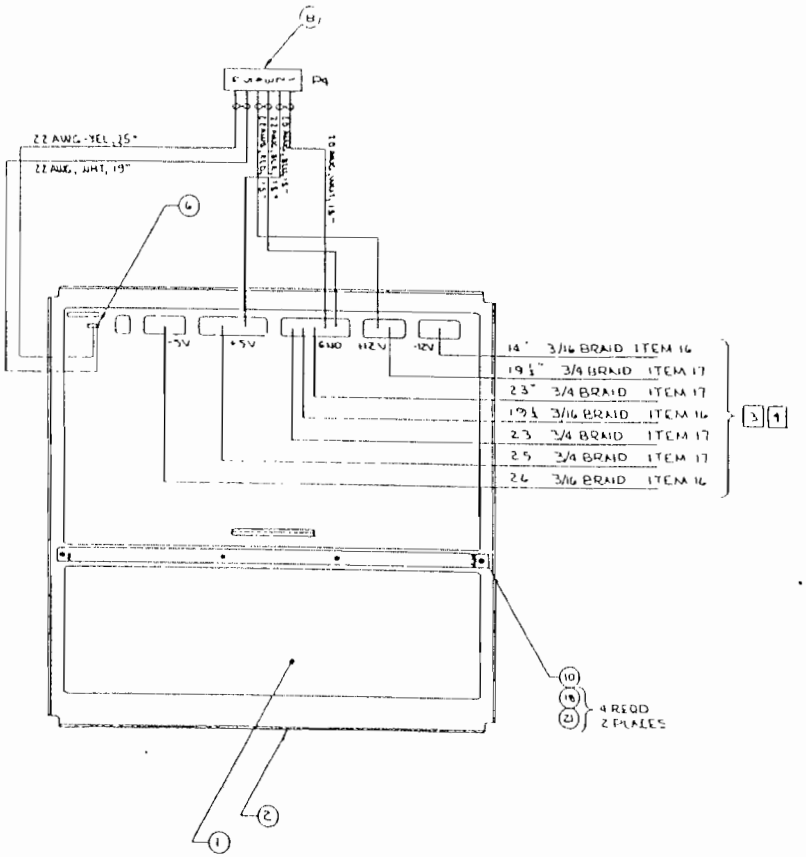
QTY PER	PART NO.	ITEM DESCRIPTION	ITEM NO.

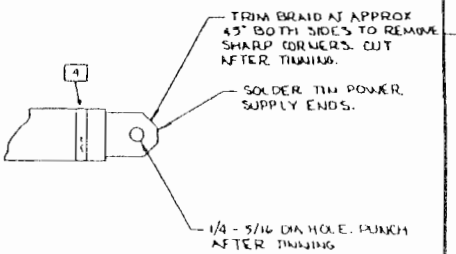
LIST OF MATERIALS

	TOLERANCES	DO NOT SCALE DRAWING	RAMTEK
		SIGNATURES / DATE	CONNECTOR PLATE ASSY
	MATL —	DWN	9300
502419	FINISH —	CHK	SIZE B — SCALE 1/1 — DWG NO. 502423 — REV A
NEXT ASSY		ENG	SHT 1 OF 1
		APVD	


REVISIONS
LTR | DESCRIPTION | APVD | DATE
A | CHG PER ECO 507056 | | 7-11-77
B | REV PER ECO # 507075 | | 7-29-77
C | REV PER ECO 507119 | | 8-11-77
D | REV PER ECO # 507156 | | 11-9-77
E | REV PER ECO # 507207 | | 12-5-77
F | REV PER ECO # 507304 | | 1-19-77
G | REV PER ECO # 507387 | | 4/19/77
CONNECTOR SIDE
CONN. REF ONLY
INSTALL FARSIDE
INSTALL FARSIDE
REF
REF
REF
3 REQD
8 PLS
3 PLS
3 PLS
NOTES, UNLESS OTHERWISE SPECIFIED:
1. INK STAMP SERIAL NUMBER & REVISION LETTER IN AREA SHOWN
2. REF DRAWING: FABRICATION DWG 502420
3. ALL BRAID TO BE CENTRALLY LOCATED AND SOLDERED TO THEIR RESPECTIVE PADS. BRAIDS TO RUN FROM PAD TO BOTTOM OF BOARD, COIL AND TIE. SEE DWG 502419 FOR TERMINATING INFORMATION.
4. FOR IDENTIFICATION BAND ALL FLAT BRAID WIRE AT BOTH ENDS WITH ¼" WIDE COLORED SHRINK TUBING. GROUND- BLACK, +12V- WHITE, -12V- YELLOW, +5V- RED, -5V- BLUE.
SEE SEPERATE LM
LIST OF MATERIALS
QTY REQD | PART NO. | ITEM DESCRIPTION | ITEM NO.
CUT
A CUT TRACE GOING TO J3-6 (COMPONENT SIDE)
ADD
B SOLDER ONE END OF 30 GA WIRE TO J3-6 & WIRE-WRAP OTHER END TO A02 ACC-07 (CIRCUIT SIDE)
TOLERANCES
DO NOT SCALE DRAWING
SIGNATURES
DATE
DWN
CHK
ENG
APVD
RAMTEK
ASSEMBLY DRAWING
G400 X 320 BACK PLANE
SIZE B
SCALE 1/1
SHT 1 OF 2
DWG NO. 502420
REV G
502420

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		





TYP VIEW ALL 3/4" WIDE BRAID

QTY PER ASSY	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING	RAMTEK
	SIGNATURES / DATE	ASSEMBLY DRAWING 640 X 520 BACKPLANE
NEXT ASSY	DWN / CHK / ENG / APVD	SIZE D · SCALE · SHT 2 OF 2 · DWG NO. 502420 · REV 6

LTR	REVISIONS DESCRIPTION	APVD	DATE
A	RELEASE PER ECO 501005		

A01	INTERFACE BOARD	
A02	(MAY BE WIREWRAPPED)	[1]
A03		
A04	CONTROL BOARD 502450	
A05	MEMORY EXPANSION BOARD 502440	
A06	SERIAL LINK BOARD NO 1 502641	
A07	SERIAL LINK BOARD NO 2 502641	
A08		
A09	WIRE WRAP OPTION	[1]
A10	FUTURE PC OPTION	
A11	FUTURE PC OPTION	
A12	FUTURE PC OPTION	
A13	VIDEO BOARD NO 1	[1]
A14	VIDEO BOARD NO 2	[1]
A15	VIDEO BOARD NO. 3	[1]
A16	VIDEO BOARD NO 4	[1]
	MU-METAL SHIELD	
A17	MEMORY 502332	
A18	MEMORY 502332	
A19	MEMORY 502332	
A20	MEMORY 502332	
A21	MEMORY 502332	
A22	MEMORY 502332	
A23	MEMORY 502332	
A24	MEMORY 502332	

NOTES-UNLESS OTHERWISE SPECIFIED:

[1] PART NUMBER TO BE DETERMINED BY APPLICATION OF UNIT.

QTY PER	PART NO.	ITEM DESCRIPTION	ITEM NO.

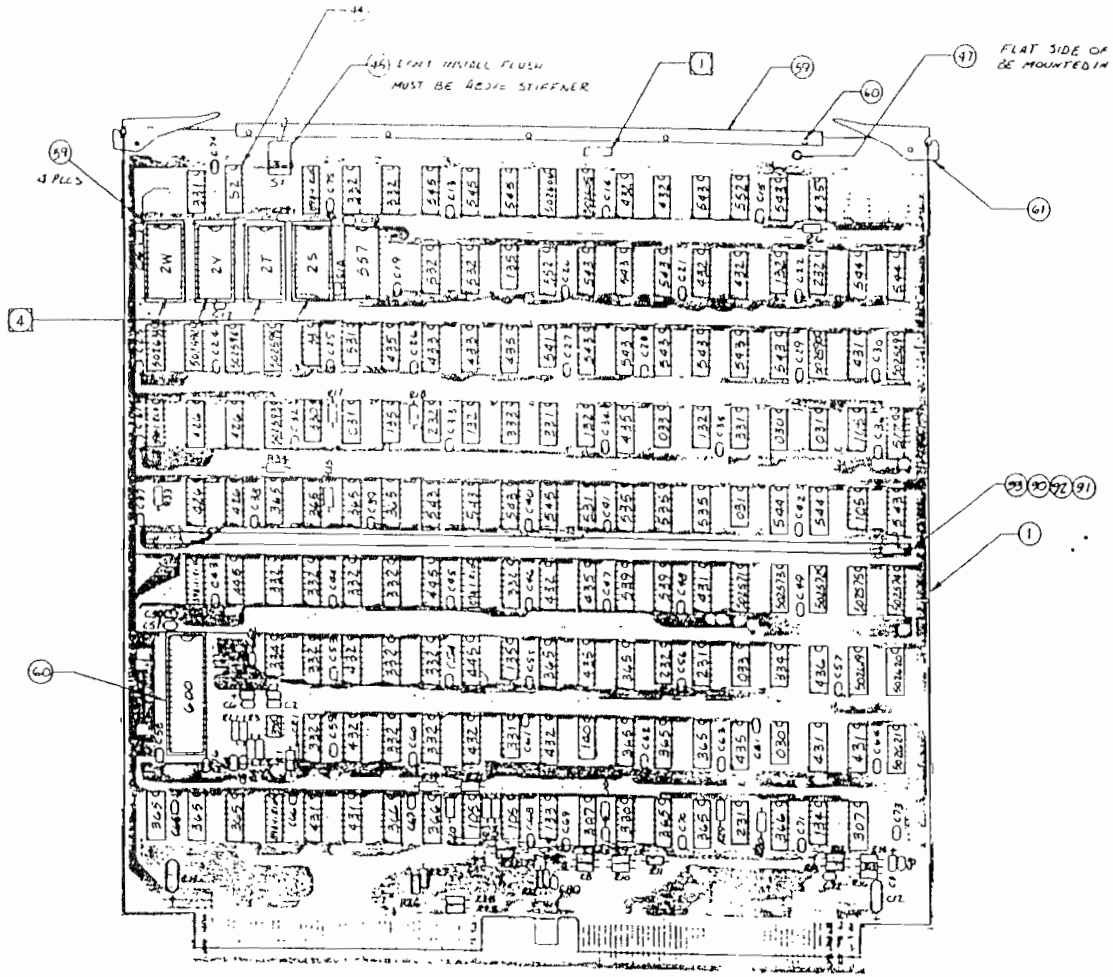
LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING	RAMTEK	
	SIGNATURES / DATE		
MATL	DWN	BOARD LOADING DIAGRAM	
502419	CHK	9300	
FINISH	ENG	SIZE D / SCALE NONE / DWG NO. 502803 / REV A	
HEAT ASSY	APVD	SHT 1 OF 1	

SYSTEM ASSEMBLIES

502450	2 sheets
502451	18 sheets
502446	3 sheets
502448	11 sheets
503045	4 sheets
503046	17 sheets
502332	1 sheet
502331	10 sheets
502335	3 sheets
502334	7 sheets
502346	1 sheet
502438	1 sheet

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	ECO ME 100 502451	CW	7-6-83
B	ECO# ME ECO 502461	CW	9-6-83
C	REVISED PER ECO 502461	CW	10-6-83
D	ECO# ME ECO 502470	SKC	10-6-83
E	REVISED ECO#502480	SKC	11-6-83
F	REV PER ECO# 502492	SKC	12-7-83
G	REV PER ECO# 502528	SKC	2-16-84
H	REV PER ECO # 502554	SKC	3-19-84
J	REV PER ECO #502560	SKC	4-16-84
K	REV PER ECO 502578	SKC	4-16-84
	DCN# 319	MPA	4-23-84
L	REV PER ECO# 502618	MPA	6-6-84
M	REV PER ECO# 502621	MPA	6-6-84



COMPONENT SIDE

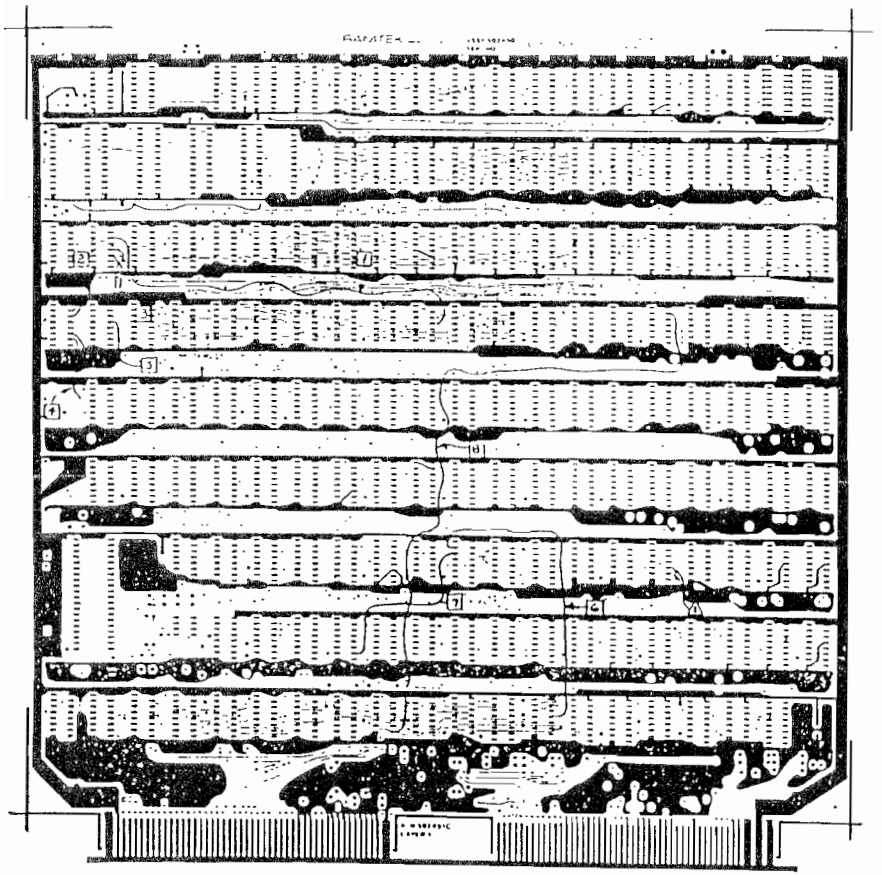
NOTES: UNLESS OTHERWISE SPECIFIED

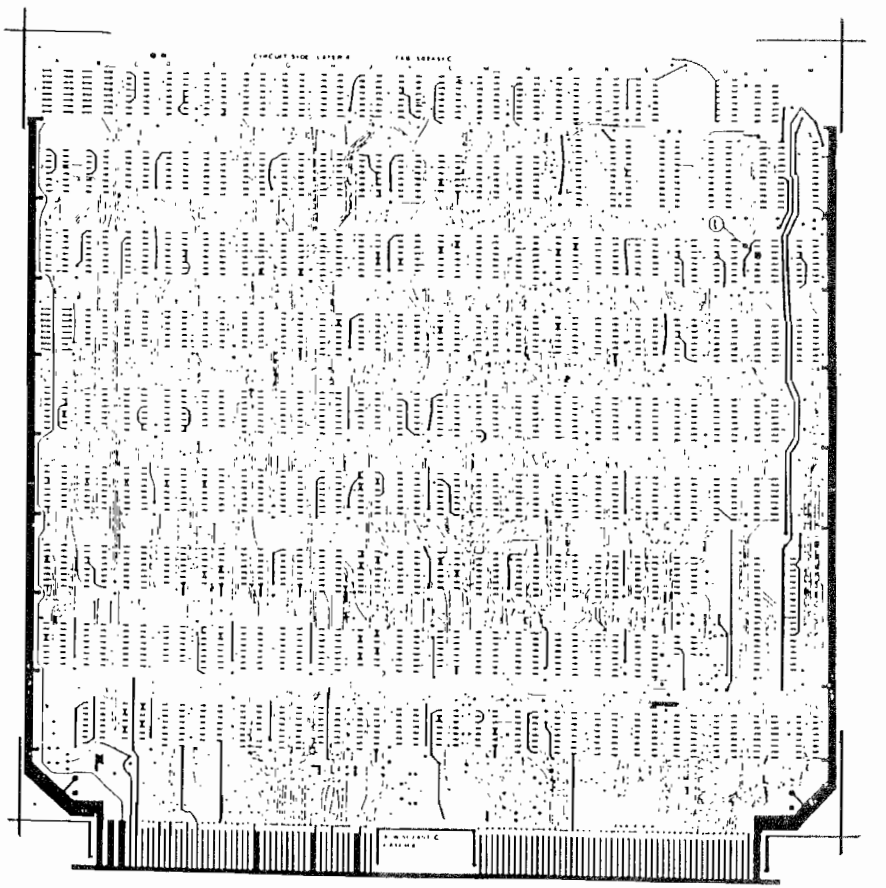
1. INK STAMP SERIAL NUMBER AND ASSY REVISION LEVEL IN AREA SHOWN.
2. REFERENCE DRAWINGS:
   LOGIC DIAGRAM - 502452
   FAB DRAWING 502451-C
3. LOGIC DEVICE TYPE NUMBERS ARE RAMTEK STANDARD PART NUMBERS 1301-XXX AND 502-XXX.
4. -01 SIZ x 8 PROMS ARE INSTALLED:
   2W - 502607
   2V - 502608
   2T - 502609
   2S - 502610
   -02 1K x 8 PROMS ARE INSTALLED:
   2W - 502611
   2V - 502612
   2T - BLANK
   2S - BLANK

QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		RAMTEK
	SIGNATURES	DATE	
	DWN		PCB ASSEMBLY
MATL	CHK		MULTI-RES CONTROL BD
502344	ENG		SCALE 1/1 DWG NO 502450 REV M
NEXT ASSY	APVD		SHT 1 OF 2





REV. G
1. MAKE A TRACE CUT TO DELETE THE FOLLOWING WIRE:
   (1) 3V-13 to 3V-14
2. ADD THE FOLLOWING WIRES:
   [1] 3V-14 to FEEDTHRU
   [2] 3V-12 to 4W-15
   [3] 3V-11 to 4W-14
   [4] 4W-10 to FEEDTHRU
   [5] 4W-11 to 4V-13

NOTE THAT THESE CHANGES APPLY TO ALL CURRENT ARTWORK A, B, & C

REV. H NO ADDS OR DELETES REQUIRED. JUST ADDS STIFFENER.

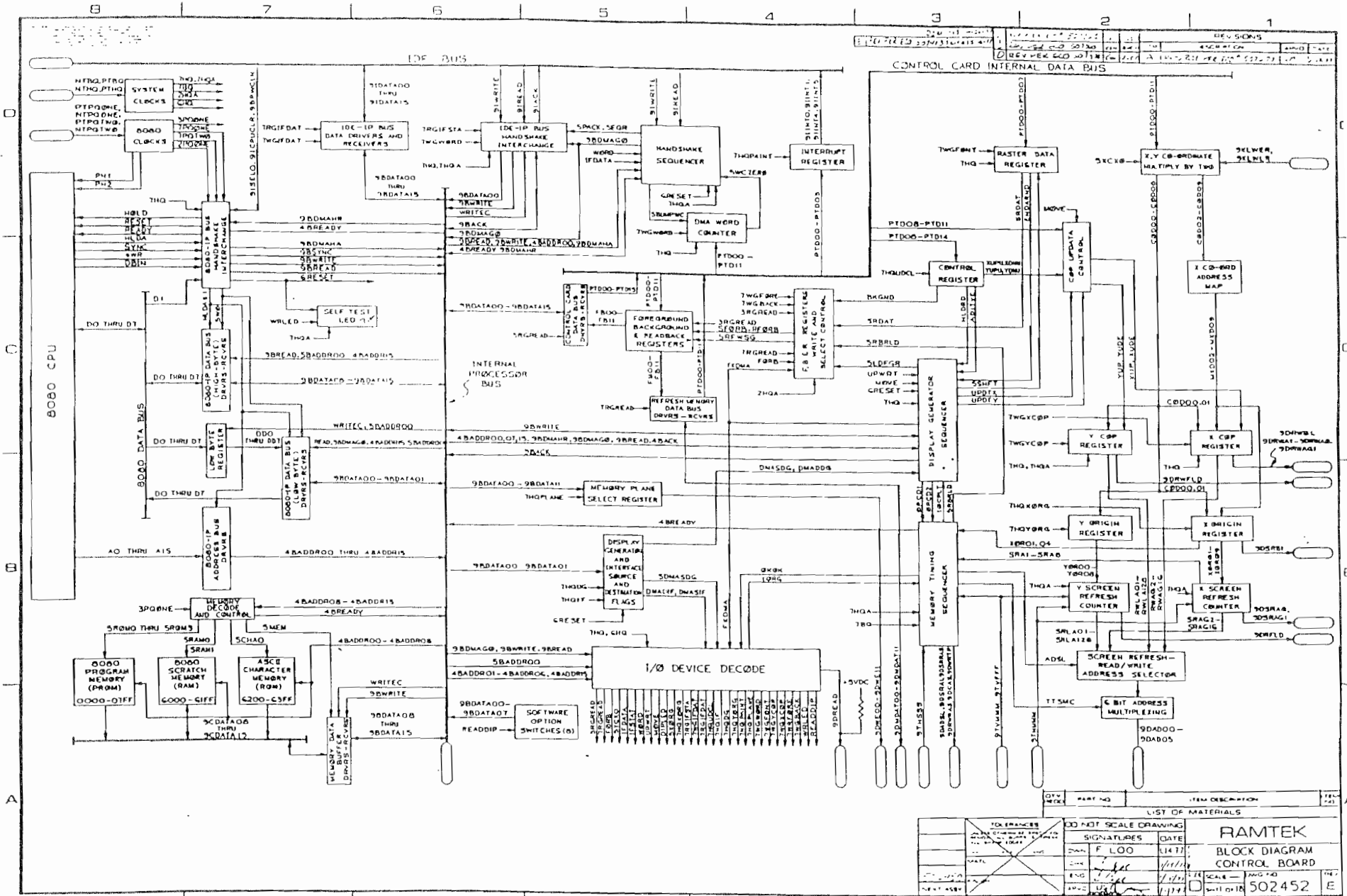
REV. J ~~ADD CAPACITOR (47 pf) AS SHOWN BY SOLDERING ONE LEAD OF THE CAP TO A 1 KOHM RESISTOR AT FEEDTHRU AS SHOWN, AND THE OTHER END TO THE GROUND PLANE.~~
(DELETED BY REV. "L")

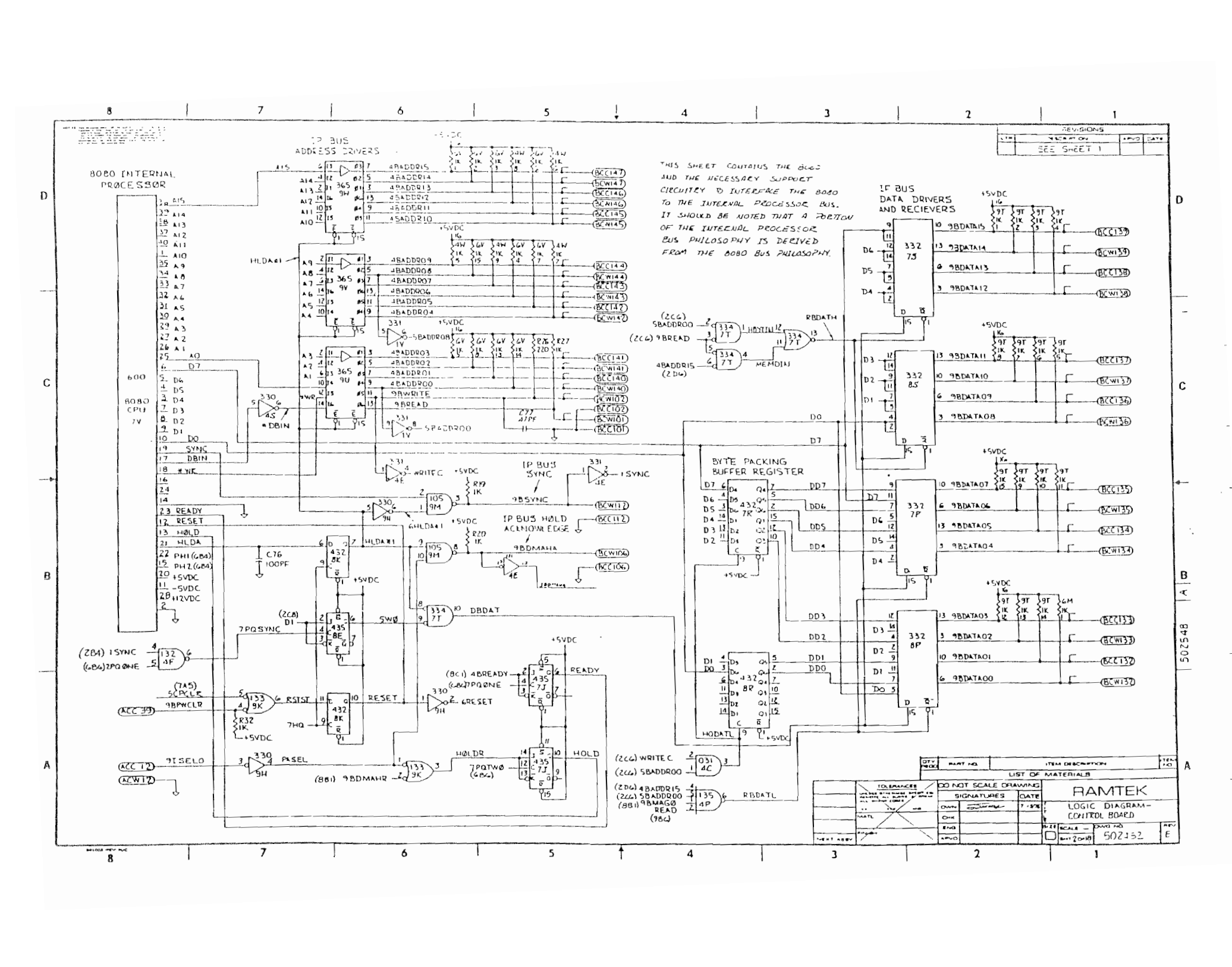
REV. K [6] ADD WIRE FROM 9H-11 to 7K-02.
[7] ADD WIRE FROM 7K-03 to 8H-10.

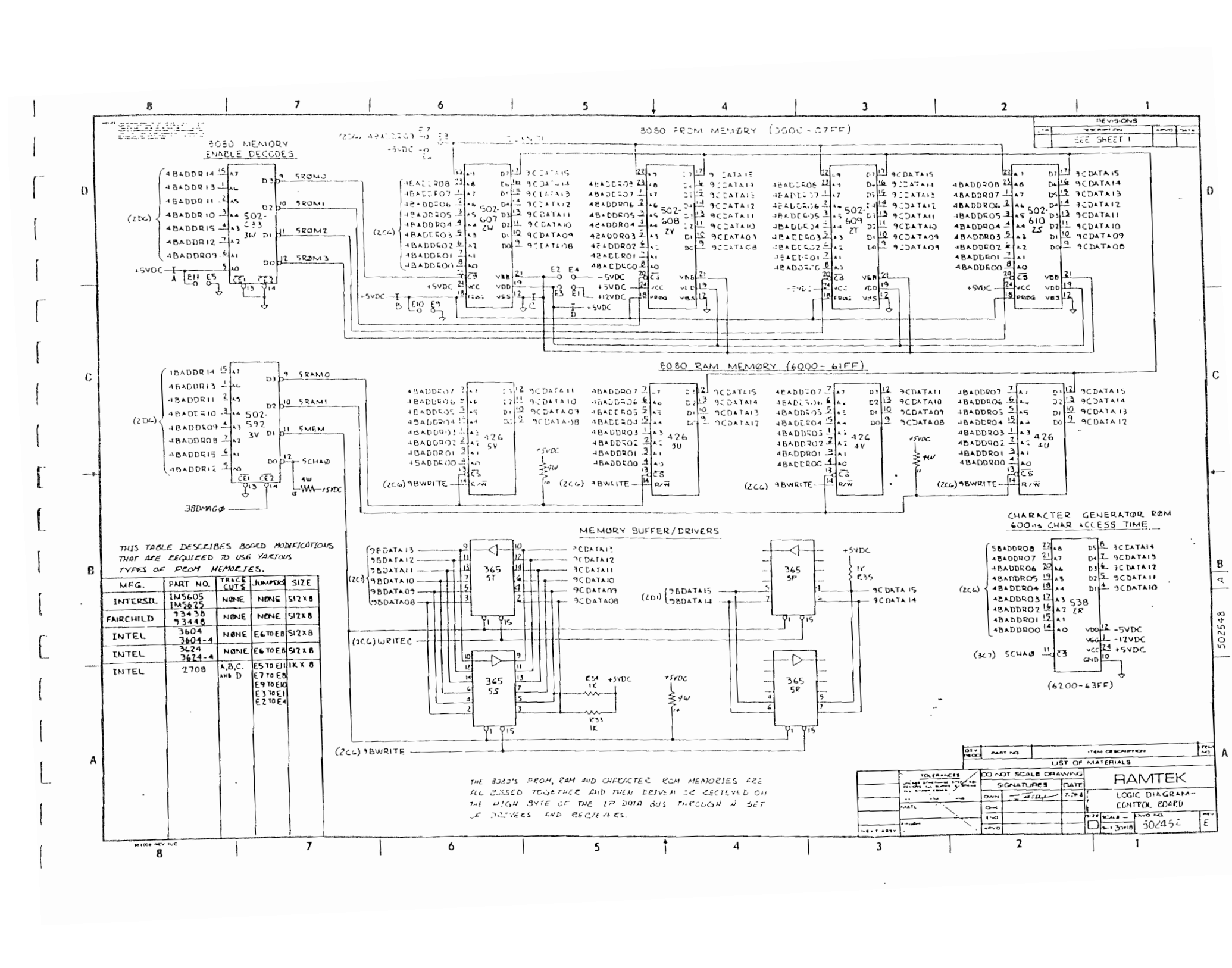
REV. L ⚠1 CUT I.C. PINS 7E-09 & 7E-10 FREE FROM THE PCB AND BEND UP. CONNECT BENT-UP PINS 7E-09 & 7E-10 TOGETHER WITH A WIRE. CONNECT BENT-UP PIN 7E-10 TO 4E-12.
[8] ADD WIRE 4E-13 TO 9M-08.
⚠2 DELETE 47-pf CAPACITOR INSTALLED ON REV. "J".

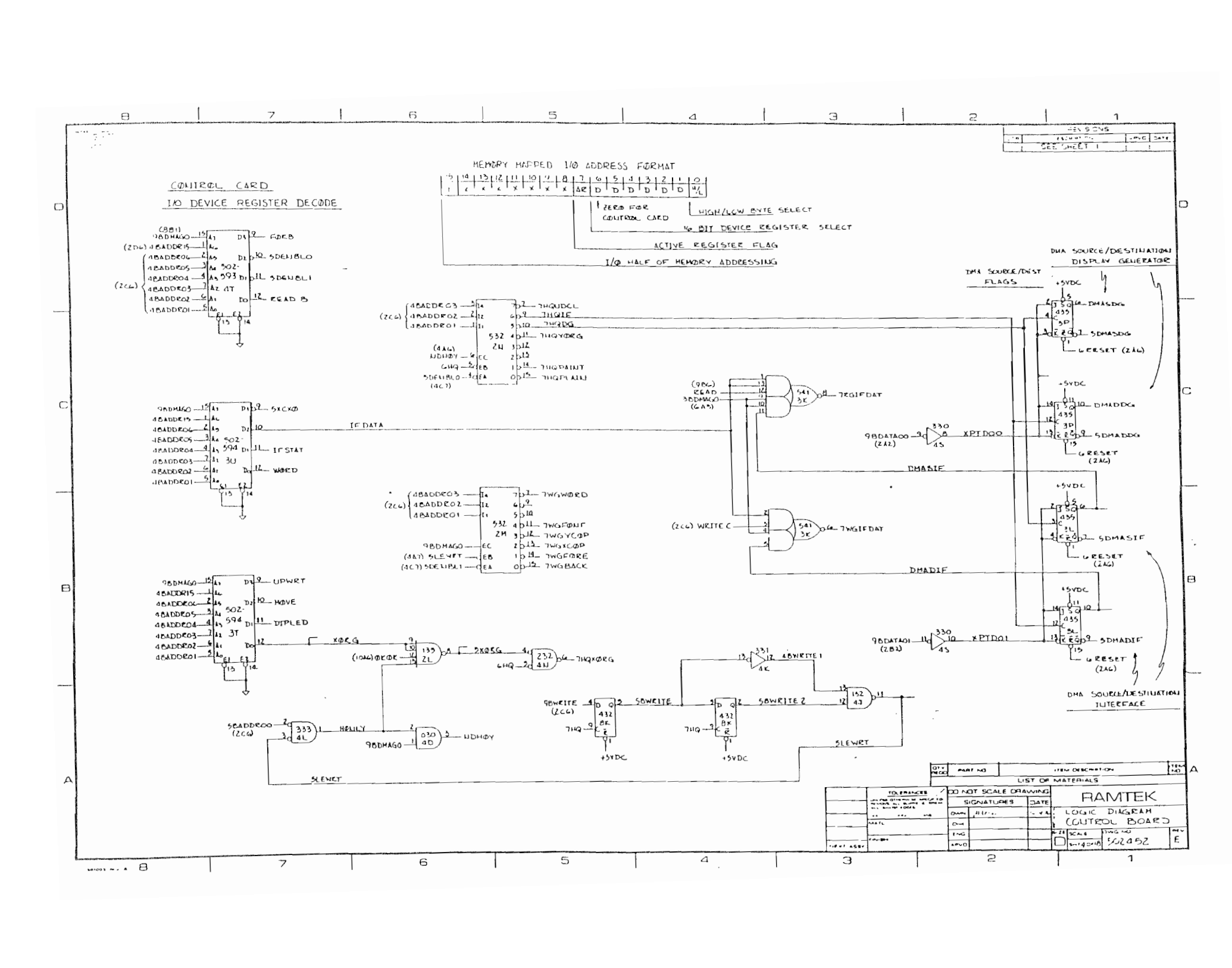
ALL JUMPERS SUPERCEDED BY REV. "E" ARTWORK--5/23/77

DO NOT SCALE DRAWING			RAMTEK
SIGNATURES		DATE	PCB ASSEMBLY
DWN	J. CUPP	10/11/77	MULTI-PES CONTROL BD
CHK			
ENG		SIZE D	SCALE 1/1
APVD		NEXT ASSY	SIZE 502450 REV M


8080 CPU
8080 DATA BUS
8080 CLOCKS
SYSTEM CLOCKS
8080-IP BUS HANDSHAKE INTERCHANGE
IOE-IP BUS DATA DRIVERS AND RECEIVERS
IOE-IP BUS HANDSHAKE INTERCHANGE
HANDSHAKE SEQUENCER
INTERRUPT REGISTER
DMA WORD COUNTER
SELF TEST LED
8080-IP DATA BUS (HIGH-BYTE) DRVRS-RCVRS
LOW BYTE REGISTER
8080-IP DATA BUS (LOW BYTE) DRVRS-RCVRS
8080-IP ADDRESS BUS DRIVERS
MEMORY DECODE AND CONTROL
8080 PROGRAM MEMORY (PROM)
0000-01FF
8080 SCRATCH MEMORY (RAM)
6000-61FF
ASCII CHARACTER MEMORY (ROM)
6200-63FF
MEMORY DATA BUFFER DRVRS-RCVRS
INTERNAL PROCESSOR BUS
FOREGROUND BACKGROUND & READBACK REGISTERS
FIBER REGISTERS WRITE AND SELECT CONTROL
REFRESH MEMORY DATA BUS DRVRS-RCVRS
MEMORY PLANE SELECT REGISTER
DISPLAY GENERATOR AND INTERFACE SOURCE AND DESTINATION FLAGS
I/Ø DEVICE DECØDE
SOFTWARE OPTION SWITCHES (8)
DISPLAY GENERATOR SEQUENCER
MEMORY TIMING SEQUENCER
CONTROL CARD INTERNAL DATA BUS
RASTER DATA REGISTER
X,Y CØ-ØRDINATE MATRIMLY BY TWØ
CONTROL REGISTER
CØP UPDATA CONTROL
X CØ-ØRD ADDRESS MAP
Y CØP REGISTER
X CØP REGISTER
Y ORIGIN REGISTER
X ORIGIN REGISTER
Y SCREEN REFRESH COUNTER
X SCREEN REFRESH COUNTER
SCREEN REFRESH-READ/WRITE ADDRESS SELECTØR
6 BIT ADDRESS MULTIPLEXING
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
BLOCK DIAGRAM CONTROL BOARD
502452

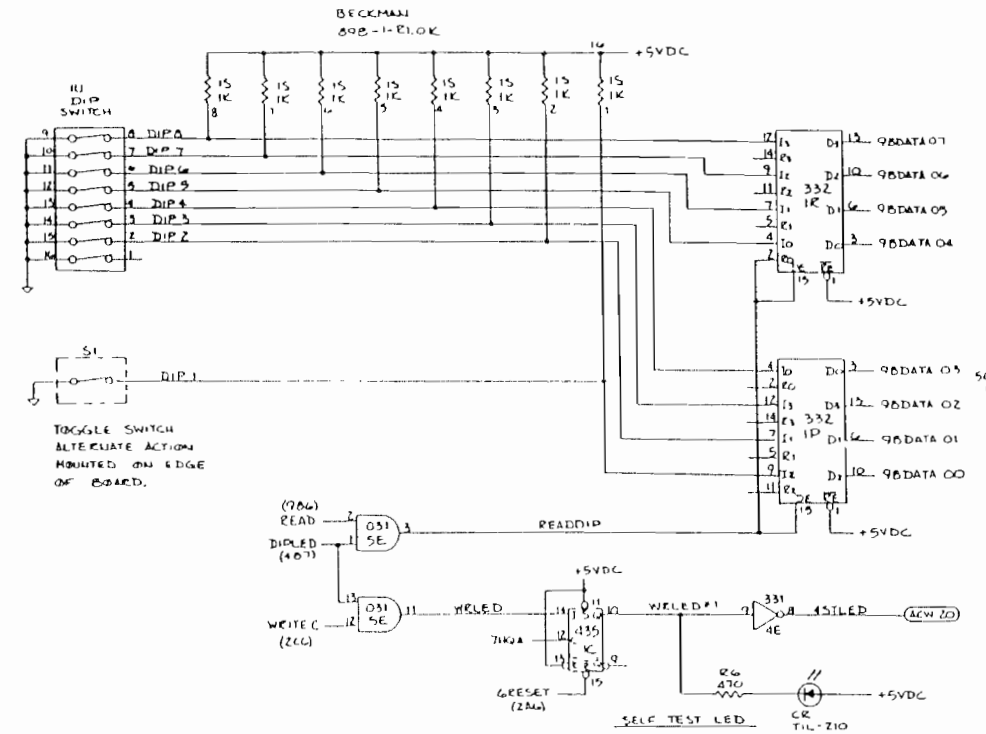

8080 INTERNAL PROCESSOR
IP BUS ADDRESS DRIVERS
IP BUS DATA DRIVERS AND RECIEVERS
THIS SHEET CONTAINS THE 8080 AND THE NECESSARY SUPPORT CIRCUITRY TO INTERFACE THE 8080 TO THE INTERNAL PROCESSOR BUS. IT SHOULD BE NOTED THAT A PORTION OF THE INTERNAL PROCESSOR BUS PHILOSOPHY IS DERIVED FROM THE 8080 BUS PHILOSOPHY.
BYTE PACKING BUFFER REGISTER
IP BUS SYNC
IP BUS HOLD ACKNOWLEDGE
REVISIONS
SEE SHEET 1
LIST OF MATERIALS
DO NOT SCALE DRAWING
RAMTEK
LOGIC DIAGRAM-CONTROL BOARD
502152

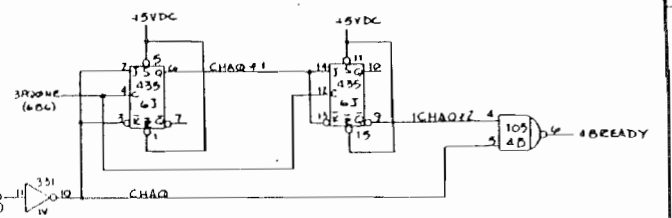

8080 MEMORY ENABLE DECODES
8080 PROM MEMORY (0000 - 07FF)
8080 RAM MEMORY (6000 - 61FF)
MEMORY BUFFER/DRIVERS
CHARACTER GENERATOR ROM 600ns CHAR ACCESS TIME
(6200-63FF)
THIS TABLE DESCRIBES BOARD MODIFICATIONS THAT ARE REQUIRED TO USE VARIOUS TYPES OF PROM MEMORIES.
MFG. | PART NO. | TRACE CUTS | JUMPERS | SIZE
INTERSIL | IM5605 IM5625 | NONE | NONE | 512X8
FAIRCHILD | 93438 93448 | NONE | NONE | 512X8
INTEL | 3604 3604-4 | NONE | E6 TO E8 | 512X8
INTEL | 3624 3624-4 | NONE | E6 TO E8 | 512X8
INTEL | 2708 | A,B,C, AND D | E5 TO E11 E7 TO E8 E9 TO E10 E3 TO E1 E2 TO E4 | 1K X 8
THE 8080'S PROM, RAM AND CHARACTER ROM MEMORIES ARE ALL BUSSED TOGETHER AND THEN DRIVEN OR RECEIVED ON THE HIGH BYTE OF THE 16 DATA BUS THROUGH 8 SET OF DRIVERS AND RECEIVERS.
REVISIONS
SEE SHEET 1
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
LOGIC DIAGRAM-CONTROL BOARD
502452
502548

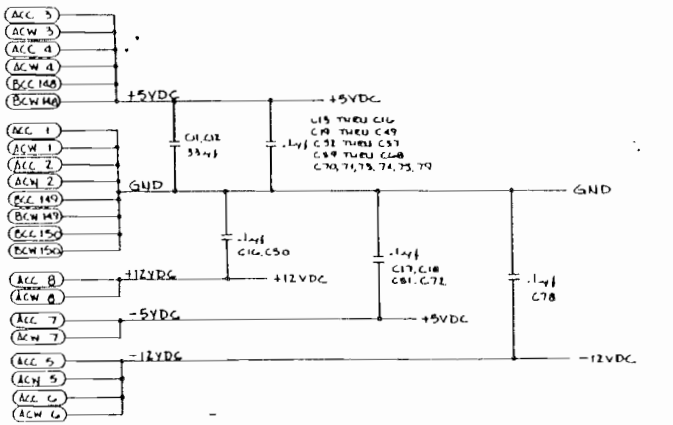

CONTROL CARD
I/O DEVICE REGISTER DECODE
MEMORY MAPPED I/O ADDRESS FORMAT
ZERO FOR CONTROL CARD
HIGH/LOW BYTE SELECT
16 BIT DEVICE REGISTER SELECT
ACTIVE REGISTER FLAG
I/O HALF OF MEMORY ADDRESSING
DMA SOURCE/DESTINATION DISPLAY GENERATOR
DMA SOURCE/DEST FLAGS
DMA SOURCE/DESTINATION INTERFACE
IF DATA
DMASIF
DMADIF
SLEWRT
SLEWCT
RAMTEK
LOGIC DIAGRAM
CONTROL BOARD
DO NOT SCALE DRAWING
LIST OF MATERIALS

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

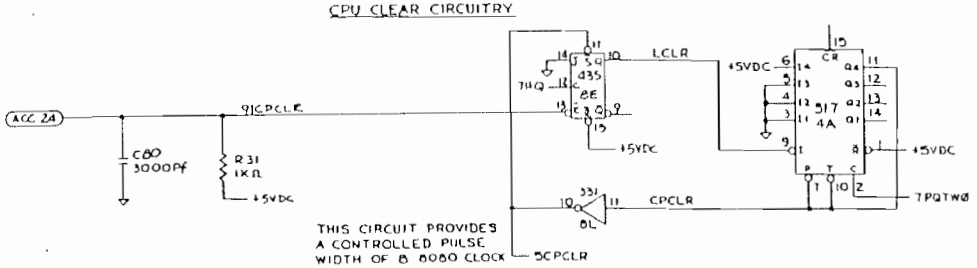
8080 CPU READS SWITCH SETTING
FOR CONFIGURATION CONTROL







CPU CLEAR CIRCUITRY



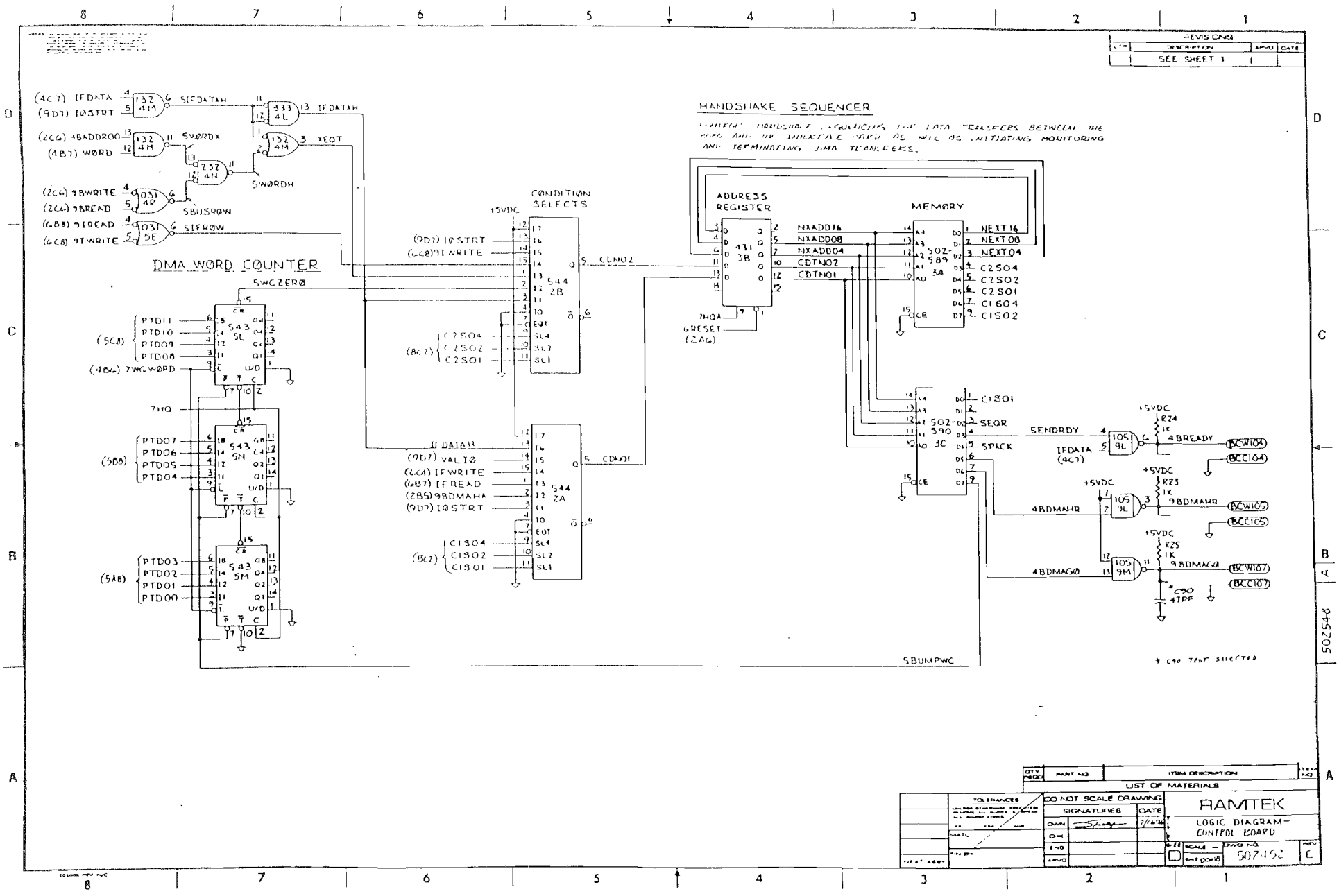
QTY PER UNIT	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

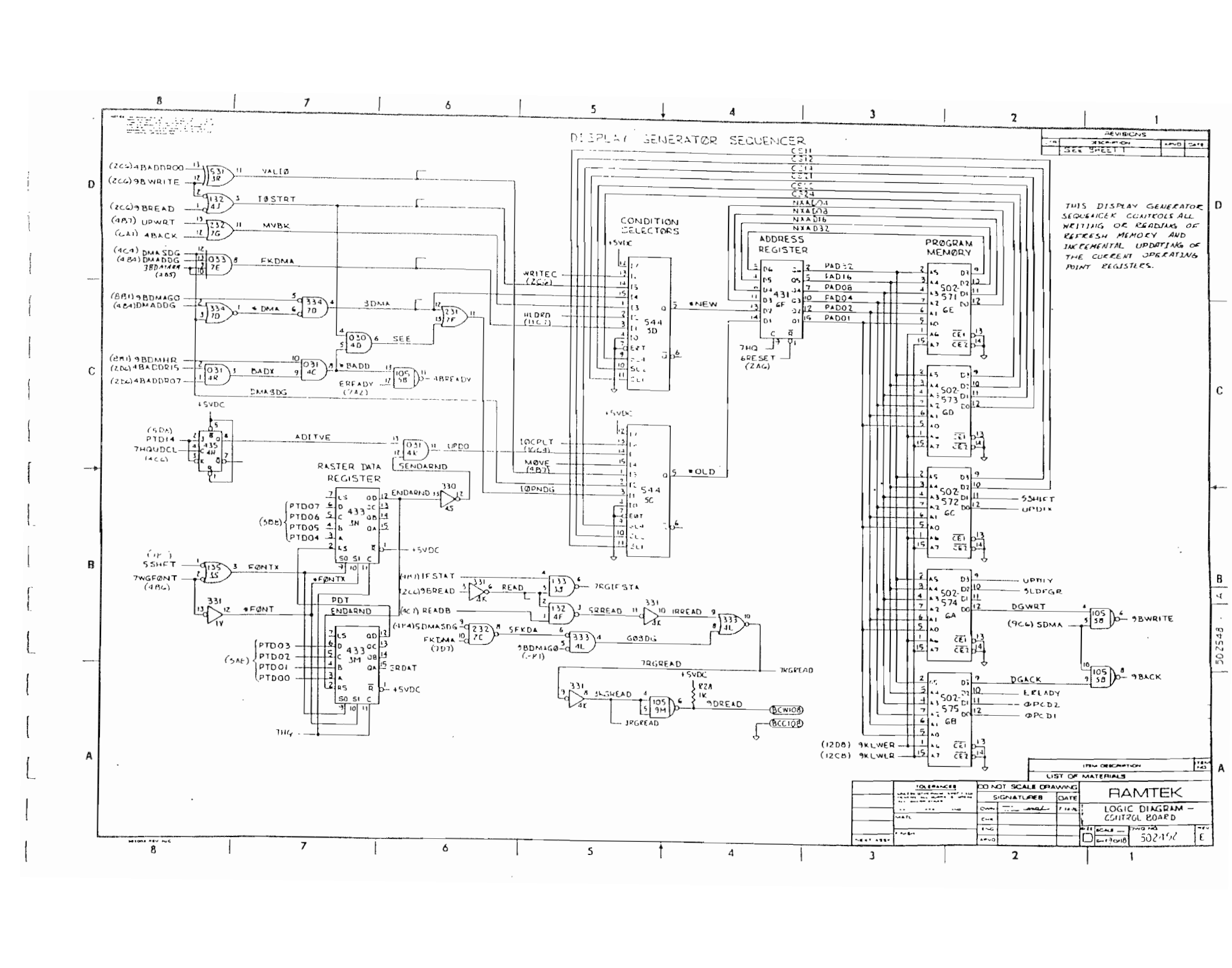
TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	UNIT A
	DWN		
	CHK		
	ENG		
	APVD		

RAMTEK

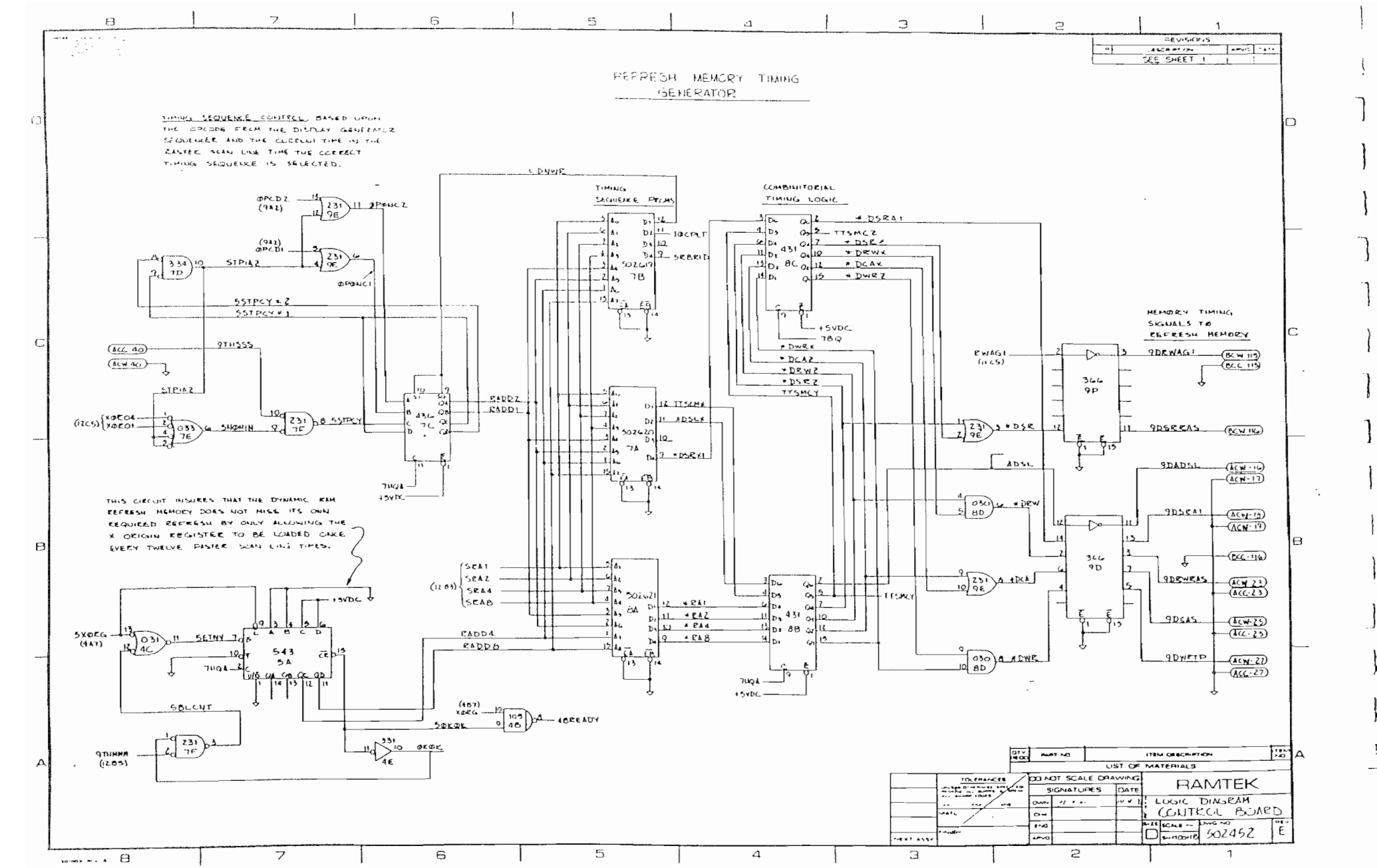
LOGIC DIAGRAM
CONTROL BOARD

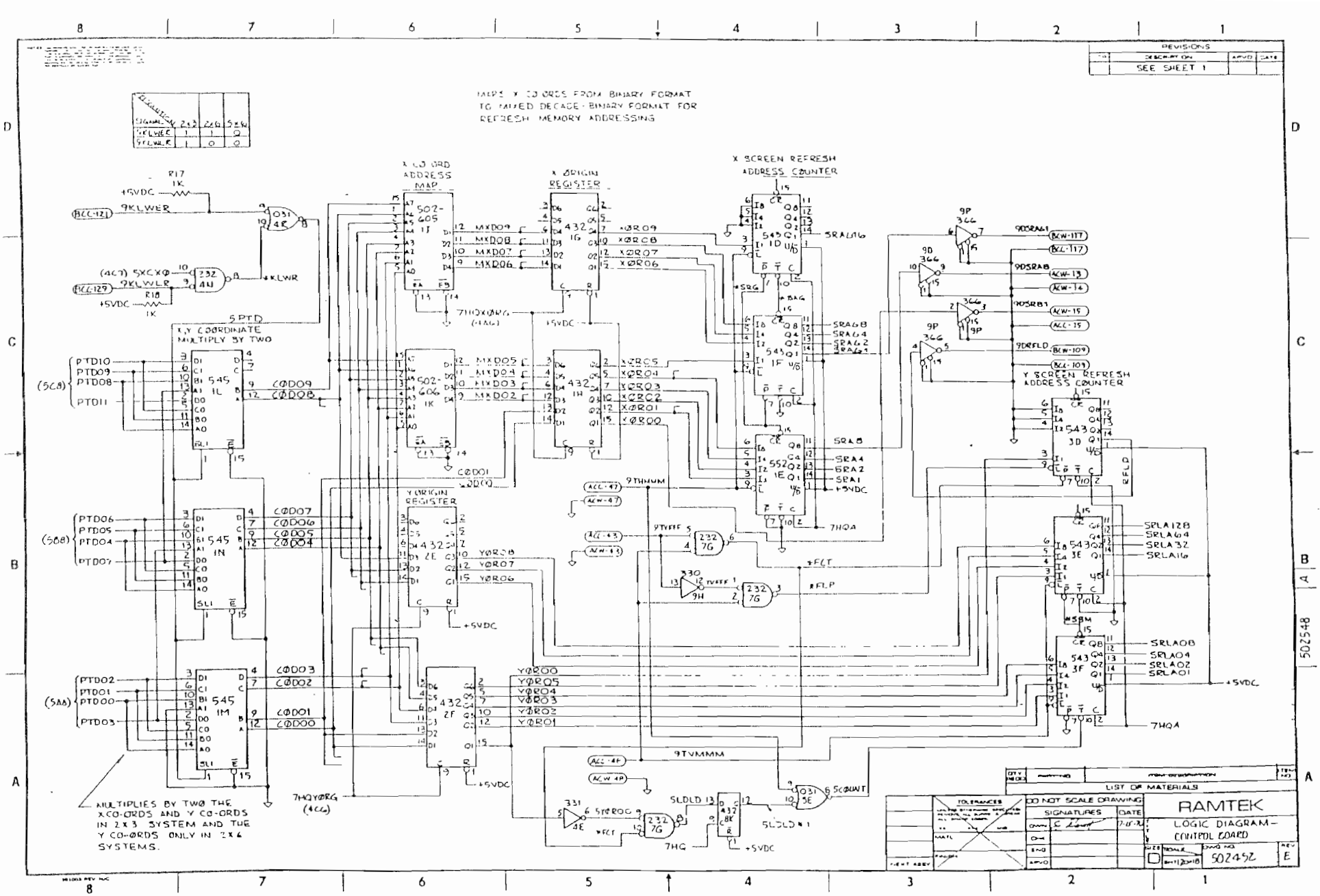
SIZE D | SCALE — | SHT 7 OF 18 | DWG NO 502452 | REV E


REVISIONS
SEE SHEET 1
HANDSHAKE SEQUENCER
DMA WORD COUNTER
CONDITION SELECTS
ADDRESS REGISTER
MEMORY
(4C7) IFDATA
(9D7) IØSTRT
SIFDATAH
IFDATAH
(2CG) 4BADDR00
(4B7) WORD
SWORDX
XEOT
SWØRDH
(2CG) 9BWRITE
(2CL) 9BREAD
SBUSRØW
(6B8) 9IREAD
(6C8) 9IWRITE
SIFRØW
+5VDC
(9D7) IØSTRT
(6C8)9IWRITE
S_CENØ2
(8C2) C2SØ4
C2SØ2
C2SØ1
(9D7) VALIØ
(6C4) IFWRITE
(6B7) IFREAD
(2B5)9BDMAHA
(9D7) IØSTRT
(8C2) C1SØ4
C1SØ2
C1SØ1
S_CDNØ1
7HØA
6RESET
(2A6)
NXADD16
NXADD08
NXADD04
CDTNØ2
CDTNØ1
NEXT16
NEXT08
NEXT04
C2SØ4
C2SØ2
C2SØ1
C1SØ4
C1SØ2
C1SØ1
SEQR
SPACK
SENDRDY
IFDATA (4C7)
4BREADY
9BDMAHR
9BDMAGR
(BCW104)
(BCC104)
(BCW105)
(BCC105)
(BCW107)
(BCC107)
RZ4 1K
RZ3 1K
RZ5 1K
C90 47PF
* C90 TEST SELECTED
(5C8) PTDI1 PTDI0 PTDØ9 PTDØ8 7WGWORD
(5B8) PTDØ7 PTDØ6 PTDØ5 PTDØ4
(5A8) PTDØ3 PTDØ2 PTDØ1 PTDØØ
7HØ
SWCZERØ
SBUMPWC
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
LOGIC DIAGRAM-
CONTROL BOARD
SCALE –
DWG NO 5071152
REV E
502548


DISPLAY GENERATOR SEQUENCER
REVISIONS
SEE SHEET 1
THIS DISPLAY GENERATOR SEQUENCER CONTROLS ALL WRITING OR READING OF REFRESH MEMORY AND INCREMENTAL UPDATING OF THE CURRENT OPERATING POINT REGISTERS.
CONDITION SELECTORS
ADDRESS REGISTER
PROGRAM MEMORY
RASTER DATA REGISTER
PDT
ENDARND
VALIØ
IØSTRT
MVBK
FKDMA
3DMA
SEE
BADD
ERDAT
ADITVE
UPDO
SENDARND
IØCPLT
MØVE
IØPNDG
*NEW
*OLD
SSHIFT
UPDIX
UPDIY
SLDFGR
DGWRT
DGACK
EREADY
ØPCD2
ØPCD1
RAMTEK
LOGIC DIAGRAM — CONTROL BOARD
DO NOT SCALE DRAWING
LIST OF MATERIALS
502492

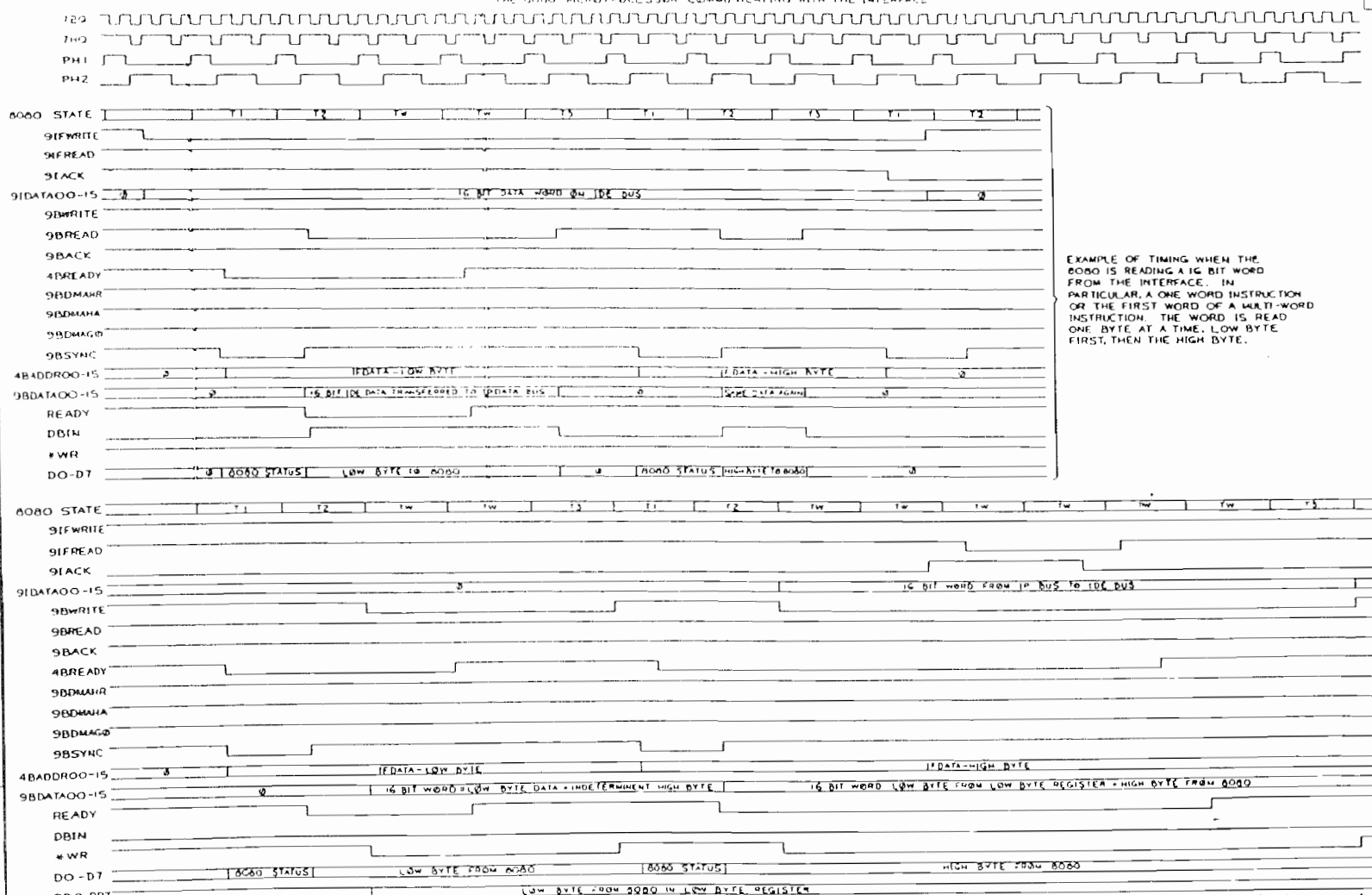
REFRESH MEMORY TIMING GENERATOR




MAPS X COORDS FROM BINARY FORMAT TO MIXED DECADE-BINARY FORMAT FOR REFRESH MEMORY ADDRESSING
REVISIONS
SEE SHEET 1
X COORD ADDRESS MAP
X ORIGIN REGISTER
X SCREEN REFRESH ADDRESS COUNTER
Y SCREEN REFRESH ADDRESS COUNTER
Y ORIGIN REGISTER
X,Y COORDINATE MULTIPLY BY TWO
MULTIPLIES BY TWO THE XCO-ORDS AND Y CO-ORDS IN 2X3 SYSTEM AND THE Y CO-ORDS ONLY IN 2X6 SYSTEMS.
LIST OF MATERIALS
DO NOT SCALE DRAWING
RAMTEK
LOGIC DIAGRAM-
CONTROL BOARD
502492
502548

HANDSHAKE TIMING

THE 8080 MICROPROCESSOR COMMUNICATING WITH THE INTERFACE



EXAMPLE OF TIMING WHEN THE 8080 IS READING A 16 BIT WORD FROM THE INTERFACE. IN PARTICULAR, A ONE WORD INSTRUCTION OR THE FIRST WORD OF A MULTI-WORD INSTRUCTION. THE WORD IS READ ONE BYTE AT A TIME, LOW BYTE FIRST, THEN THE HIGH BYTE.

EXAMPLE OF TIMING WHEN THE 8080 IS WRITING A 16 BIT WORD TO THE INTERFACE. IN PARTICULAR, A DATA WORD TRANSFER REQUIRED BY SOME PREVIOUSLY RECEIVED INSTRUCTION WORD. THE WORD IS WRITTEN ONE BYTE AT A TIME, LOW BYTE FIRST INTO A HOLDING REGISTER, THEN THE HIGH BYTE.

REVISIONS

LTR	DESCRIPTION	APP'D	DATE
1	SEE SHEET 1		

LIST OF MATERIALS

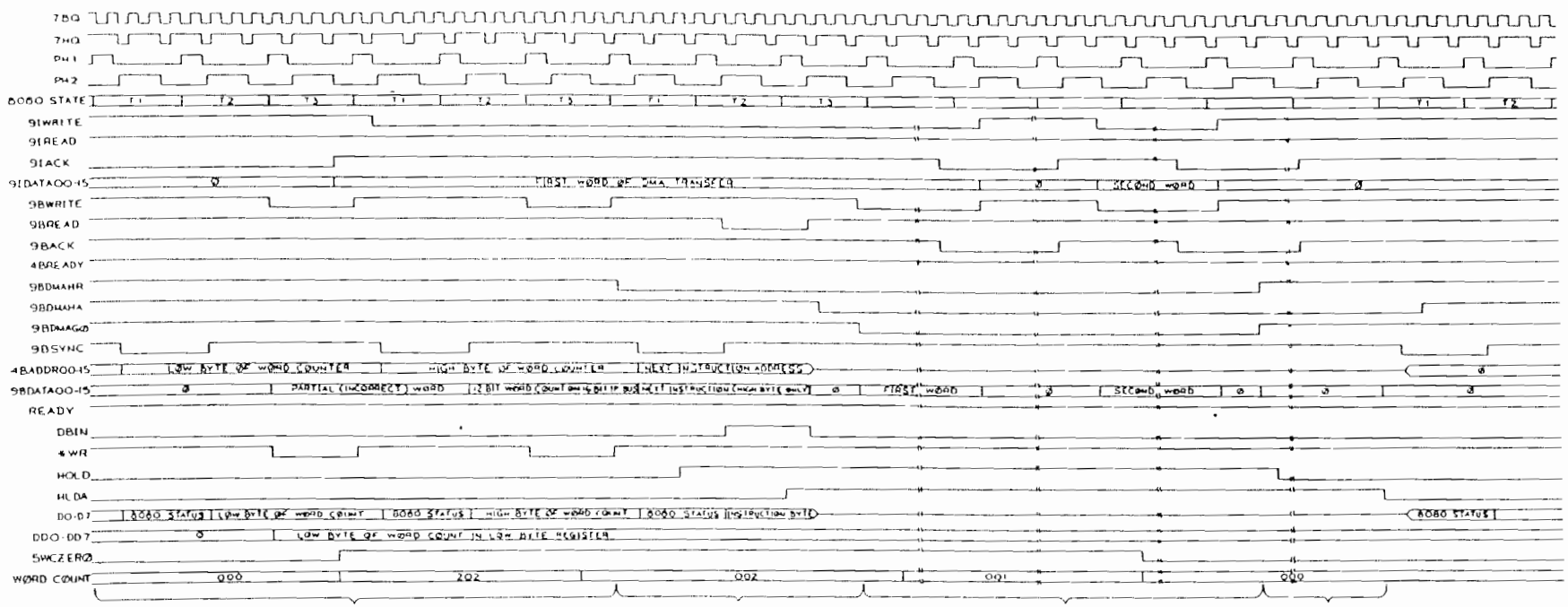
QTY PER	PART NO	DESCRIPTION	ITEM NO

TOLERANCES	DO NOT SCALE DRAWING		RAMTEK
	SIGNATURES	DATE	TIMING DIAGRAM CONTROL BOARD
	DRAWN F LOO	8/6	
	CHK'D		SIZE D 502452 REV E
	ENG		
	MFG		

NEXT ASSY | USED ON | APPLICATION | SHEET 2 OF 2

HANDSHAKE TIMING

TWO WORD DMA TRANSFER WITH THE INTERFACE AS THE SOURCE



THE DMA WORD COUNTER IS LOADED BY THE 8080

THE HANDSHAKE SEQUENCER REQUESTS THE 8080 TO ENTER THE HOLD STATE, WAITS UNTIL THE 8080 ACKNOWLEDGES THE HOLD REQUEST AND THEN INITIATES THE DMA TRANSFER

THE DMA TRANSFER OCCURS

THE HANDSHAKE SEQUENCER DETECTS THE END OF THE DMA TRANSFER AND THEN RELEASES THE HOLD REQUEST TO THE 8080.

LIST OF MATERIALS

NOT SCALE DRAWING

SIGNATURES	DATE
F LOO	12 7 [illegible]

RAMTEK

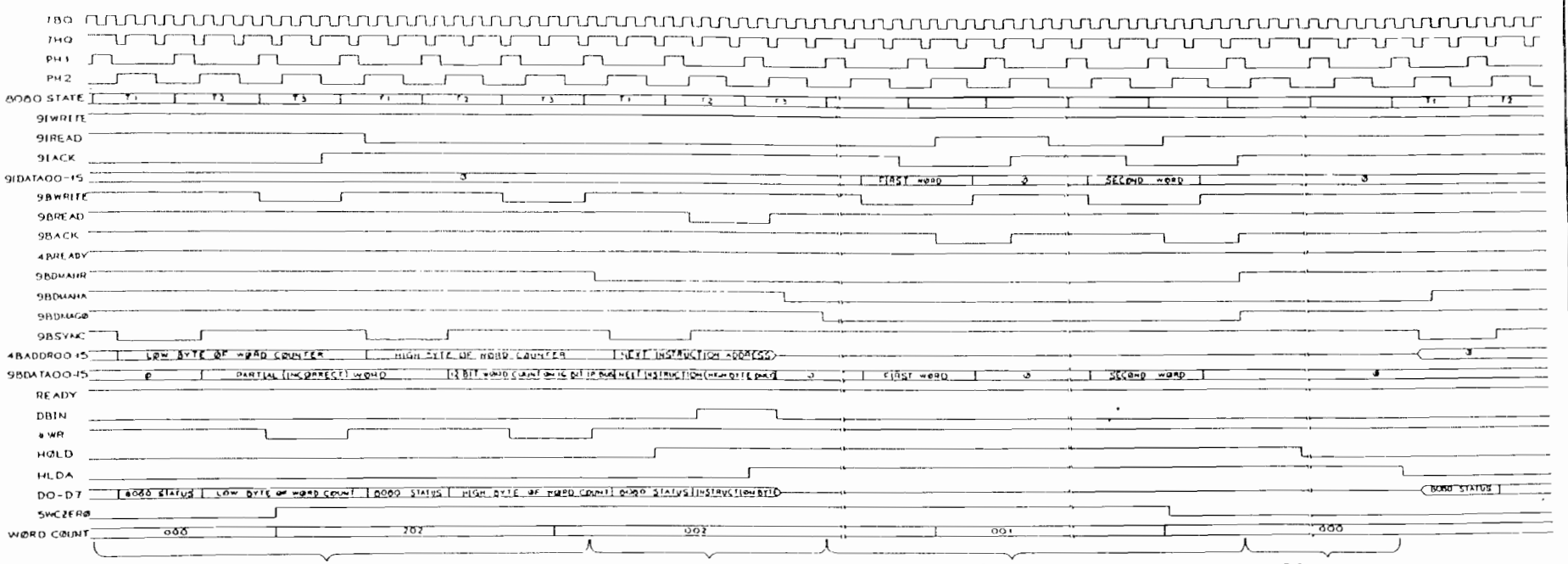
TIMING DIAGRAM
CONTROL BOARD

D 502452 E

SEE SHEET 1

HANDSHAKE TIMING

TWO WORD DMA TRANSFER WITH THE INTERFACE AS THE DESTINATION



THE DMA WORD COUNTER IS LOADED BY THE 8080.

THE HANDSHAKE SEQUENCER REQUESTS THE 8080 TO ENTER THE HOLD STATE, WAITS UNTIL THE 8080 ACKNOWLEDGES THE HOLD REQUEST AND THEN INITIATES THE DMA TRANSFER

THE DMA TRANSFER OCCURS.

THE HANDSHAKE SEQUENCER DETECTS THE END OF THE DMA TRANSFER AND THEN RELEASES THE HOLD REQUEST TO THE 8080.

LIST OF MATERIALS

DO NOT SCALE DRAWING

SIGNATURES

F LOO 12-6-74

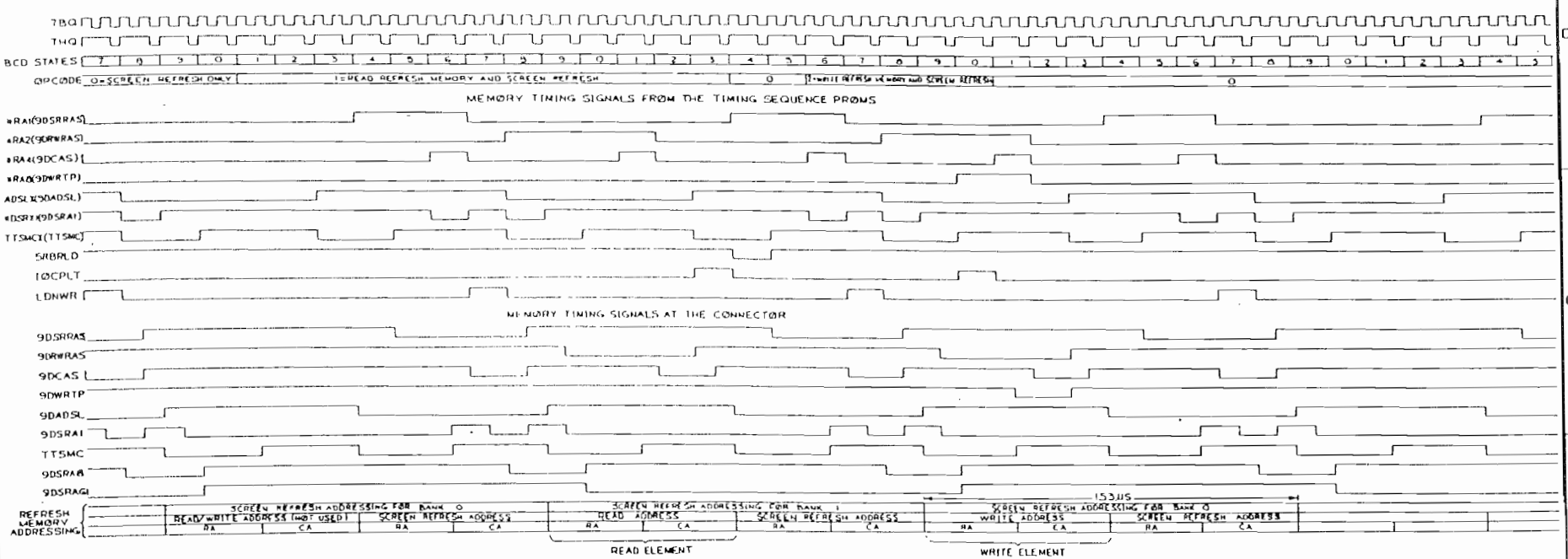
RAMTEK

TIMING DIAGRAM
CONTROL BOARD

502432

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

REFRESH MEMORY TIMING GENERATOR



NOTES:

1. THE LINE LABLED BCD STATES IS A REPRESENTATION OF THE STATES OF THE BCD COUNTER PORTION (LOCATION 1E) OF THE X SCREEN REFRESH ADDRESS COUNTER.
2. THE LINE LABLED OPCODE IS A REPRESENTATION OF THE CYCLE REQUEST OPCODES FROM THE DISPLAY GENERATOR SEQUENCER. IN ACTUALLITY IT IS IMPOSSIBLE FOR A READ TO BE FOLLOWED BY A WRITE IN THE NEXT FEW CYCLES, OR VICE VERSA, BECAUSE THE CONTROL CARD CANNOT BE SWITCHED OVER THAT FAST. BUT FOR TIMING DIAGRAM PURPOSES ONE IS SHOWN FOLLOWING THE OTHER.
3. THE LINES LABLED REFRESH MEMORY ADDRESSING ARE A REPRESENTATION OF THE ADDRESSING THAT IS SUPPLIED BY THE CONTROL CARD TO THE MEMORY CARDS.

   RA = ROW ADDRESS

   CA = COLUMN ADDRESS

QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO

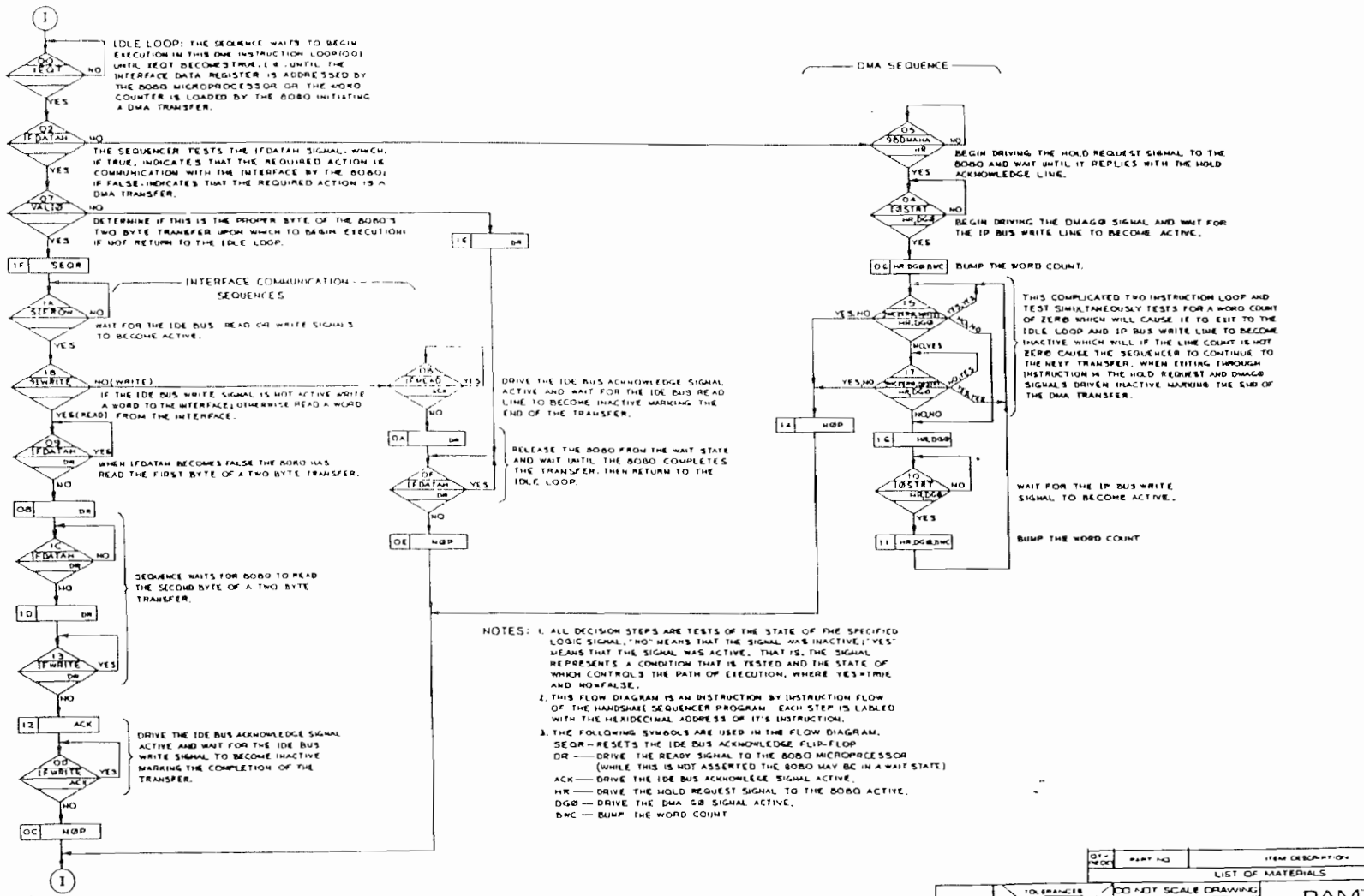
LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
	DWN F LOO	12/8/82	TIMING DIAGRAM
	CHK		CONTROL BOARD
	ENG		SIZE D — SCALE — DWG NO 502452 REV E
	APVD		

NEXT ASSY

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

HANDSHAKE SEQUENCER



NOTES:
1. ALL DECISION STEPS ARE TESTS OF THE STATE OF THE SPECIFIED LOGIC SIGNAL; "NO" MEANS THAT THE SIGNAL WAS INACTIVE; "YES" MEANS THAT THE SIGNAL WAS ACTIVE. THAT IS, THE SIGNAL REPRESENTS A CONDITION THAT IS TESTED AND THE STATE OF WHICH CONTROLS THE PATH OF EXECUTION, WHERE YES=TRUE AND NO=FALSE.
2. THIS FLOW DIAGRAM IS AN INSTRUCTION BY INSTRUCTION FLOW OF THE HANDSHAKE SEQUENCER PROGRAM. EACH STEP IS LABLED WITH THE HEXIDECIMAL ADDRESS OF IT'S INSTRUCTION.
3. THE FOLLOWING SYMBOLS ARE USED IN THE FLOW DIAGRAM:
   SEQR — RESETS THE IDE BUS ACKNOWLEDGE FLIP-FLOP
   DR — DRIVE THE READY SIGNAL TO THE 8080 MICROPROCESSOR (WHILE THIS IS NOT ASSERTED THE 8080 MAY BE IN A WAIT STATE)
   ACK — DRIVE THE IDE BUS ACKNOWLEDGE SIGNAL ACTIVE.
   HR — DRIVE THE HOLD REQUEST SIGNAL TO THE 8080 ACTIVE.
   DG@ — DRIVE THE DMA G@ SIGNAL ACTIVE.
   BWC — BUMP THE WORD COUNT

QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES		DATE
	DWN F. LOO		12/10/81
MATL	CHK		
FINISH	ENG		
NEXT ASSY	APVD		

RAMTEK
FLOW DIAGRAM
CONTROL BOARD

SIZE	SCALE	DWG NO	REV
D	NONE	502452	E

DISPLAY GENERATOR SEQUENCER FLOW DIAGRAM

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

IDLE LOOP: THE SEQUENCER WAITS TO BEGIN EXECUTION IN THIS ONE INSTRUCTION LOOP(00) UNTIL IOPNDG BECOMES TRUE, I.E., THE 8080 MICROPROCESSOR HAS INITIATED A REFRESH MEMORY OPERATION OR DMA TRANSFER INVOLVING THE REFRESH MEMORY.

00 IOPNDG NO / YES

01 SDMA — YES

THE SEQUENCER TESTS THE SIGNAL SDMA, WHICH, IF TRUE, INDICATES THAT THE REQUIRED ACTION IS A DMA TRANSFER. IF FALSE, INDICATES THAT THE REQUIRED ACTION IS A REFRESH MEMORY OPERATION.

NO

04 VAL 0 — NO

DETERMINE IF THIS IS THE PROPER BYTE OF THE 8080'S TWO BYTE TRANSFER UPON WHICH TO BEGIN EXECUTION. IF NOT, RETURN TO IDLE LOOP.

YES

03 NOP

02 NOP

8080 COMMUNICATION SEQUENCING

04 IMSTRT — NO

WAIT FOR THE IP BUS READ OR WRITE LINE TO BECOME ACTIVE.

YES

0A WRITEC — YES (WRITE)

DETERMINE IF THE REFRESH MEMORY OPERATION IS A READ OR A WRITE

NO (READ)

09 NOP

0B MOVE — YES

IF YES, AN UPDATE OF THE COP'S WITH NO WRITE OF REFRESH MEMORY IS EXECUTED. THE MOVE REGISTER WAS LOADED.

NO

0C IOCPLT WRITE — NO / YES

DRIVE THE WRITE OPCODE TO THE MEMORY TIMING SEQUENCER AND WAIT FOR THE REFRESH MEMORY WRITE CYCLE TO COMPLETE.

0D

08 IOCPLT READ — NO

DRIVE THE READ OPCODE TO THE MEMORY TIMING SEQUENCER AND WAIT FOR THE REFRESH MEMORY READ CYCLE TO COMPLETE.

YES

0F HLDRQ — YES

IF YES, DO NOT UPDATE THE COP'S. IF NO, UPDATE THE COP'S.

NO

12 DR

10 NOP

11 NOP

13 UDWAT UPDTE UPDTF — NO

IF YES, AN UPDATE BEFORE WRITING REFRESH MEMORY IS REQUIRED, MOVE AND WRITE REGISTER WAS LOADED.

YES

1A UPDTE UPDTY DR

1G UPDTE UPDTY

18 IOCPLT WRITE — NO

DRIVE THE WRITE OPCODE TO THE MEMORY TIMING SEQUENCER AND WAIT FOR THE REFRESH MEMORY WRITE CYCLE TO COMPLETE.

YES

19 DR

1B IOPNDG — YES

ALL SEQUENCES RETURN THROUGH THIS INSTRUCTION WHICH WAITS FOR IOPNDG TO BE COME FALSE, INSURING THAT THE CURRENT OPERATION IS COMPLETE.

NO

1A NOP

DMA SEQUENCING

0C FXDMA — YES

IF YES, A QUSI DMA MODE IS ENTERED WHICH IS USED TO WRITE ALPHANUMERICS INTO REFRESH MEMORY. IF NO, IT IS NORMAL DMA THAT IS REQUIRED

NO

05 DMASDG — YES (READ)

IF YES, THE DMA TRANSFER WILL BE FROM REFRESH MEMORY. IF NO, THE DATA WILL BE TO REFRESH MEMORY.

NO (WRITE)

1C NOP

WRITE LOOP (DMA TO REFRESH MEMORY)

24 PWITEC — NO

WAIT FOR THE IP BUS WRITE SIGNAL TO BECOME ACTIVE

YES

26 SLDFGR

LOAD THE DATA FROM THE DMA SOURCE INTO THE FOREGROUND REGISTER

28 IOCPLT WRITE ACK — NO

DRIVE THE WRITE OPCODE TO THE MEMORY TIMING SEQUENCER AND WAIT FOR THE REFRESH MEMORY WRITE CYCLE TO COMPLETE. ALSO, DRIVE THE IP BUS ACKNOWLEDGE SIGNAL ACTIVE.

29 ACK

27 WRITEC ACK — YES

WAIT FOR THE IP BUS WRITE SIGNAL TO BECOME INACTIVE WHILE CONTINUING TO ACKNOWLEDGE IT

NO

2E UPDTE UPDTY

25 SDMA UPDTE UPDTF — YES

CHECK IF FURTHER TRANSFERS ARE REQUIRED. IF YES, RETURN FOR NEXT TRANSFER. IF NO, RETURN TO THE IDLE LOOP. THE COP'S ARE UPDATED AFTER EACH TRANSFER.

NO

2C UPDTE UPDTF

1D NOP

READ LOOP (DMA FROM REFRESH MEMORY)

32 IOCPLT READ — NO

DRIVE THE READ OPCODE TO THE MEMORY TIMING SEQUENCER AND WAIT FOR THE REFRESH MEMORY READ CYCLE TO COMPLETE. THE DATA RELEVED IS PUT IN THE READ BACK REGISTER

YES

33 NOP

34 RBACK WRT — NO

DRIVE THE IP BUS WRITE LINE ACTIVE AND WAIT FOR THE DESTRUCTION TO ACKNOWLEDGE THE TRANSFER.

YES

36 UPDTE UPDTY

37 RBACK — YES

WAIT FOR THE DESTRUCTION TO BECOME NOT BUSY, I.E. THE IP BUS ACKNOWLEDGE SIGNAL IS AGAIN INACTIVE.

NO

55 SDMA UPDTE UPDTF — YES

CHECK IF FURTHER TRANSFERS ARE REQUIRED. IF YES, RETURN FOR NEXT TRANSFER. IF NO, RETURN TO THE IDLE LOOP. THE COP'S ARE UPDATED AFTER EACH TRANSFER.

NO

30 NOP

QUSI-DMA LOOP

0D UPDB WRT — YES

UNDER ADDITIVE WRITE ONLY A COP'S UPDATE MAY BE NECESSARY. UPDB WILL BE TRUE IF THAT IS THE CASE.

NO

1E WRT

1F WRT

20 IOCPLT WRITE WRT — NO

WRITE REFRESH MEMORY AND DRIVE THE IP BUS WRITE LINE TO CAUSE THE HANDSHAKE SEQUENCER TO BUMP THE WORD COUNT.

YES

21 ACK

22 ACK

23 SDMA UPDTE UPDTF — YES

CHECK IF FURTHER TRANSFERS ARE REQUIRED. IF YES, RETURN FOR THE NEXT TRANSFER. IF NO, RETURN TO THE IDLE LOOP. THE COP'S ARE UPDATED AFTER EACH TRANSFER.

NO

15 UPDTE UPDTY

1F UPDTE UPDTY

NOTES:

1. ALL DECISION STEPS ARE TESTS OF THE STATE OF THE SPECIFIED LOGIC SIGNAL. "NO" MEANS THAT THE SIGNAL WAS INACTIVE; "YES" MEANS THAT THE SIGNAL WAS ACTIVE. THAT IS, THE SIGNAL REPRESENTS A CONDITION THAT IS TESTED AND THE STATE OF WHICH CONTROLS THE PATH OF EXECUTION, WHERE YES = TRUE AND NO = FALSE.
2. THIS FLOW DIAGRAM IS AN INSTRUCTION BY INSTRUCTION FLOW OF THE DISPLAY GENERATOR SEQUENCER PROGRAM. EACH STEP IS LABLED WITH THE HEXIDECIMAL ADDRESS OF IT'S INSTRUCTION.
3. THIS FLOW DIAGRAM IS REPRESENTATIVE OF THE PROGRAM FOR ALL THREE RESOLUTION CASES. THE DIAGRAM AS SHOWN IS FOR THE 256 LINE × 320 ELEMENT CASE. THE STEP THAT ARE DIFFERENT FOR THE 256 LINE × 640 ELEMENT AND 512 LINE × 640 ELEMENT CASES ARE MARKED WITH AN '*' SYMBOL. THE AFFECTED STEP WOULD APPEAR AS FOLLOWS:

256 LINE × 640 ELEMENT

512 LINE × 640 ELEMENT

4. THE FOLLOWING SYMBOLS ARE USED IN THE FLOW DIAGRAM.

READ	— READ REFRESH MEMORY
WRITE	— WRITE REFRESH MEMORY
UPDTF	— UPDATE THE X-COP REGISTER
UPDTY	— UPDATE THE Y-COP REGISTER
DR	— DRIVE THE READY SIGNAL TO THE 8080 MICROPROCESSOR (WHILE THIS IS NOT ASSERTED THE 8080 MAY BE IN A WAIT STATE)
ACK	— DRIVE THE INTERNAL PROCESSOR BUS ACKNOWLEDGE SIGNAL ACTIVE.
WRT	— DRIVE THE INTERNAL PROCESSOR BUS WRITE SIGNAL ACTIVE.
SLDFGR	— LOAD FOREGROUND REGISTER
SSHIFT	— SHIFT THE FRONT DATA REGISTER

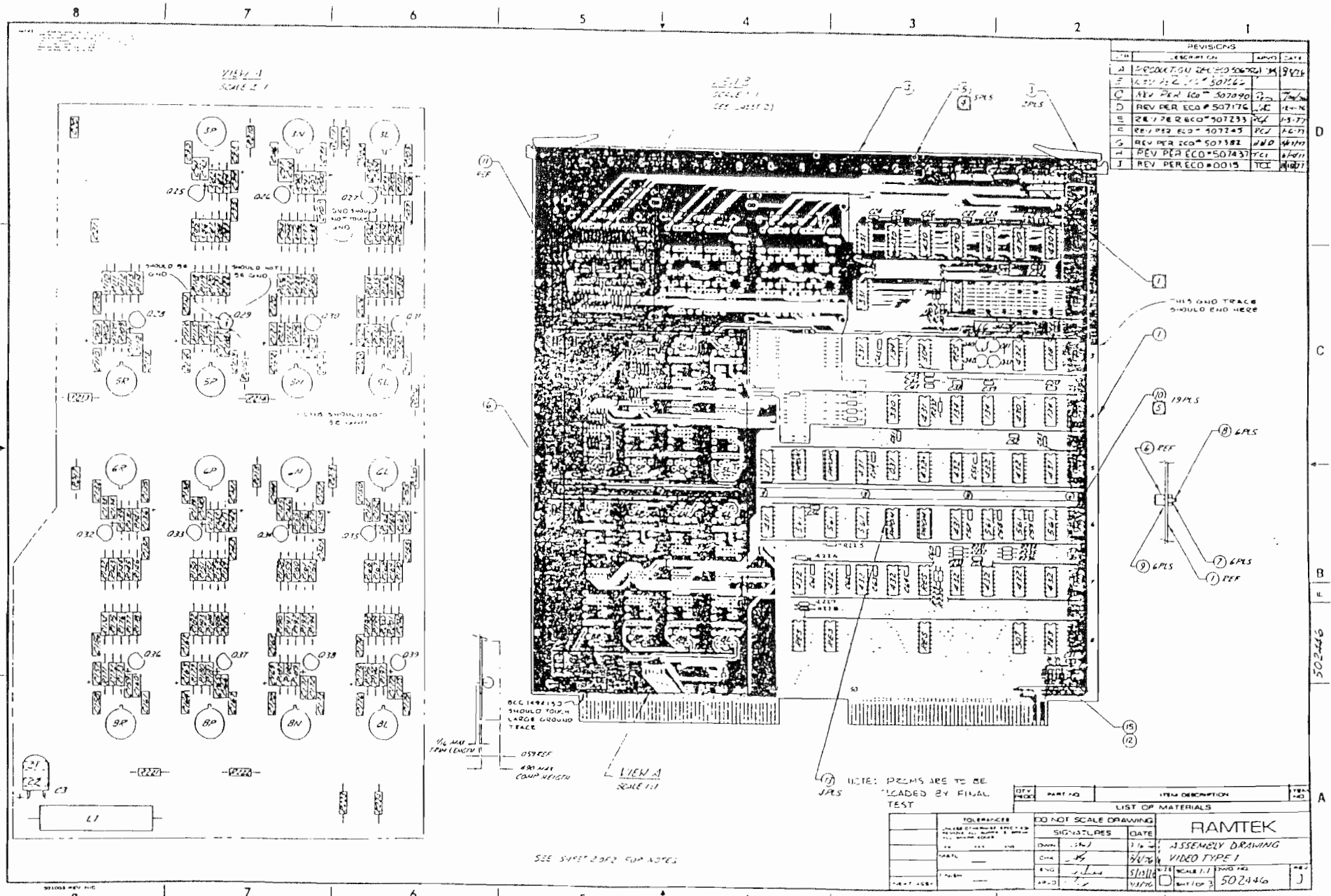
QTY PER	PART NO	ITEM DESCRIPTION
		LIST OF MATERIALS

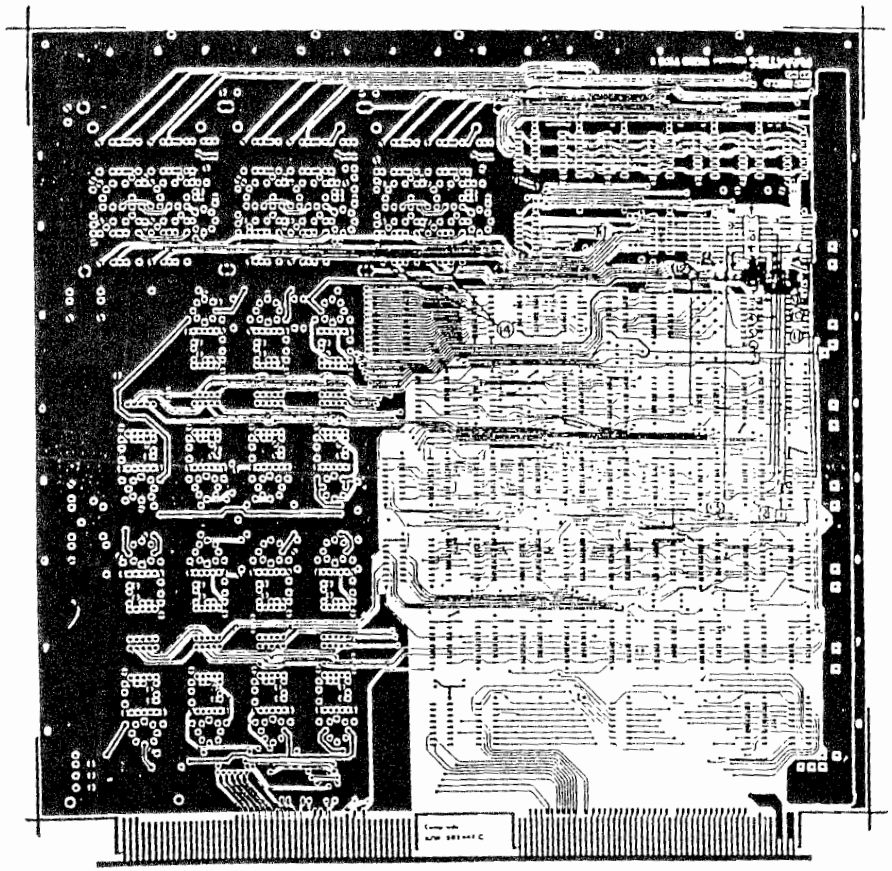
TOLERANCES	DO NOT SCALE DRAWING	SIGNATURES	DATE
	DRWN	F LOO	12 9 78
	CHK		
	ENGR		
	APVD		
NEXT ASSY			

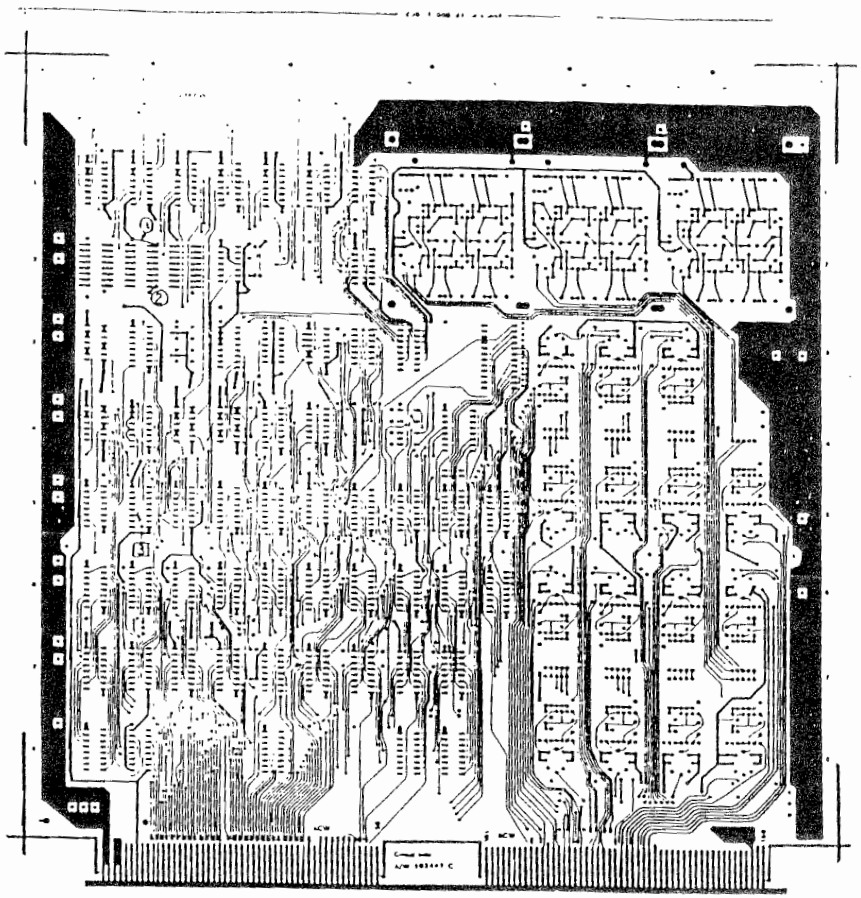
RAMTEK
FLOW DIAGRAM
CONTROL BOARD

SIZE D — SCALE — DWG NO 502452 — REV E

SHEET 1 OF 2


VIEW A
SCALE 2:1
SCALE 1:1
SEE SHEET 2
THIS GND TRACE SHOULD END HERE
19 PLS
6 PLS
4 REF
8 PLS
9 PLS
7 PLS
1 REF
VIEW A
SCALE 1:1
NOTE: PINS ARE TO BE
LOADED BY FINAL
TEST
SEE SHEET 2 FOR NOTES
REVISIONS
DESCRIPTION
APVD
DATE
REV PER ECO # 507490
REV PER ECO # 507176
REV PER ECO # 507233
REV PER ECO # 507245
REV PER ECO # 507382
REV PER ECO # 507437
REV PER ECO # 0015
LIST OF MATERIALS
ITEM DESCRIPTION
PART NO
QTY PER BOARD
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
ASSEMBLY DRAWING
VIDEO TYPE 1
SCALE 1:1
SHEET 1 OF 3
502446
J





⚠ INSTALL A 745174 AT 2B.

DELETES

1. CUT TRACE AT 5B-15, 5B-12, 5B-10, & 5B-7 (comp side).
2. CUT TRACE AT 5B-9 AS SHOWN. (comp side).
3. CUT TRACE AT 5B-10 (CKT SIDE).

ADDS

1. 2B-1 TØ 2B-16 & THE FEED THRU SHOWN (CKT SIDE)
2. 2B-8 TØ FEEDTHRU SHOWN. (CKT SIDE)
3. 2B-14 TØ 5B-15 (comp side)
4. 2B-13 TØ 5B-12 (comp side)
5. 2B-11 TØ 5B-10 (comp side)
6. 2B-6 TØ 5B-9 (comp side)
7. 2B-7 TØ 5A-6 (comp side)
8. 2B-10 TØ 4E-5 (comp side) NOT SHOWN
9. 2B-10 TØ 5A-11 (comp side)
10. 2B-12 TØ 5A-13 (comp side)
11. 2B-15 TØ 5A-14 (comp side)
12. 2B-9 TØ 4C-6 (comp side)
13. 5A-9 TØ 5D-9 (comp side)

REV "J"

14. ADD WIRES AS SHOWN (ADDING GND PLN)

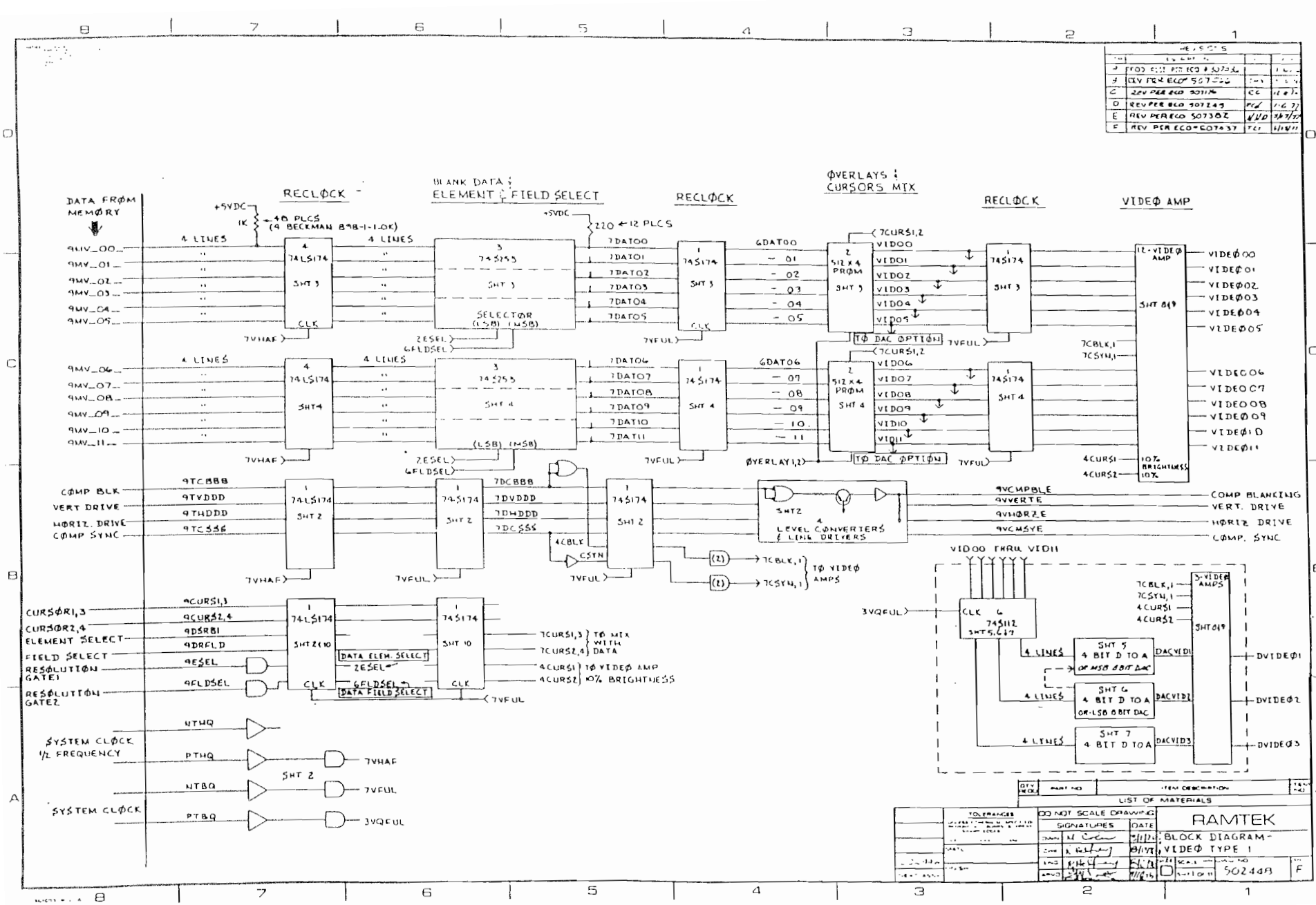
DO NOT SCALE DRAWING

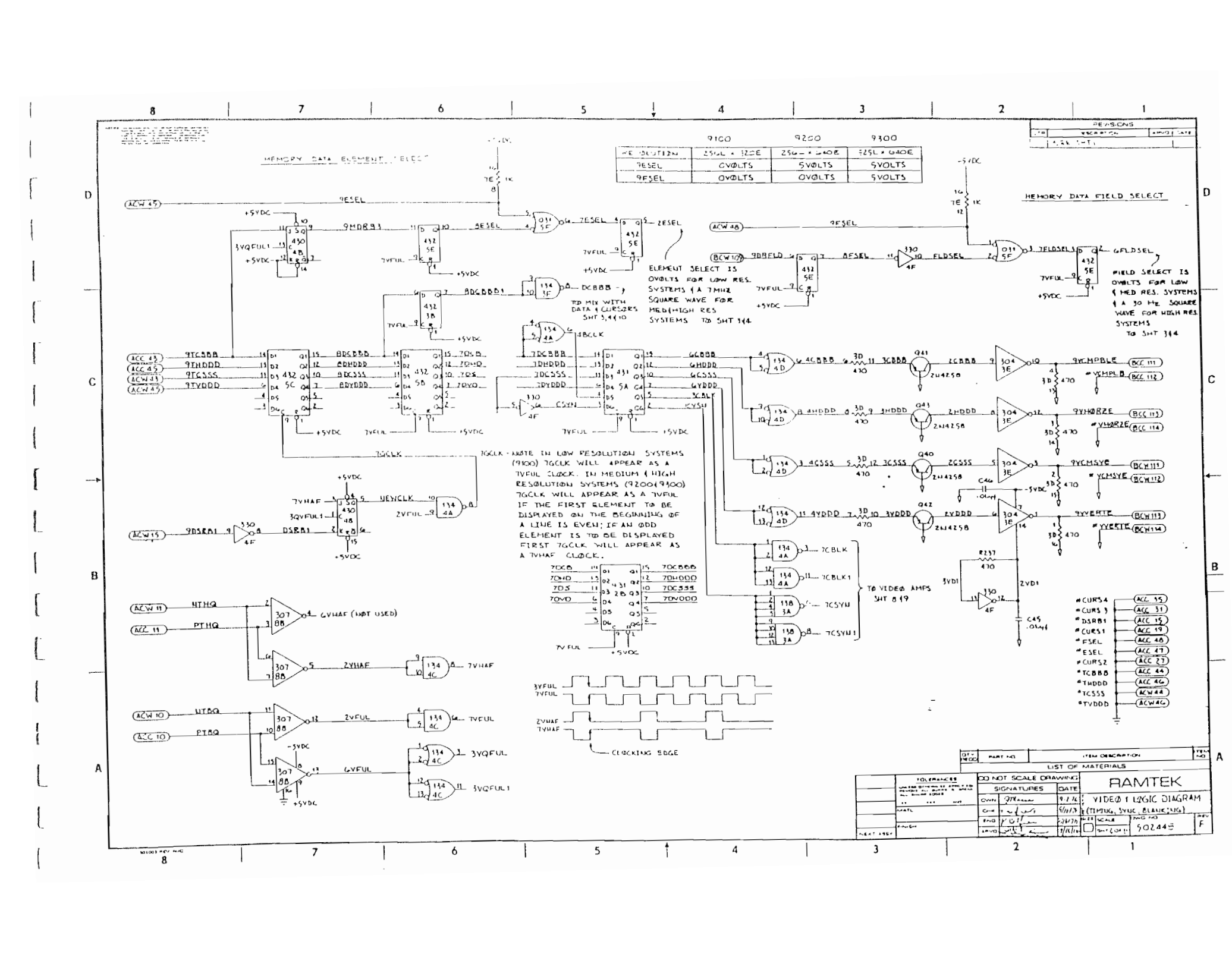
SIGNATURES		DATE
DRWN	P Hoffman	4-11-77
CHK	R Hoffman	4-11-77
ENG	W Christian	4-11-77
APVD		

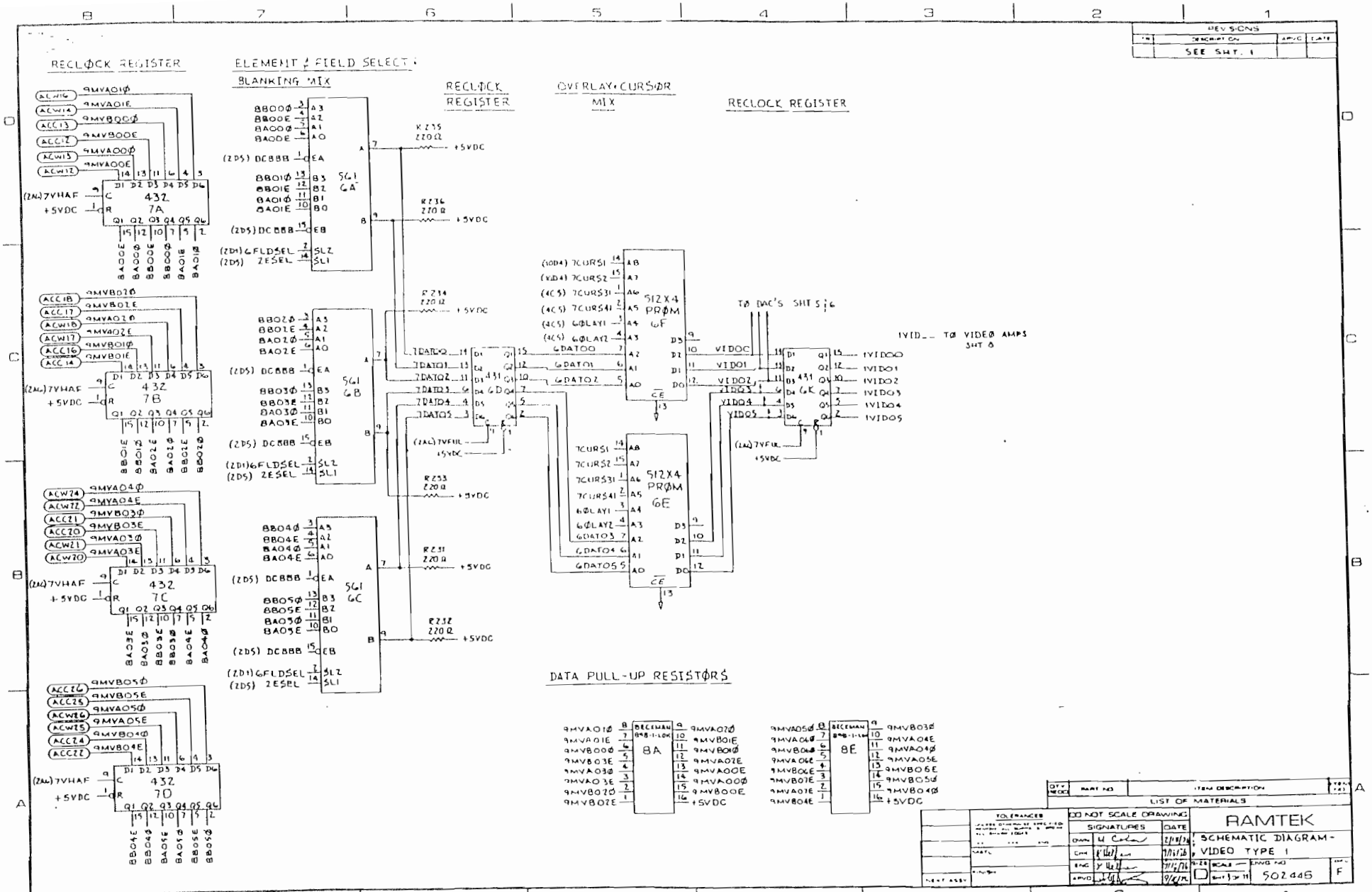
RAMTEK

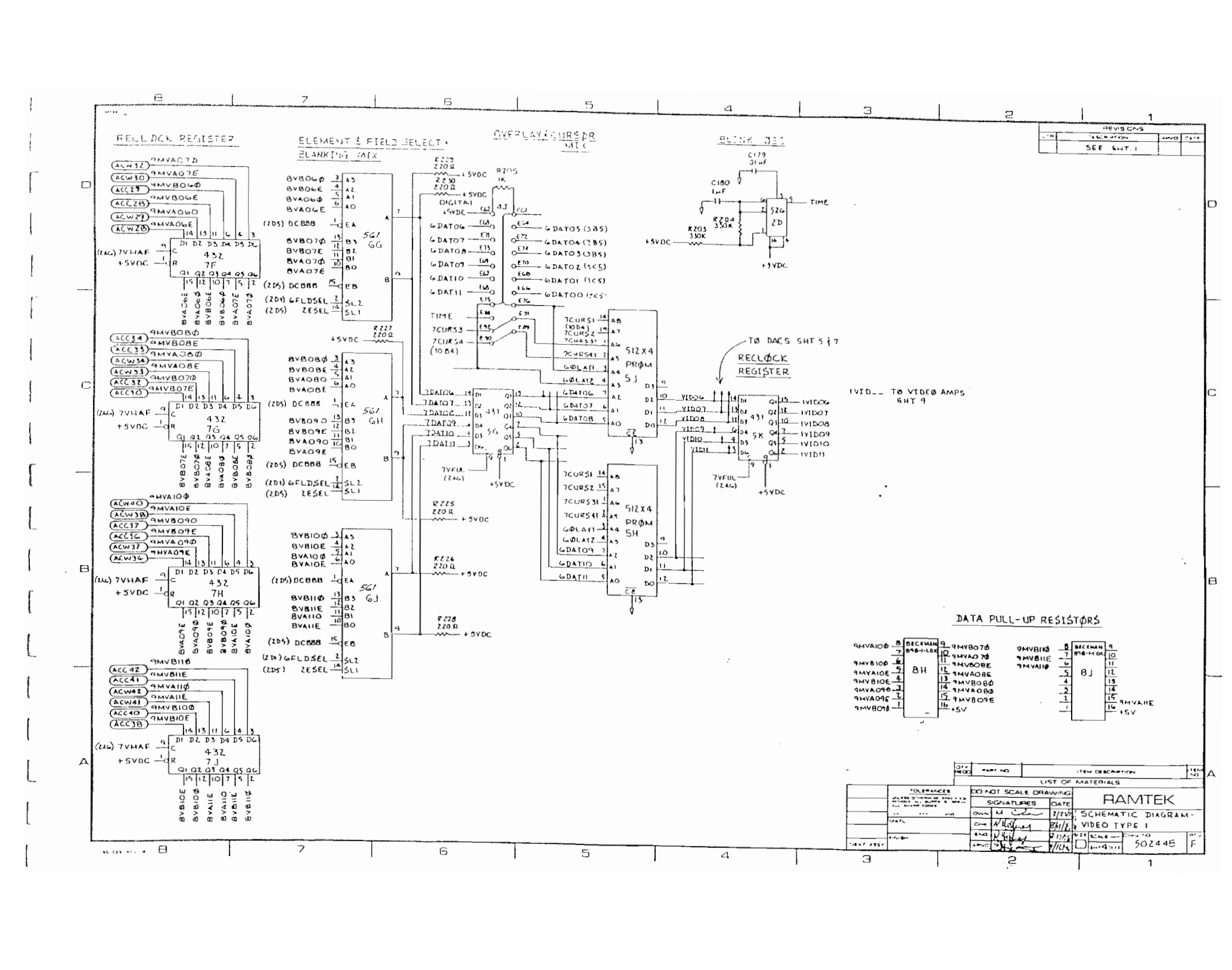
ASSY DWG VIDEO TYPE I

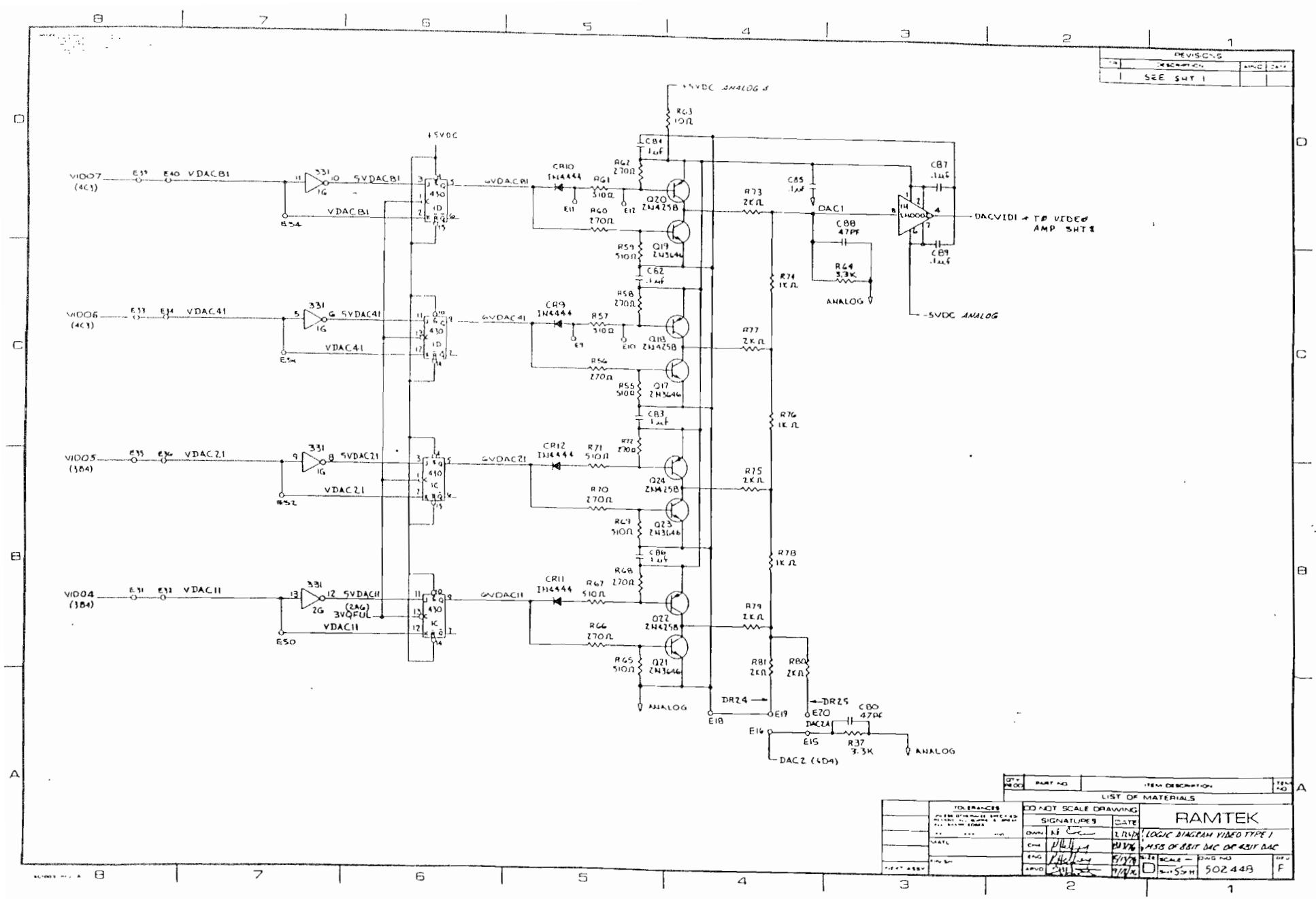
SIZE D | SCALE | DWG NO 502446 | REV J


DATA FROM MEMORY
RECLOCK
BLANK DATA ; ELEMENT & FIELD SELECT
RECLOCK
OVERLAYS ; CURSORS MIX
RECLOCK
VIDEO AMP
+5VDC
1K
40 PLCS (9 BECKMAN 898-1-1-0K)
220 ←12 PLCS
4 LINES
9MV_00
9MV_01
9MV_02
9MV_03
9MV_04
9MV_05
9MV_06
9MV_07
9MV_08
9MV_09
9MV_10
9MV_11
74LS174 SHT 3
74S253 SHT 3
SELECTOR (LSB) (MSB)
74S174 SHT 3
512 X 4 PROM SHT 3
74S174 SHT 4
74S253 SHT 4
512 X 4 PROM SHT 4
74S174 SHT 4
7VHAF
7VFUL
7ESEL
6FLDSEL
7DAT00
7DAT01
7DAT02
7DAT03
7DAT04
7DAT05
7DAT06
7DAT07
7DAT08
7DAT09
7DAT10
7DAT11
6DAT00
6DAT06
7CURS1,2
VIDEO0
VIDEO1
VIDEO2
VIDEO3
VIDEO4
VIDEO5
VIDEO6
VIDEO7
VIDEO8
VIDEO9
VIDEO10
VIDEO11
TO DAC OPTION
OVERLAY1,2
12 - VIDEO AMP
SHT 8&9
7CBLK,1
7CSYN,1
4CURS1
4CURS2
10% BRIGHTNESS
VIDEO00
VIDEO01
VIDEO02
VIDEO03
VIDEO04
VIDEO05
VIDEO06
VIDEO07
VIDEO08
VIDEO09
VIDEO10
VIDEO11
COMP BLK
VERT DRIVE
HORIZ. DRIVE
COMP SYNC
9TCBBB
9TVDDD
9THDDD
9TCSSS
74LS174 SHT 2
7DCBBB
7DVDDD
7DHDDD
7DCSSS
4CBLK
CSYN
SHT2
4 LEVEL CONVERTERS & LINE DRIVERS
9VCMPBLE
9VVERTE
9VHORZE
9VCMSYE
COMP BLANKING
VERT. DRIVE
HORIZ DRIVE
COMP. SYNC
(2)
7CBLK,1
7CSYN,1
TO VIDEO AMPS
VID00 THRU VID11
3VQFUL
CLK 6
74S112 SHTS 6&9
7CBLK,1
7CSYN,1
4CURS1
4CURS2
VIDEO AMPS
SHT 5 4 BIT D TO A OR MSB 8 BIT DAC
SHT 6 4 BIT D TO A OR LSB 8 BIT DAC
SHT 7 4 BIT D TO A
DACVID1
DACVID2
DACVID3
DVIDEO1
DVIDEO2
DVIDEO3
CURSORI,3
CURSORZ,4
ELEMENT SELECT
FIELD SELECT
RESOLUTION GATE1
RESOLUTION GATE2
9CURS1,3
9CURS2,4
9DSRBI
9DRFLD
9ESEL
9FLDSEL
74LS174 SHT2(10)
74S174 SHT 10
DATA ELEM. SELECT
DATA FIELD SELECT
7CURS1,3
7CURS2,4
4CURS1
4CURS2
TO MIX WITH DATA
TO VIDEO AMP
10% BRIGHTNESS
SYSTEM CLOCK
1/2 FREQUENCY
NTHQ
PTHQ
NTBQ
PTBQ
SHT 2
7VHAF
7VFUL
3VQFUL
REVISIONS
F FROD SYST PER ECO # 507336
G ADV PER ECO 507506
H 22V PER ECO 507596
D REV PER ECO 507249
E REV PER ECO 507302
F REV PER ECO-C07037
LIST OF MATERIALS
QTY REQD
PART NO
ITEM DESCRIPTION
REF NO
TOLERANCES
DO NOT SCALE DRAWING
SIGNATURES
DATE
DWN
CHK
ENG
APVD
RAMTEK
BLOCK DIAGRAM-
VIDEO TYPE 1
SIZE
DWG NO
902448
REV
F


MEMORY DATA ELEMENT SELECT
MEMORY DATA FIELD SELECT
RESOLUTION 9100 9200 9300
9ESEL 256L x 32CE 256 x 640E 525L x 640E
9FSEL OVOLTS 5VOLTS 5VOLTS
9ESEL OVOLTS OVOLTS 5VOLTS
ELEMENT SELECT IS OVOLTS FOR LOW RES. SYSTEMS @ A 7MHz SQUARE WAVE FOR MED(HIGH RES SYSTEMS TO SHT 3@4
FIELD SELECT IS OVOLTS FOR LOW @ MED RES. SYSTEMS @ A 30 Hz SQUARE WAVE FOR HIGH RES SYSTEMS TO SHT 3@4
TO MIX WITH DATA @ CURSORS SHT 5,9@10
7GCLK - NOTE IN LOW RESOLUTION SYSTEMS (9100) 7GCLK WILL APPEAR AS A 7VFUL CLOCK. IN MEDIUM @ HIGH RESOLUTION SYSTEMS (9200(9300) 7GCLK WILL APPEAR AS A 7VFUL IF THE FIRST ELEMENT TO BE DISPLAYED ON THE BEGINNING OF A LINE IS EVEN; IF AN ODD ELEMENT IS TO BE DISPLAYED FIRST 7GCLK WILL APPEAR AS A 7VHAF CLOCK.
TO VIDEO AMPS SHT 8 @ 9
CLOCKING EDGE
REVISIONS
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
VIDEO @ LOGIC DIAGRAM
(TIMING, SYNC, BLANKING)
502445
SIZE F
SCALE
SHEET 3 OF 11

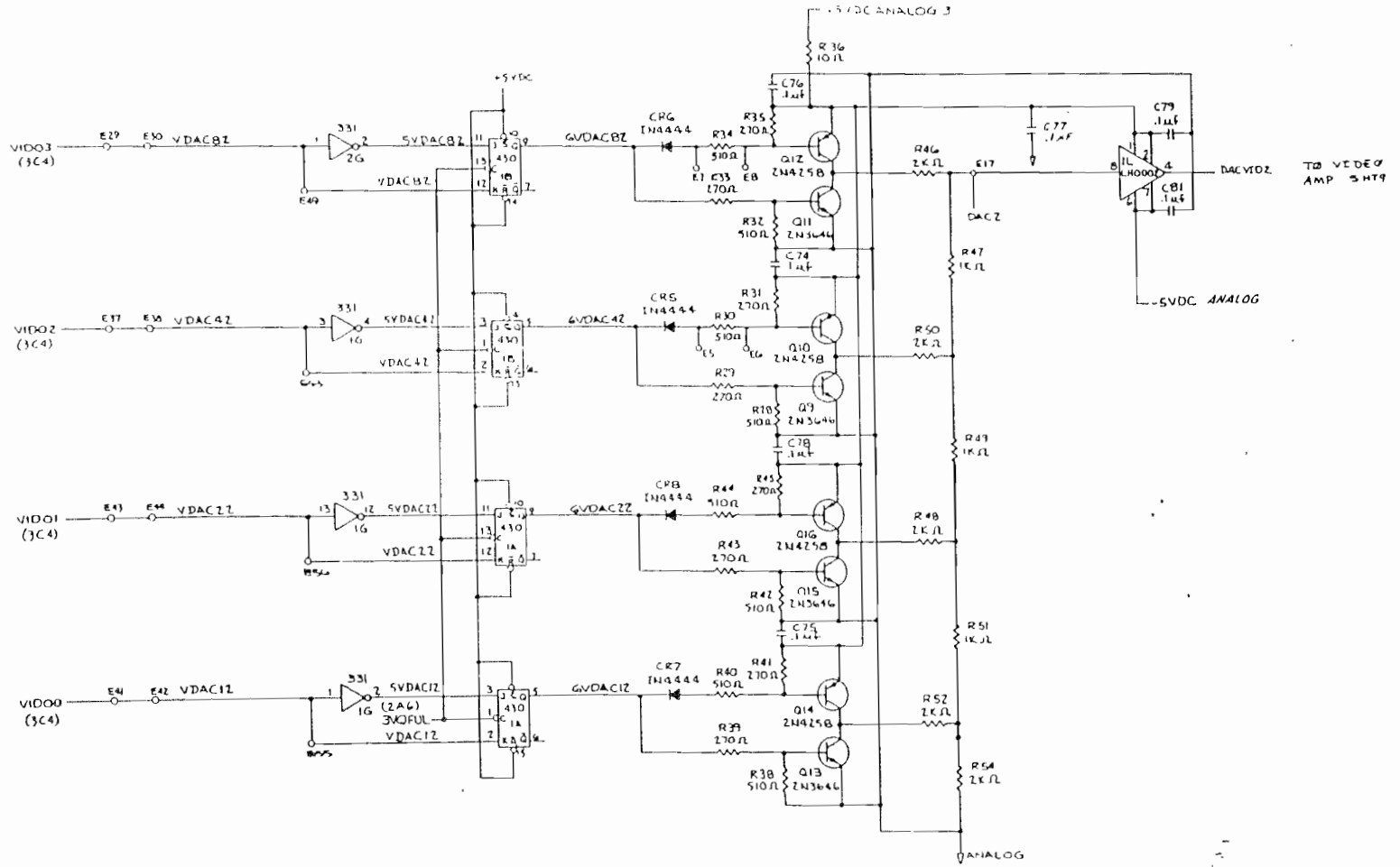

RECLOCK REGISTER
ELEMENT / FIELD SELECT
BLANKING MIX
RECLOCK REGISTER
OVERLAY CURSOR MIX
RECLOCK REGISTER
TO DAC'S SHT 5 & 6
TO VIDEO AMPS SHT 6
DATA PULL-UP RESISTORS
512X4 PROM 6F
512X4 PROM 6E
5G1 7A
5G1 6A
5G1 6B
5G1 6C
432 7A
432 7B
432 7C
432 7D
8A
8E
RAMTEK
SCHEMATIC DIAGRAM - VIDEO TYPE 1
502445
LIST OF MATERIALS
DO NOT SCALE DRAWING
SEE SHT. 1


RECLOCK REGISTER
ELEMENT & FIELD SELECT + BLANKING MUX
OVERLAY CURSOR MUX
BLINK DET
DATA PULL-UP RESISTORS
TØ DACS SHT 5 & 7
RECLØCK REGISTER
IVID__ TØ VIDEØ AMPS SHT 9
SEE SHT 1
RAMTEK
SCHEMATIC DIAGRAM - VIDEO TYPE I
502445
LIST OF MATERIALS
DO NOT SCALE DRAWING



QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
	DRWN		LOGIC DIAGRAM VIDEO TYPE I
	CHK		MSB OF 8BIT DAC OR 12BIT DAC
	ENG		SIZE D · SCALE — · DWG NO 502448 · REV F
	APVD		SHEET 5 OF 8



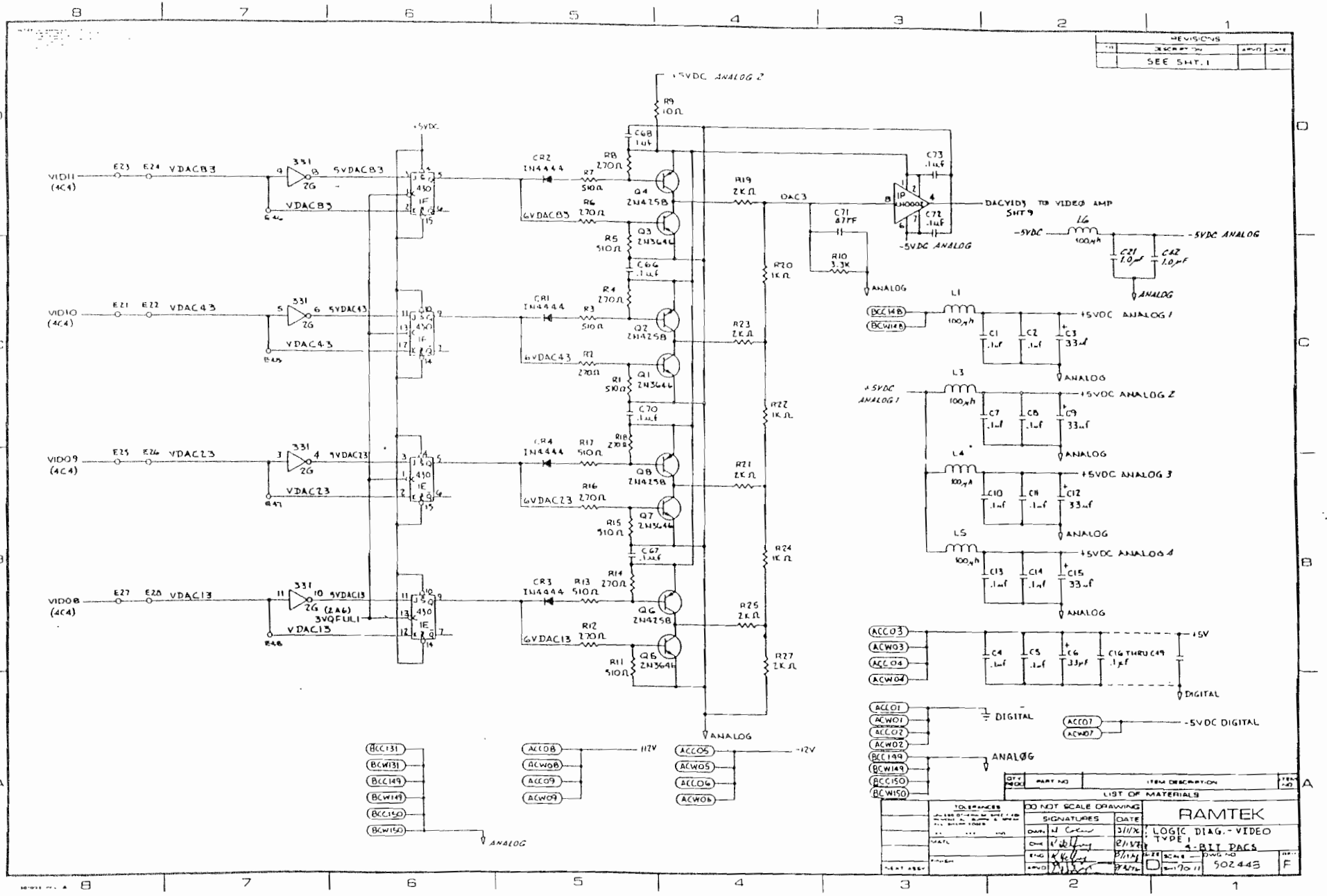
REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHT. 1		

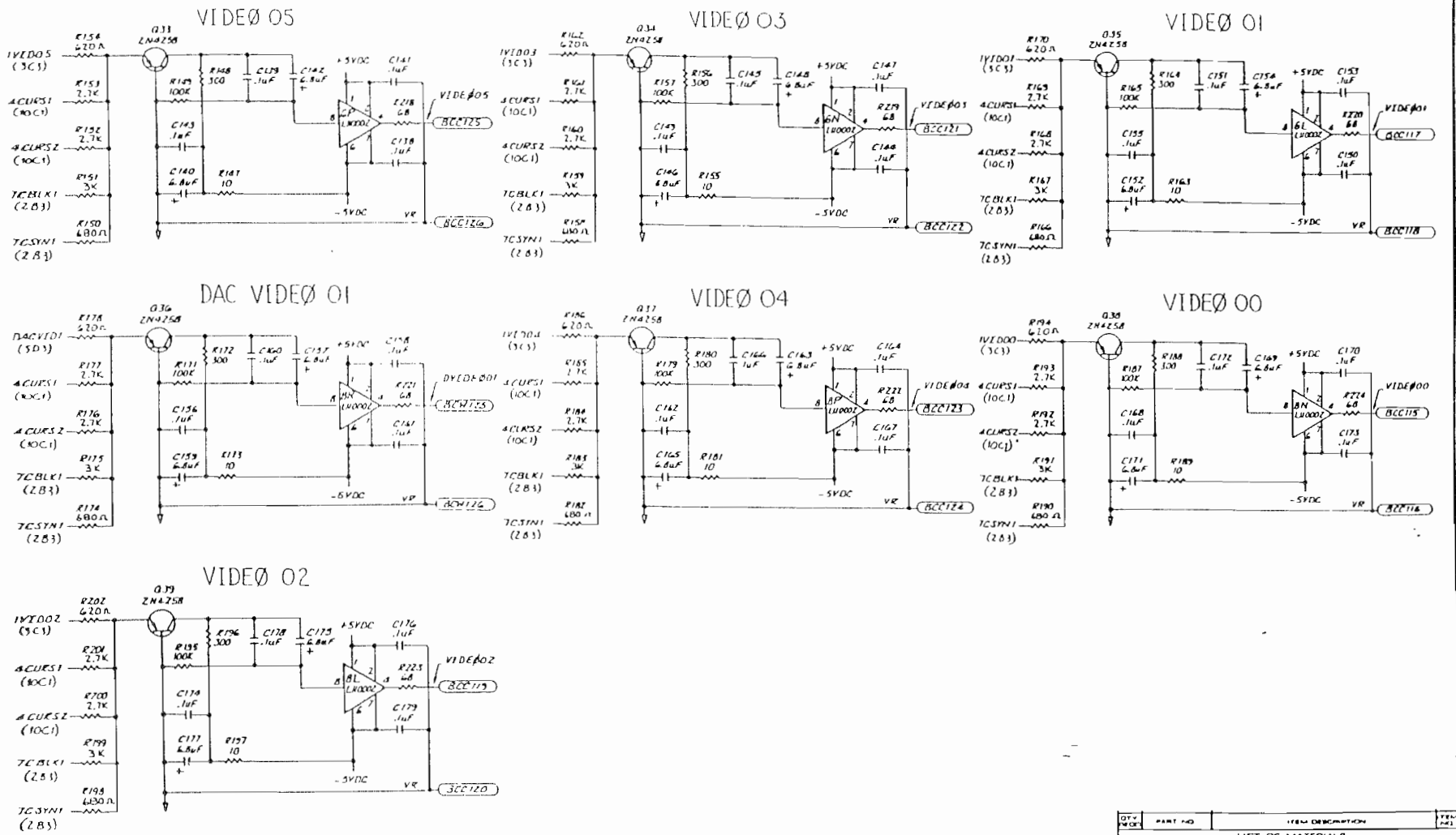
LIST OF MATERIALS

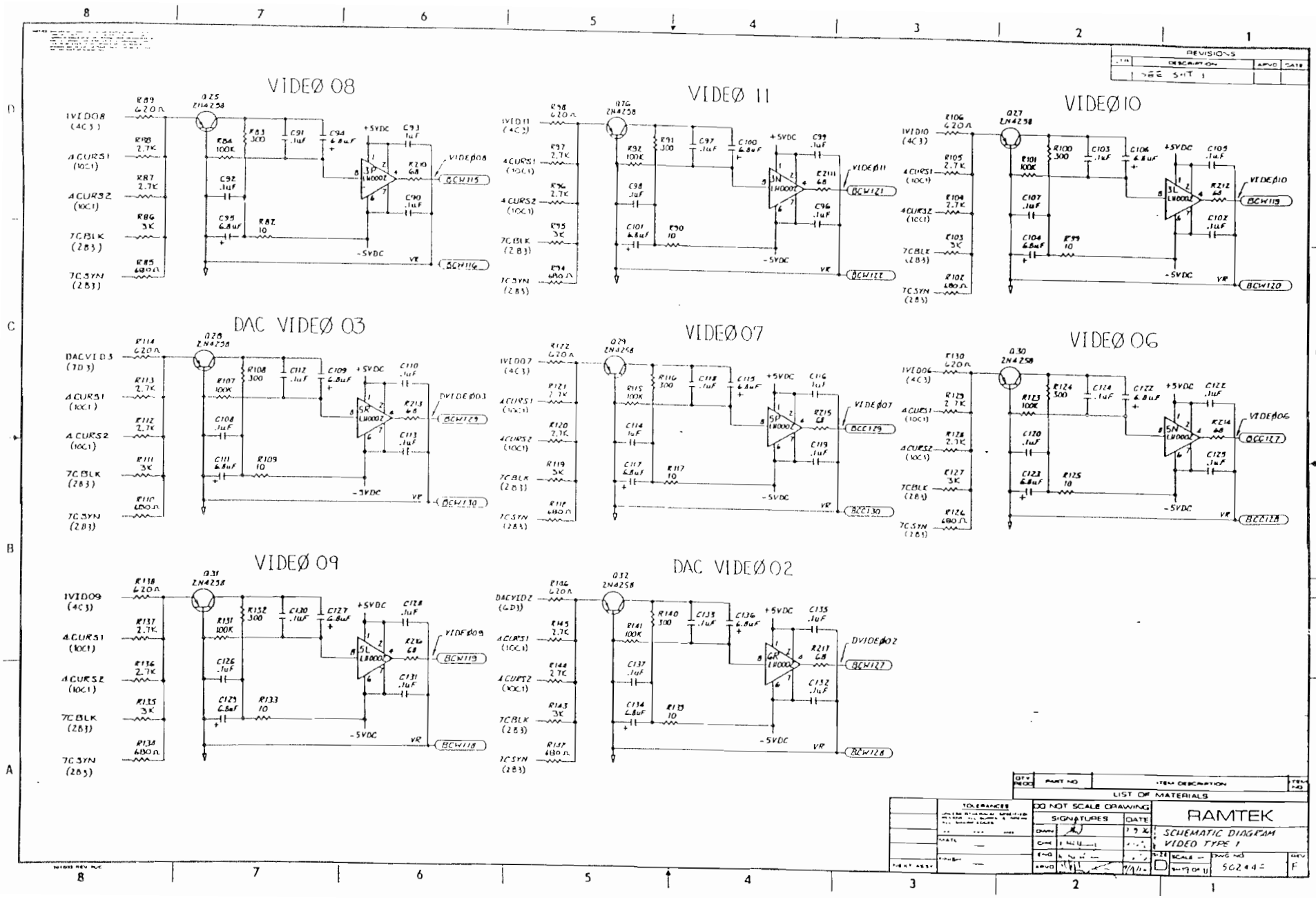
QTY PER UNIT	PART NO	ITEM DESCRIPTION	REF DES

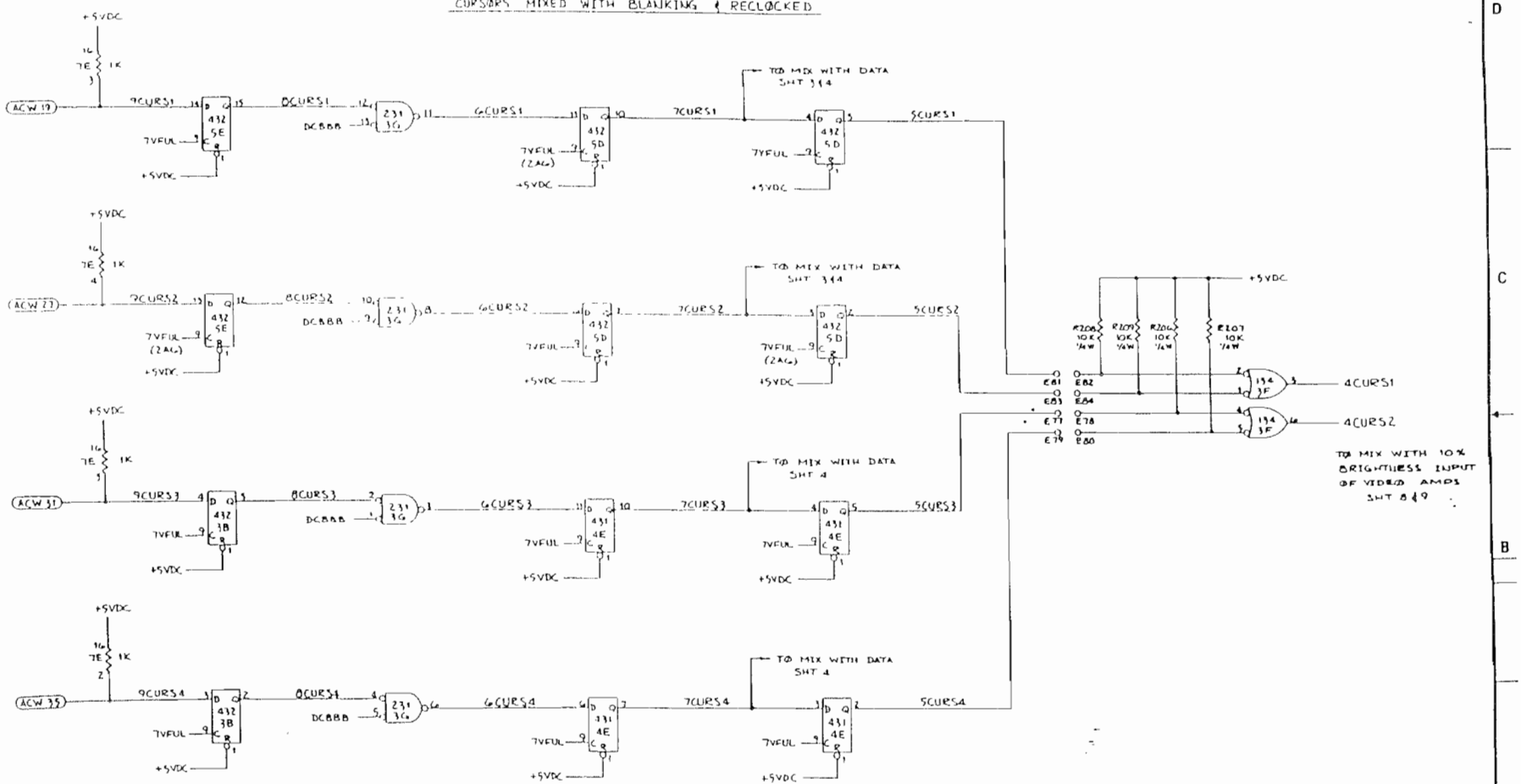
TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
	DWN TJ	2/14/72	LOGIC DIAG - VIDEO TYPE I
	CHK [illegible]	2/14/74	LSB OF 8 BIT DAC OF 4 BIT DAC
	ENG [illegible]	3/7/74	SCALE — SIZE H
	APVD [illegible]	3/7/74	DWG NO 502448 REV F

NEXT ASSY


REVISIONS
SEE SHT. 1
+5VDC ANALOG 2
R9 10Ω
VID11 (4C4)
VID10 (4C4)
VID09 (4C4)
VID08 (4C4)
VDAC83
VDAC43
VDAC23
VDAC13
5VDAC83
5VDAC43
5VDAC23
5VDAC13
3VGFULL
CR2 IN4444
CR1 IN4444
CR4 IN4444
CR3 IN4444
Q4 2N4258
Q3 2N3640
Q2 2N4258
Q1 2N3640
Q8 2N4258
Q7 2N3640
Q6 2N4258
Q5 2N3640
DAC3
DACVID3 TO VIDEO AMP SHT 9
-5VDC ANALOG
+5VDC ANALOG 1
+5VDC ANALOG 2
+5VDC ANALOG 3
+5VDC ANALOG 4
ANALOG
DIGITAL
-5VDC DIGITAL
+5V
-12V
+12V
BCC14B
BCW14B
BCC131
BCW131
BCC149
BCW149
BCC150
BCW150
ACC03
ACW03
ACC04
ACW04
ACC01
ACW01
ACC02
ACW02
ACC07
ACW07
ACC08
ACW08
ACC09
ACW09
ACC05
ACW05
ACC06
ACW06
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
LOGIC DIAG. - VIDEO TYPE 1
4-BIT PACS
502443


VIDEØ 05
VIDEØ 03
VIDEØ 01
DAC VIDEØ 01
VIDEØ 04
VIDEØ 00
VIDEØ 02
REVISIONS
LIST OF MATERIALS
RAMTEK
SCHEMATIC DIAGRAM
VIDEO TYPE 1
SCALE —
SCZ 44 4
F


VIDEØ 08
VIDEØ 11
VIDEØ 10
DAC VIDEØ 03
VIDEØ 07
VIDEØ 06
VIDEØ 09
DAC VIDEØ 02
REVISIONS
DESCRIPTION
APVD
DATE
SEE SHT 1
LIST OF MATERIALS
ITEM DESCRIPTION
PART NO
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
SCHEMATIC DIAGRAM
VIDEO TYPE 1
SCALE —
DWG NO
SG2442
REV
F



REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	TAPE 1-71		

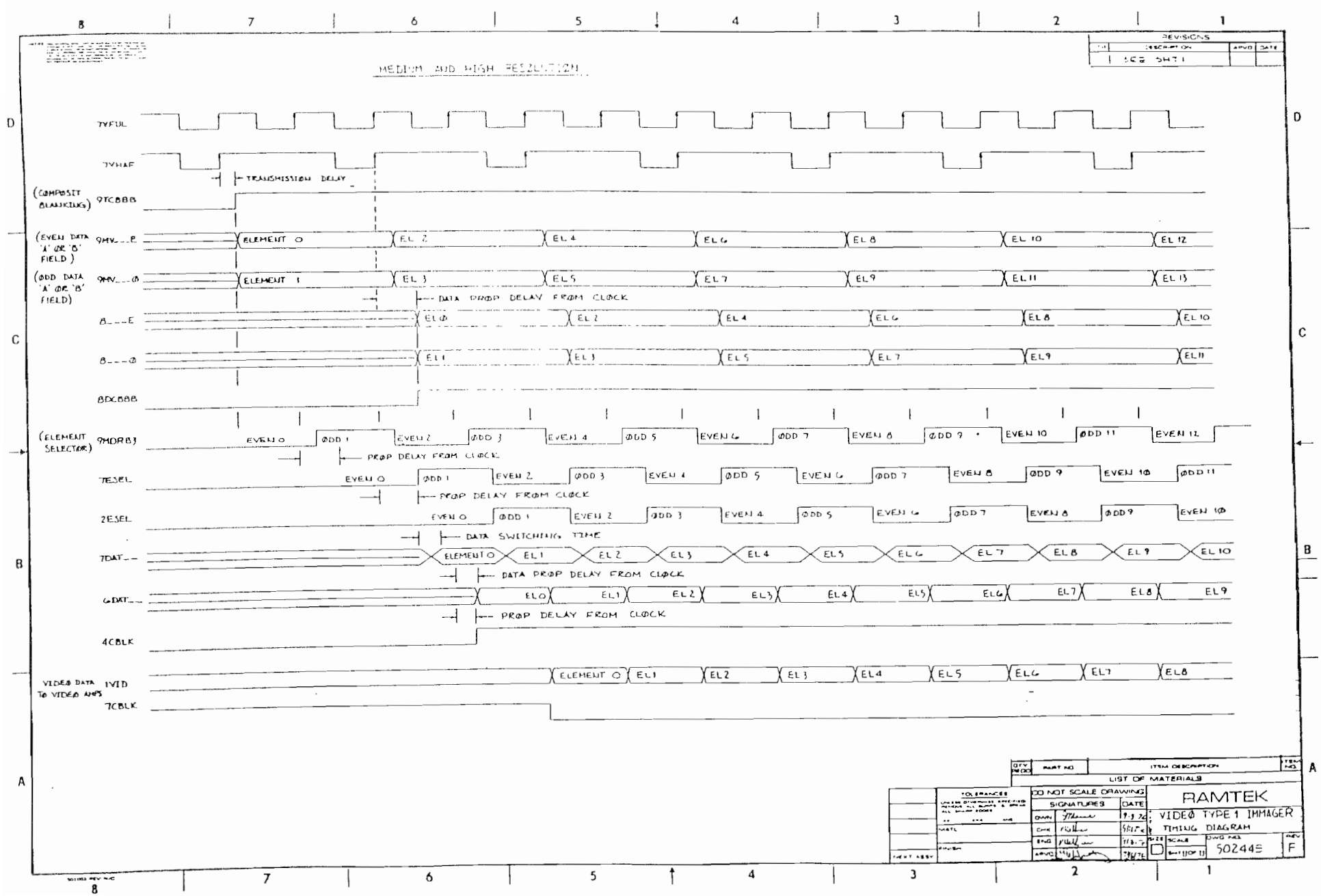
QTY PROD	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES		DATE
	DWN		3-11-76
	CHK		3/6/76
	ENG		3/11/76
	APVD		3/11/76

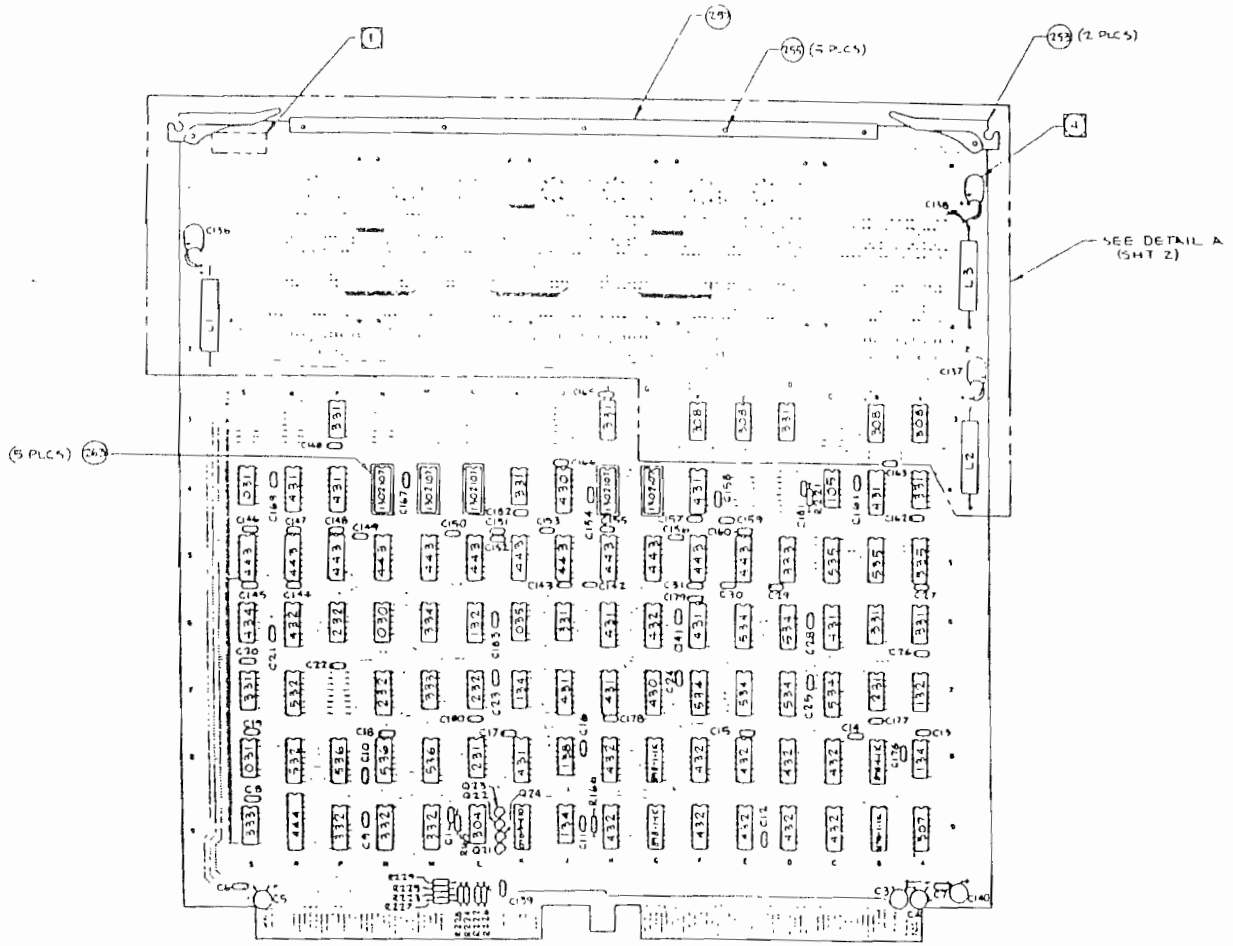
RAMTEK

VIDEO 1 LOGIC DIAGRAM CURSORS

SIZE	SCALE	DWG NO	REV
D	SHEET 11 OF 11	502445	F


MEDIUM AND HIGH RESOLUTION
REVISIONS
ECR 5H71
7YFUL
7YHAF
TRANSMISSION DELAY
(COMPOSIT BLANKING) 9TCBBB
(EVEN DATA 'A' OR 'B' FIELD) 9HV___E
(ODD DATA 'A' OR 'B' FIELD) 9HV___O
ELEMENT 0
EL 2
EL 4
EL 6
EL 8
EL 10
EL 12
ELEMENT 1
EL 3
EL 5
EL 7
EL 9
EL 11
EL 13
DATA PROP DELAY FROM CLOCK
B___E
B___O
EL0
EL 2
EL 4
EL 6
EL 8
EL 10
EL1
EL 3
EL 5
EL 7
EL 9
EL 11
8DCBBB
(ELEMENT SELECTOR) 9MDRBJ
EVEN 0
ODD 1
EVEN 2
ODD 3
EVEN 4
ODD 5
EVEN 6
ODD 7
EVEN 8
ODD 9
EVEN 10
ODD 11
EVEN 12
PROP DELAY FROM CLOCK
7ESEL
2ESEL
DATA SWITCHING TIME
7DAT__
6DAT__
EL0
EL1
EL2
EL3
EL4
EL5
EL6
EL7
EL8
EL9
4CBLK
VIDEO DATA To VIDEO AMPS 1VID
7CBLK
QTY REQD
PART NO
ITEM DESCRIPTION
ITEM NO
LIST OF MATERIALS
TOLERANCES
DO NOT SCALE DRAWING
SIGNATURES
DATE
DWN
CHK
ENG
APVD
RAMTEK
VIDEO TYPE 1 IMMAGER
TIMING DIAGRAM
SIZE
SCALE
DWG NO
REV
50244E
F

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	REL PER ECO 507364	MH	3-9
B	REV PER ECO 507380	MH	4-19-77



COMPONENT SIDE

NOTES: UNLESS OTHERWISE SPECIFIED

1. INK STAMP SERIAL NO. AND ASSY REVISION LEVEL IN AREA SHOWN.
2. REFERENCE DRAWINGS:
   LOGIC DIAGRAM - 503046
   FAB DWG - 503047
3. LOGIC DEVICE TYPE ARE RAMTEK STANDARD PART NO 1301XXX.
4. INSTALL CAPACITORS C136, 137, 138 AS SHOWN, FLAT AGAINST BOARD. ADD SLEEVING AS REQUIRED.

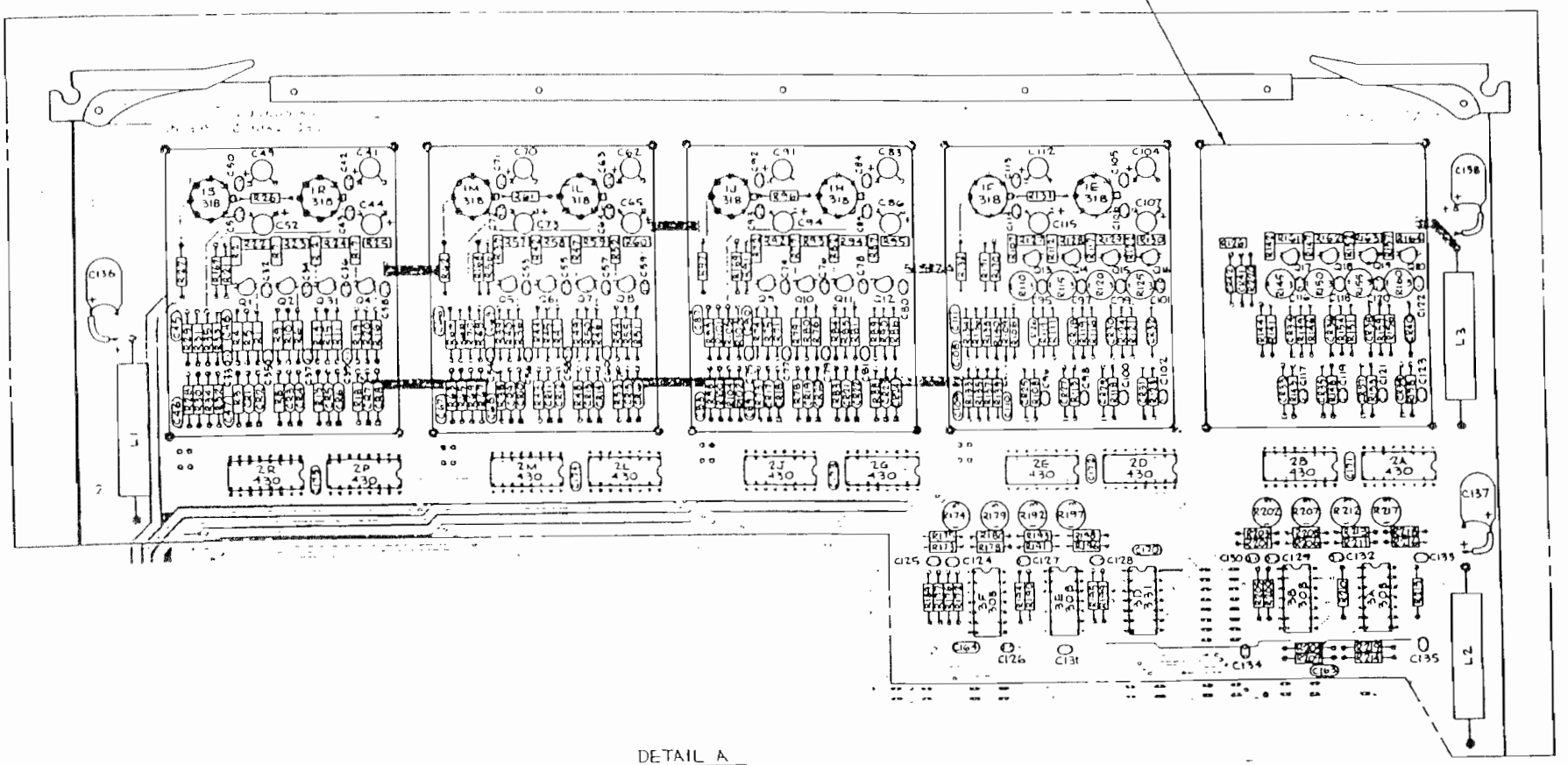
QTY/ MODEL	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING			RAMTEK
	SIGNATURES		DATE	
	DWN			P.C.B. ASSEMBLY- VIDEO TYPE 2A
	CHK			
	ENG			
	APVD			
HEAT ASSY	MATL		SIZE D	SCALE 1/1 SHT 1 OF 4 — DWG NO 503045 — REV B

REVISIONS			
	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

COMPONENTS UNDER DAC SOCKETS MUST NOT EXCEED 13/32 INCH. (5 PLCS) (ZH)



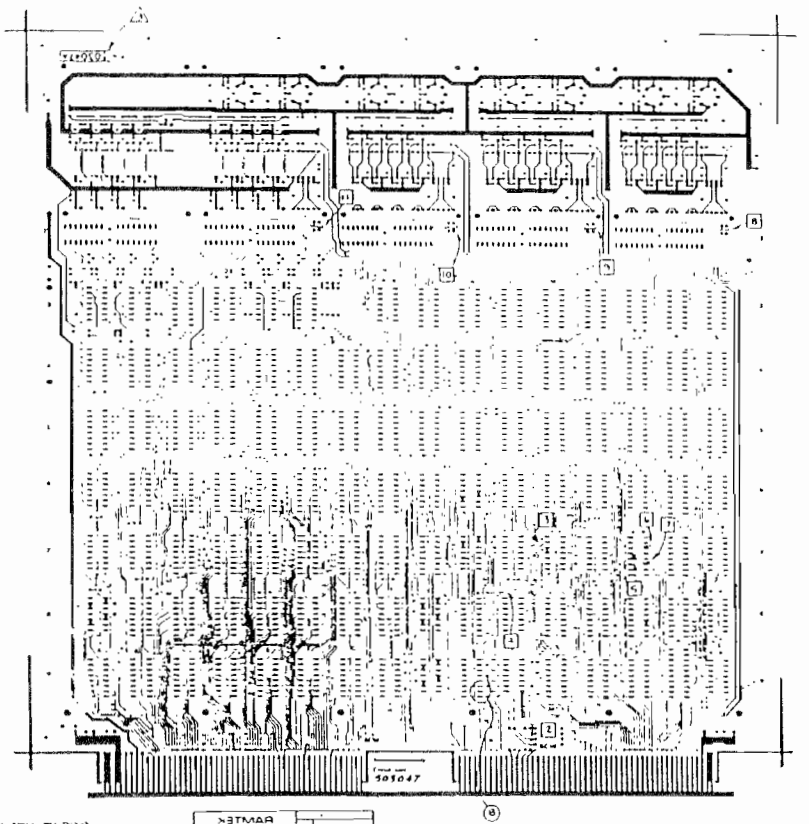
DETAIL A
SCALE 2/1

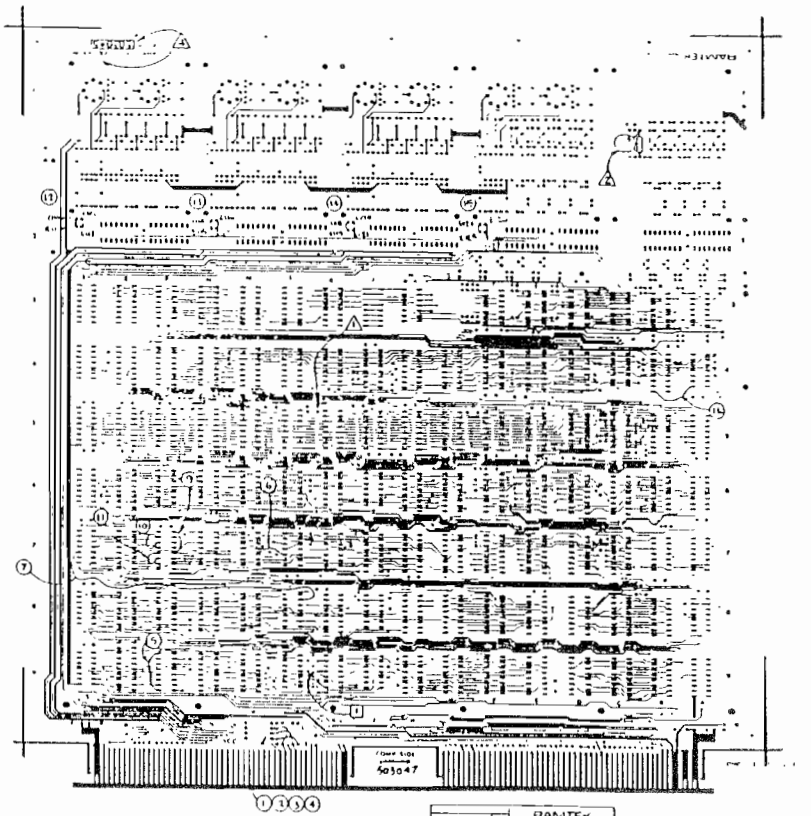
QTY PER	PART NO	ITEM DESCRIPTION	REF NO

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
	DRWN		P.C.B ASSEMBLY- VIDEO TYPE 2A
	CHKD		
	APVD		SIZE A SCALE 2/1 SHT 2 OF 4 DWG NO 503045 REV 8

NEXT ASSY





NOTES

1. CAPACITOR FEEDTHRU IS TOO CLOSE TO THE TRACE ABOVE. TO PREVENT A SHORT PROBLEM, CUT OFF SMALL PORTION OF FEEDTHRU.
2. ADD 33 pF CAPACITOR PER ECO REVISION AS SHOWN.
3. PLACE A PIXEL STICKER OVER P/N 503047-07 TO READ 503045 AND ADD AN A AFTER THE '3' AS SHOWN.
4. PLACE A PIXEL STICKER OVER ASSY 503047 TO READ 503045 AND ADD AN A AFTER THE '3' AS SHOWN.

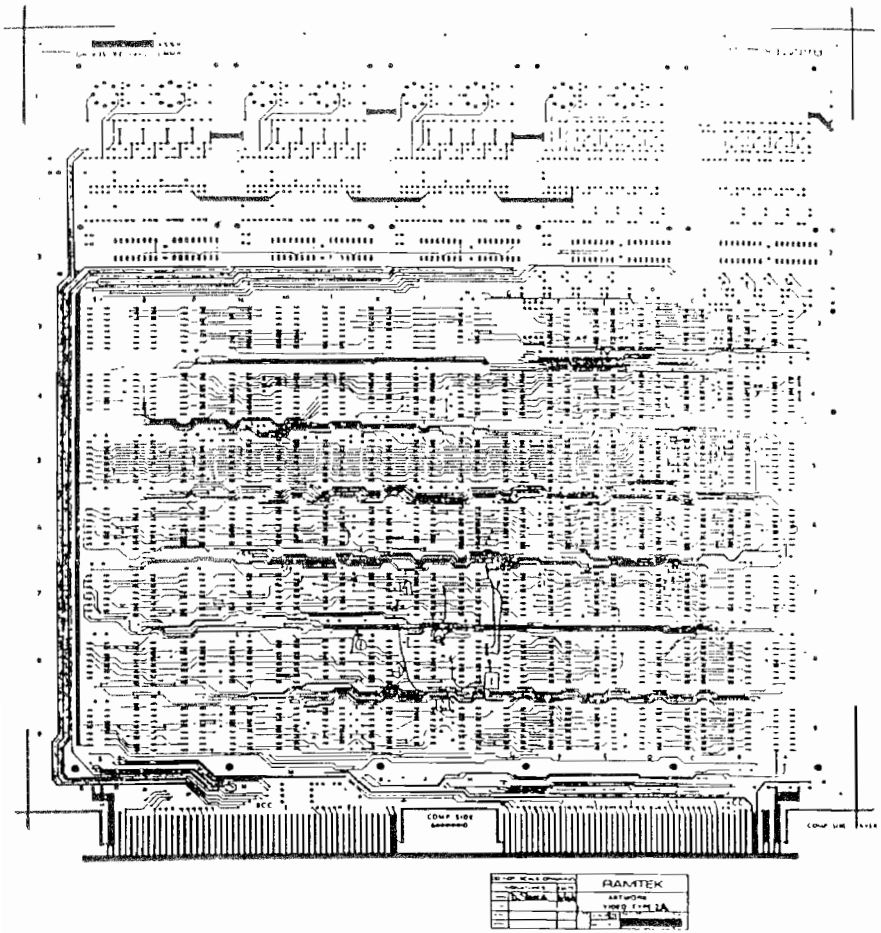
DELETES

1. CUT TRACE AT PL-4
2. CUT 4 TRACES AS SHOWN
3. CUT TRACE AT PM-12
4. CUT TRACE AT BL-13
5. CUT TRACE AT PM-12
6. CUT TRACE AT PP-3
7. CUT TRACE AT PP-5
8. CUT TRACES BETWEEN FEEDTHRUS AS SHOWN

ADDS

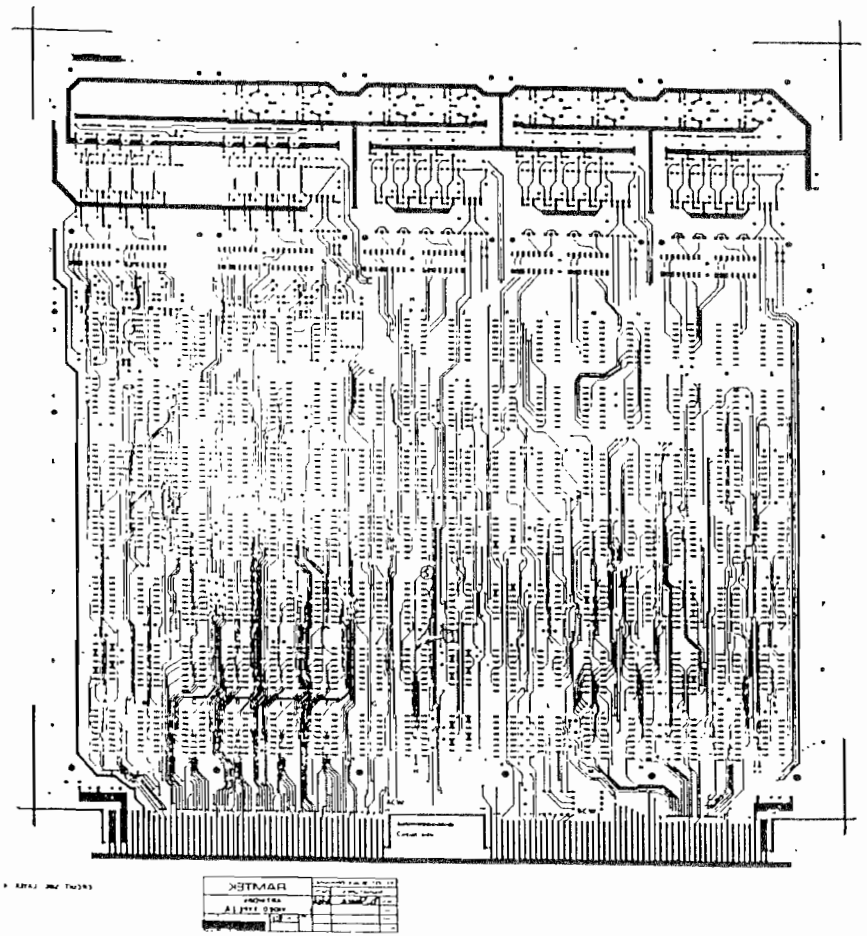
1. ADD WIRE BETWEEN FEEDTHRUS AS SHOWN.
2. PP-1 TO PP-6
3. PM-11 TO PL-5
4. PS-5 TO BL-13
5. PK-5 TO SQUARE FEEDTHRU (USE INSULATED WIRE)
6. PP-12 TO PP-14
7. PP-2 TO PP-5
8. PP-5 TO PP-6
9. END TO END BIT TO EH5
10. EH4 TO EH5 BIT TO EH7
11. EH8 TO EH9 BIT TO EH1
12. EH14 TO EH15 BIT TO EH7
13. AA-17 TO AB-5

			RAMTEK	
			P.C.B. ASSY CUT & PATCH VIDEO TYPE 2A	
			503045	3



DELETES

1. CUT TRACE AT 8H-3, 8H-15, & 8H-14 (COMP SIDE)
2. LIFT IC PIN 9 AT 8H AWAY FROM CKT PAD (COMP SIDE)
3. CUT TRACE AT 8H-2 (CKT SIDE)
4. CUT TRACE AT 7K-8 (COMP SIDE)

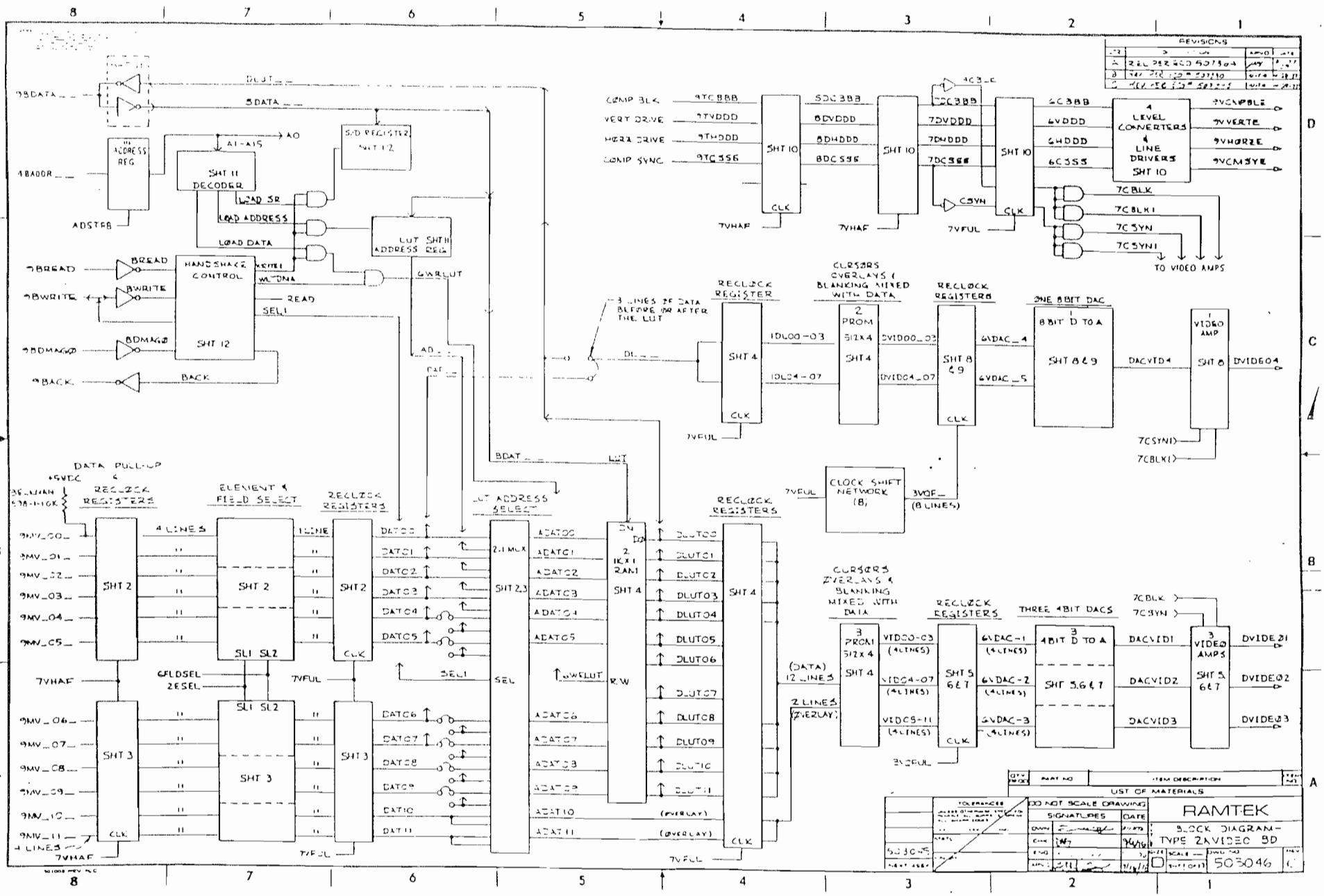


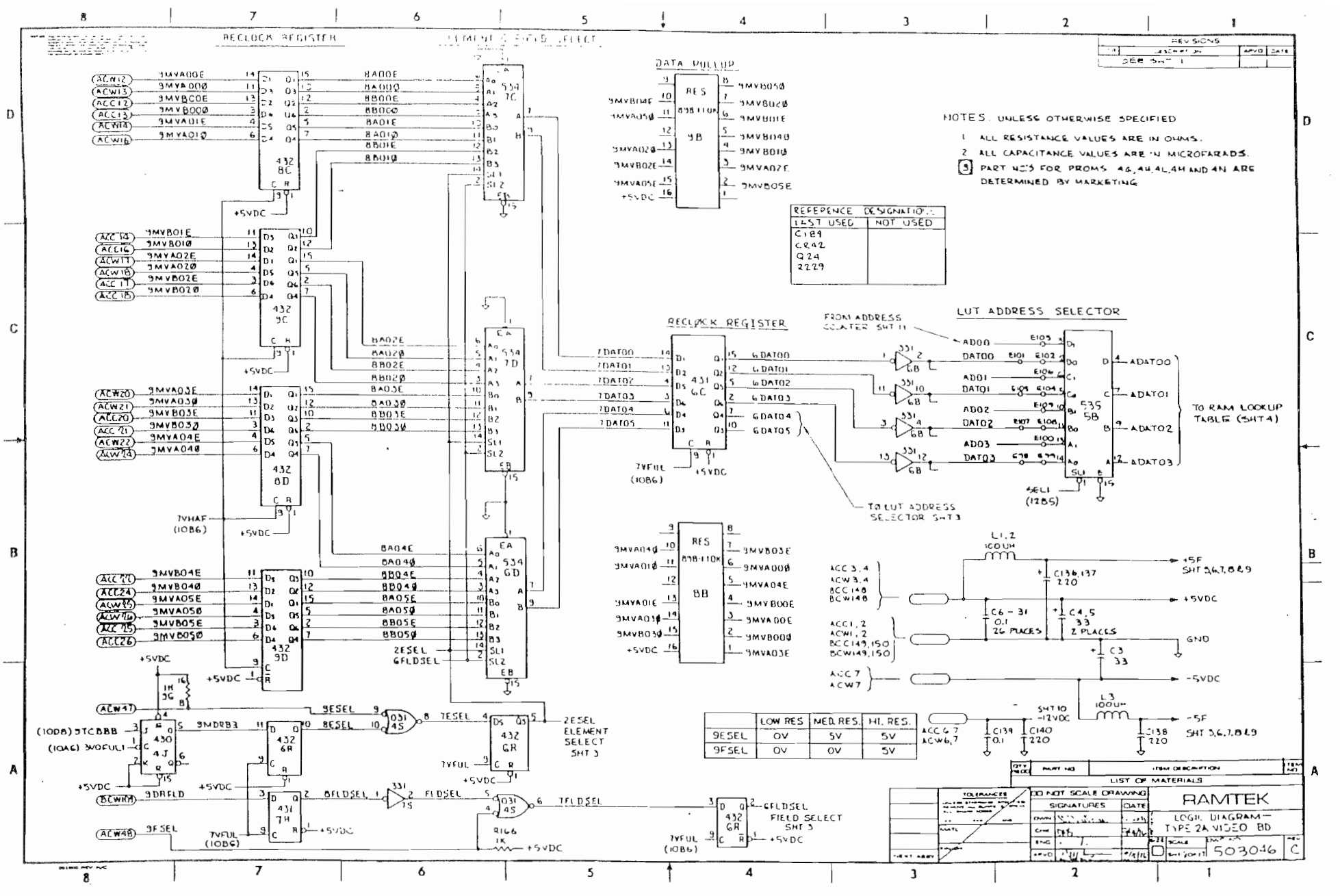
ADDS

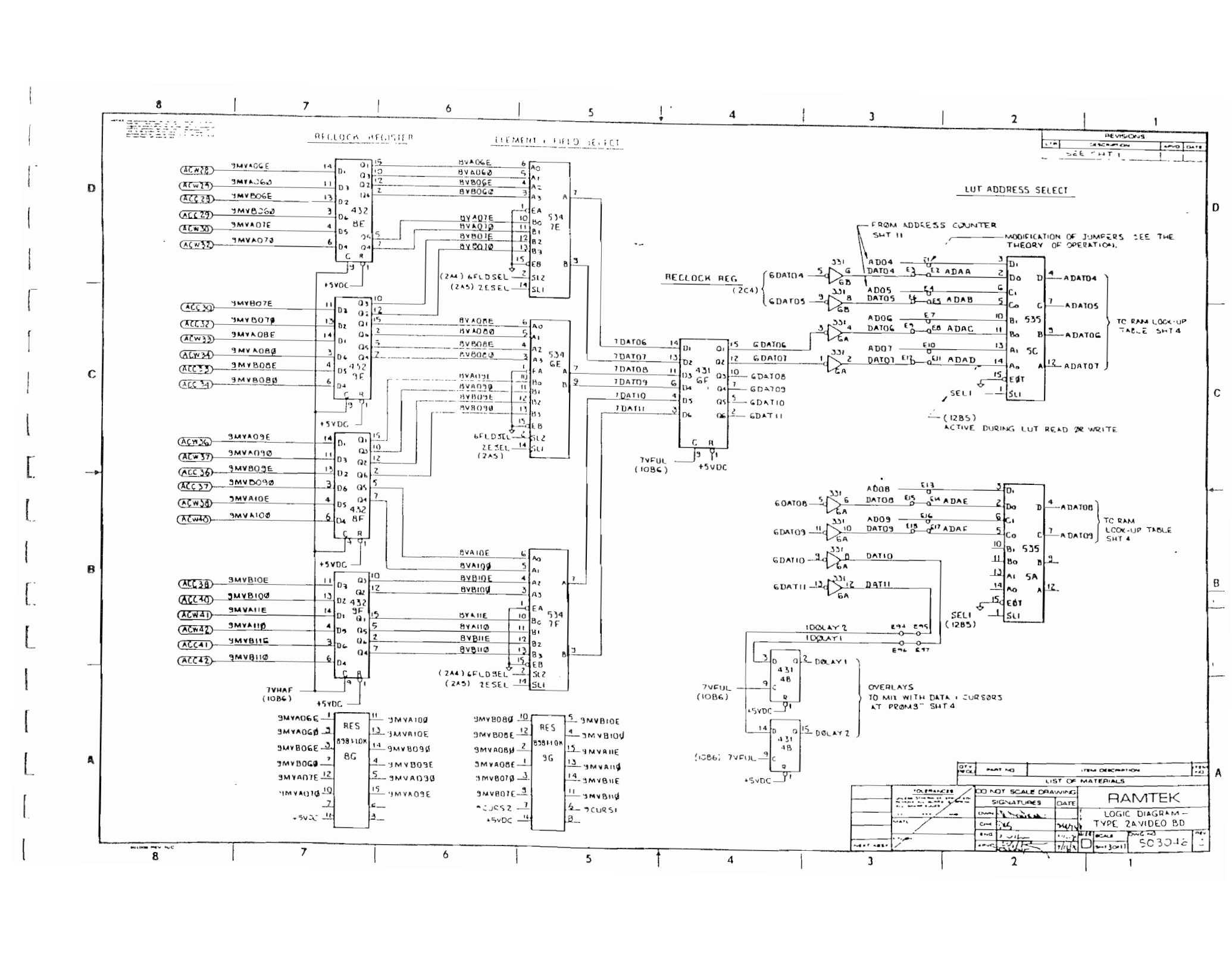
1. 7H-3 TO FEEDTHRU SHOWN (COMP SIDE)
2. 7H-15 TO FEEDTHRU SHOWN (COMP SIDE)
3. 7H-14 TO FEEDTHRU SHOWN (COMP SIDE)
4. 7K-8 TO IC PIN 9 AT 8H-8E SURE PIN 9 DOESNOT TOUCH THE PAD. (COMP SIDE)
5. 7H-2 TO FEEDTHRU SHOWN (CKT SIDE)
6. 7H-9 TO 7J-9

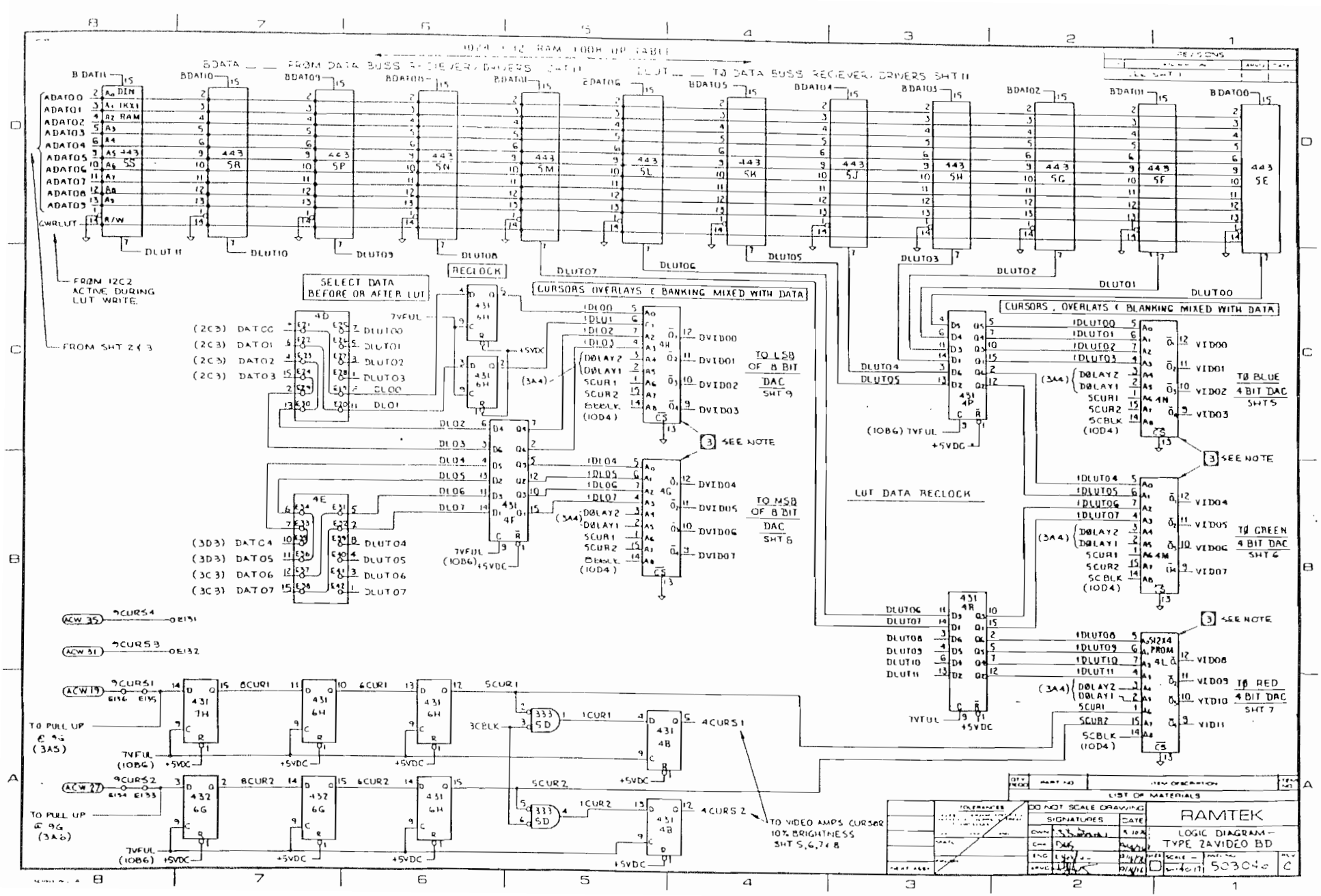
ECO # 507709
Sheet 3 of 8

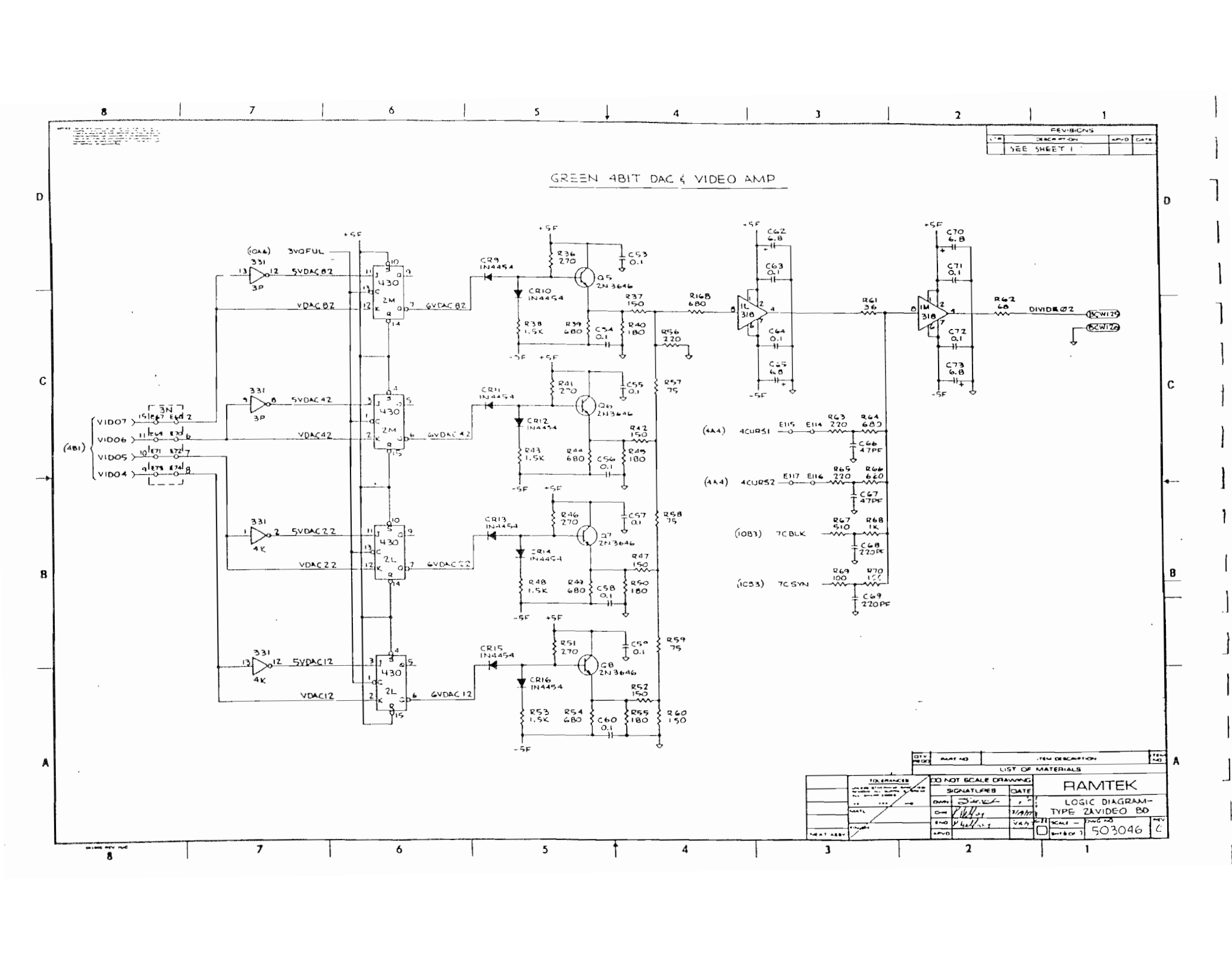
DO NOT SCALE DRAWING			RAMTEK	
SIGNATURES		DATE		
DWN	[illegible]	4/17/84	PCB ASSY	
CHK	[illegible]	4/17/84	VIDEO TYPE 2A	
ENG	[illegible]	4/17/84	SIZE: D	SCALE: NOT TO SCALE
APVD			DWG NO: 503045	REV: B

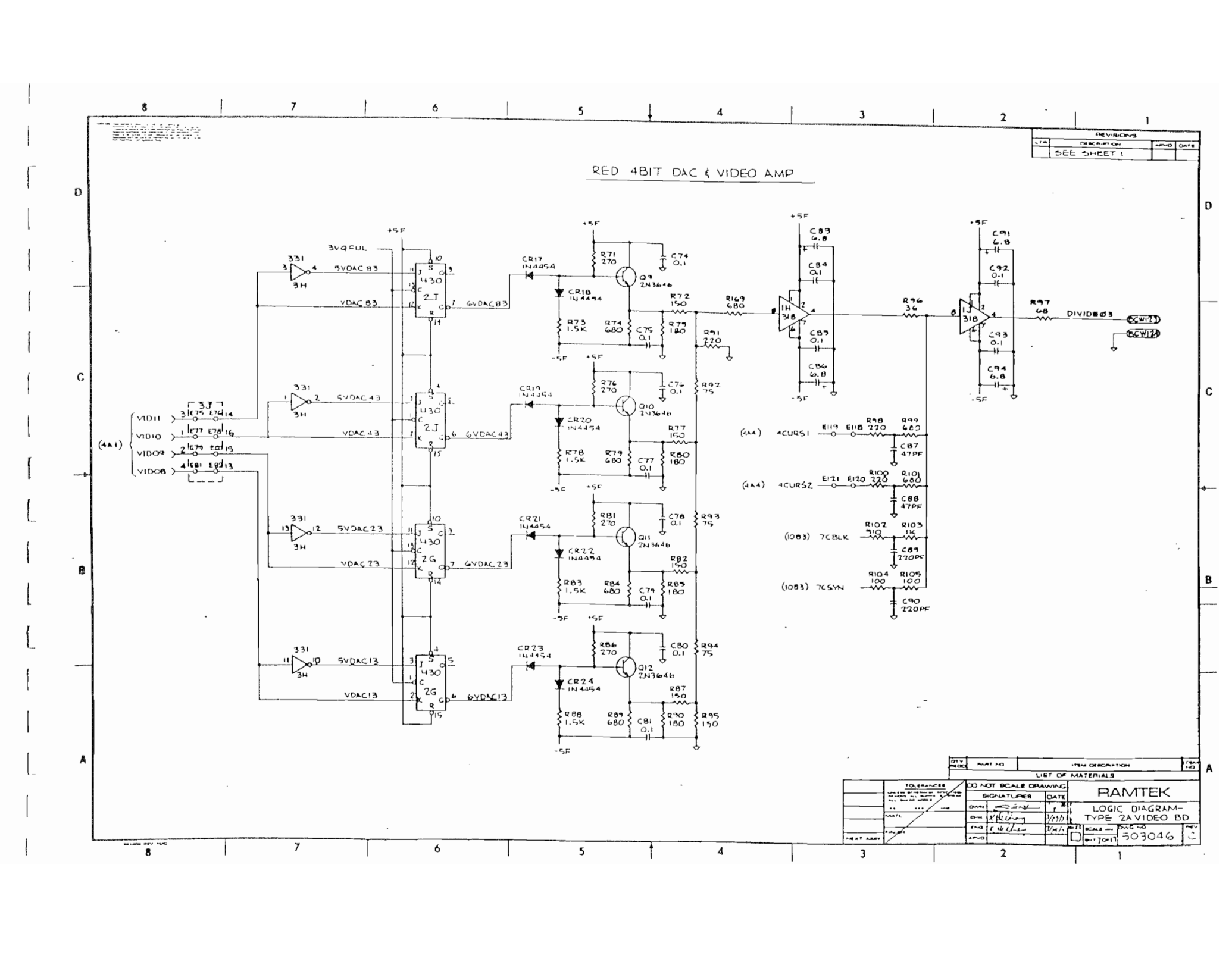

REVISIONS
LEVEL CONVERTERS & LINE DRIVERS SHT 10
ADDRESS REG
SHT 11 DECODER
S/D REGISTER SHT 12
LUT SHTH ADDRESS REG
HANDSHAKE CONTROL
SHT 12
3 LINES OF DATA BEFORE AND AFTER THE LUT
RECLOCK REGISTER
SHT 4
2 PROM 512x4 SHT 4
CURSORS OVERLAYS & BLANKING MIXED WITH DATA
RECLOCK REGISTERS
SHT 8 & 9
ONE 8BIT DAC
8BIT D TO A
SHT 8 & 9
VIDEO AMP
SHT 8
TO VIDEO AMPS
DATA PULL-UP
RECLOCK REGISTERS
ELEMENT & FIELD SELECT
RECLOCK REGISTERS
LUT ADDRESS SELECT
2:1 MUX
SHT 2,3
2 1KX1 RAM
SHT 4
RECLOCK REGISTERS
SHT 4
CLOCK SHIFT NETWORK (8)
SHT 2
SHT 3
CURSORS OVERLAYS & BLANKING MIXED WITH DATA
3 PROM 512x4 SHT 4
RECLOCK REGISTERS
SHT 5 6 & 7
THREE 4BIT DACS
4BIT D TO A
SHT 5,6 & 7
3 VIDEO AMPS
SHT 5 6 & 7
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
BLOCK DIAGRAM-
TYPE 2A/VIDEO 8D
503046

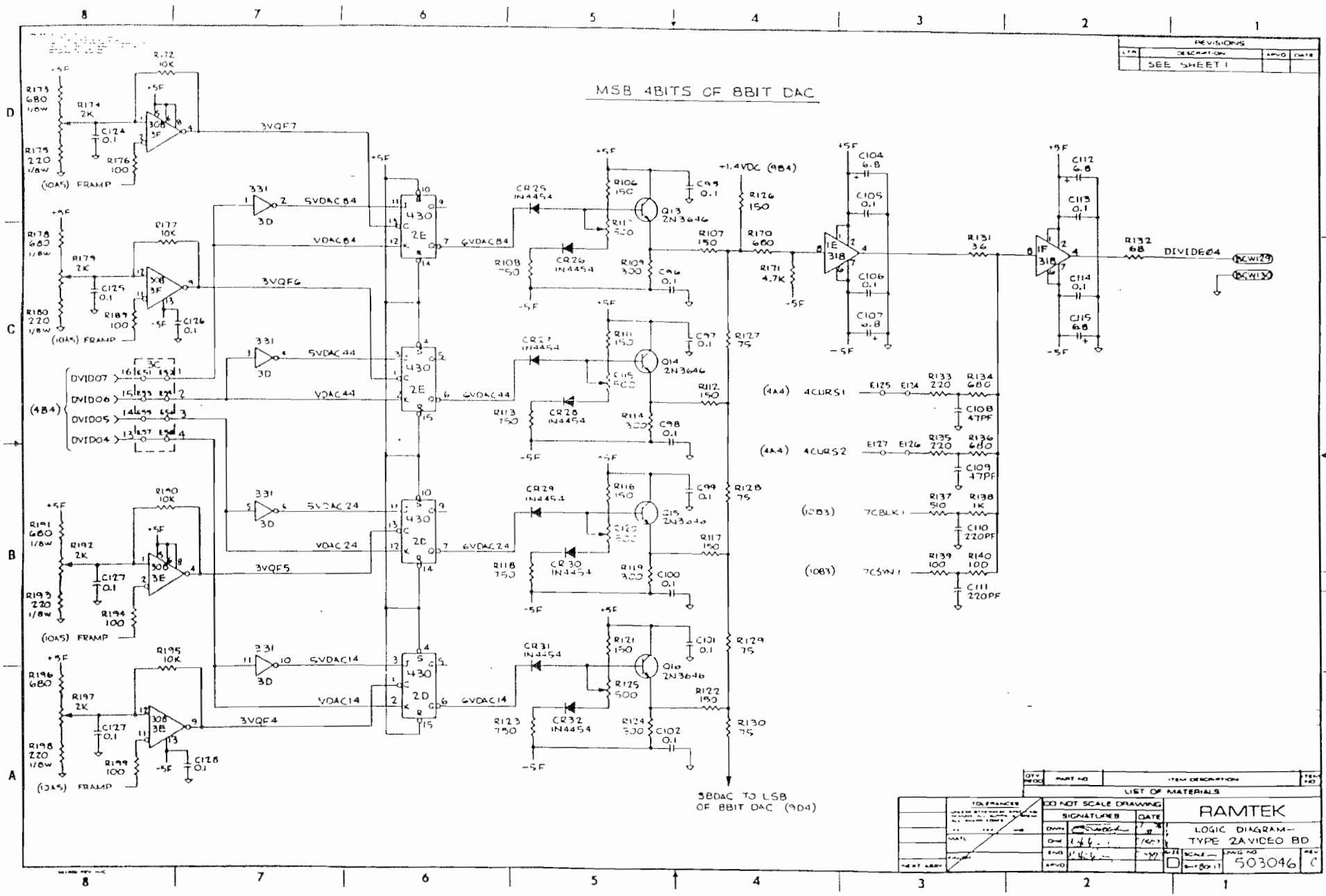

RECLOCK REGISTER
ELEMENT & FIELD SELECT
DATA PULLUP
RECLOCK REGISTER
LUT ADDRESS SELECTOR
FROM ADDRESS COUNTER SHT 11
TO LUT ADDRESS SELECTOR SHT 3
TO RAM LOOKUP TABLES (SHT 4)
NOTES: UNLESS OTHERWISE SPECIFIED
1 ALL RESISTANCE VALUES ARE IN OHMS.
2 ALL CAPACITANCE VALUES ARE IN MICROFARADS.
3 PART NOS FOR PROMS 4G,4H,4L,4M AND 4N ARE DETERMINED BY MARKETING
REFERENCE DESIGNATIONS
TEST USED
NOT USED
C189
CR42
Q24
Z229
REVISIONS
SEE SHT 1
LIST OF MATERIALS
DO NOT SCALE DRAWING
RAMTEK
LOGIC DIAGRAM — TYPE 2A VIDEO BD
503046
SHEET 2 OF 11

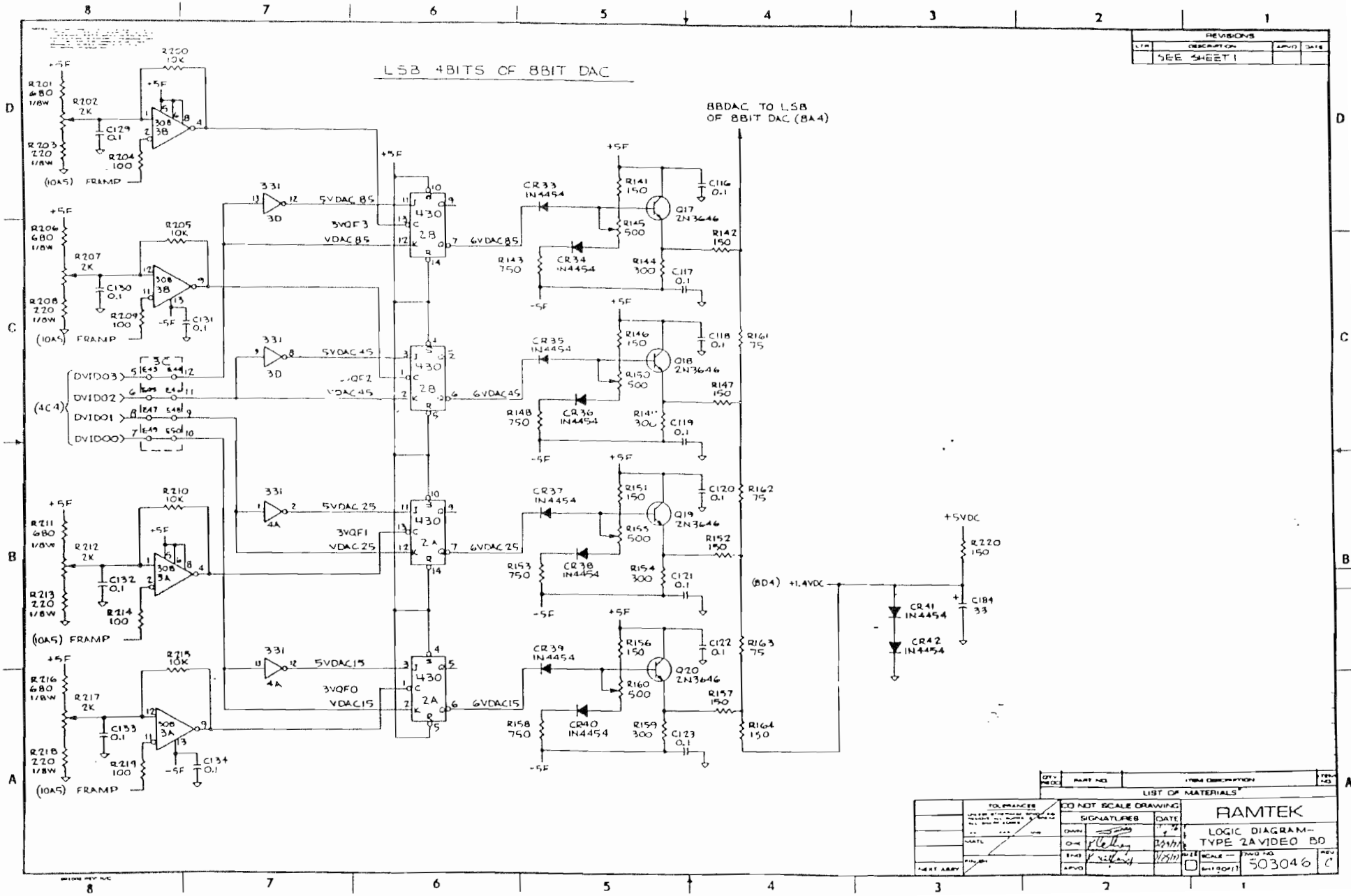

RECLOCK REGISTER
ELEMENT + FIELD SELECT
LUT ADDRESS SELECT
REVISIONS
SEE SHT 1
FROM ADDRESS COUNTER SHT 11
MODIFICATION OF JUMPERS SEE THE THEORY OF OPERATION.
RECLOCK REG (2C4)
TC RAM LOOK-UP TABLE SHT 4
(12B5) ACTIVE DURING LUT READ OR WRITE
OVERLAYS TO MIX WITH DATA + CURSORS AT PROM3" SHT 4
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
LOGIC DIAGRAM — TYPE 2A VIDEO BD
503046

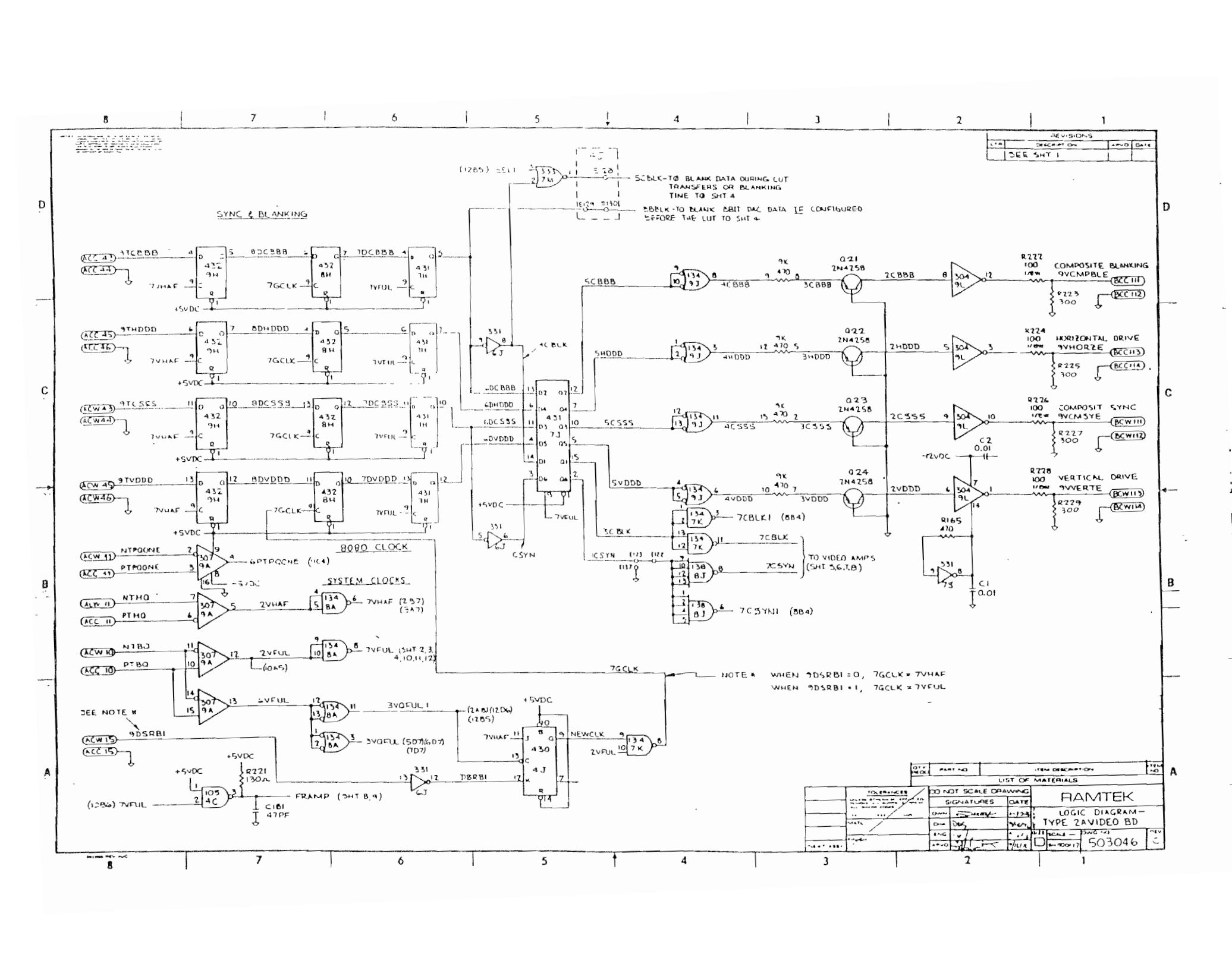

BDATA — FROM DATA BUSS RECIEVER/DRIVERS SHT 11
DLUT — TO DATA BUSS RECIEVER/DRIVERS SHT 11
B DATA
BDATA11
BDATA10
BDATA09
BDATA08
BDATA07
BDATA06
BDATA05
BDATA04
BDATA03
BDATA02
BDATA01
BDATA00
ADATA00
ADATA01
ADATA02
ADATA03
ADATA04
ADATA05
ADATA06
ADATA07
ADATA08
ADATA09
DIN
IKX1 RAM
RAM
R/W
5R
5P
5N
5M
5L
5K
5J
5H
5G
5F
5E
DLUT11
DLUT10
DLUT09
DLUT08
DLUT07
DLUT06
DLUT05
DLUT04
DLUT03
DLUT02
DLUT01
DLUT00
GWRLUT
FROM I2C2 ACTIVE DURING LUT WRITE.
FROM SHT 2 C 3
SELECT DATA BEFORE OR AFTER LUT
RECLOCK
CURSORS OVERLAYS & BANKING MIXED WITH DATA
CURSORS , OVERLAYS & BLANKING MIXED WITH DATA
LUT DATA RECLOCK
(2C3) DAT00
(2C3) DAT01
(2C3) DAT02
(2C3) DAT03
(3D3) DAT04
(3D3) DAT05
(3C3) DAT06
(3C3) DAT07
DLUT00
DLUT01
DLUT02
DLUT03
DLUT04
DLUT05
DLUT06
DLUT07
DVID00
DVID01
DVID02
DVID03
DVID04
DVID05
DVID06
DVID07
VID00
VID01
VID02
VID03
VID04
VID05
VID06
VID07
VID08
VID09
VID10
VID11
TO LSB OF 8 BIT DAC SHT 9
TO MSB OF 8 BIT DAC SHT 8
TO BLUE 4 BIT DAC SHT 5
TO GREEN 4 BIT DAC SHT 6
TO RED 4 BIT DAC SHT 7
SEE NOTE
7VFUL
+5VDC
DELAY2
DELAY1
SCUR1
SCUR2
SCBLK
(10D4)
(10B6)
(3A4)
(3A5)
(3A6)
ACW 35
ACW 31
ACW 19
ACW 27
9CURS4
9CURS3
9CURS1
9CURS2
8CUR1
6CUR1
5CUR1
8CUR2
6CUR2
5CUR2
3CBLK
1CUR1
1CUR2
4CURS1
4CURS2
TO PULL UP @ 9G (3A5)
TO PULL UP @ 9G (3A6)
TO VIDEO AMPS CURSOR 10% BRIGHTNESS SHTS 5,6,7 & 8
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
LOGIC DIAGRAM — TYPE ZA VIDEO BD
50304-C

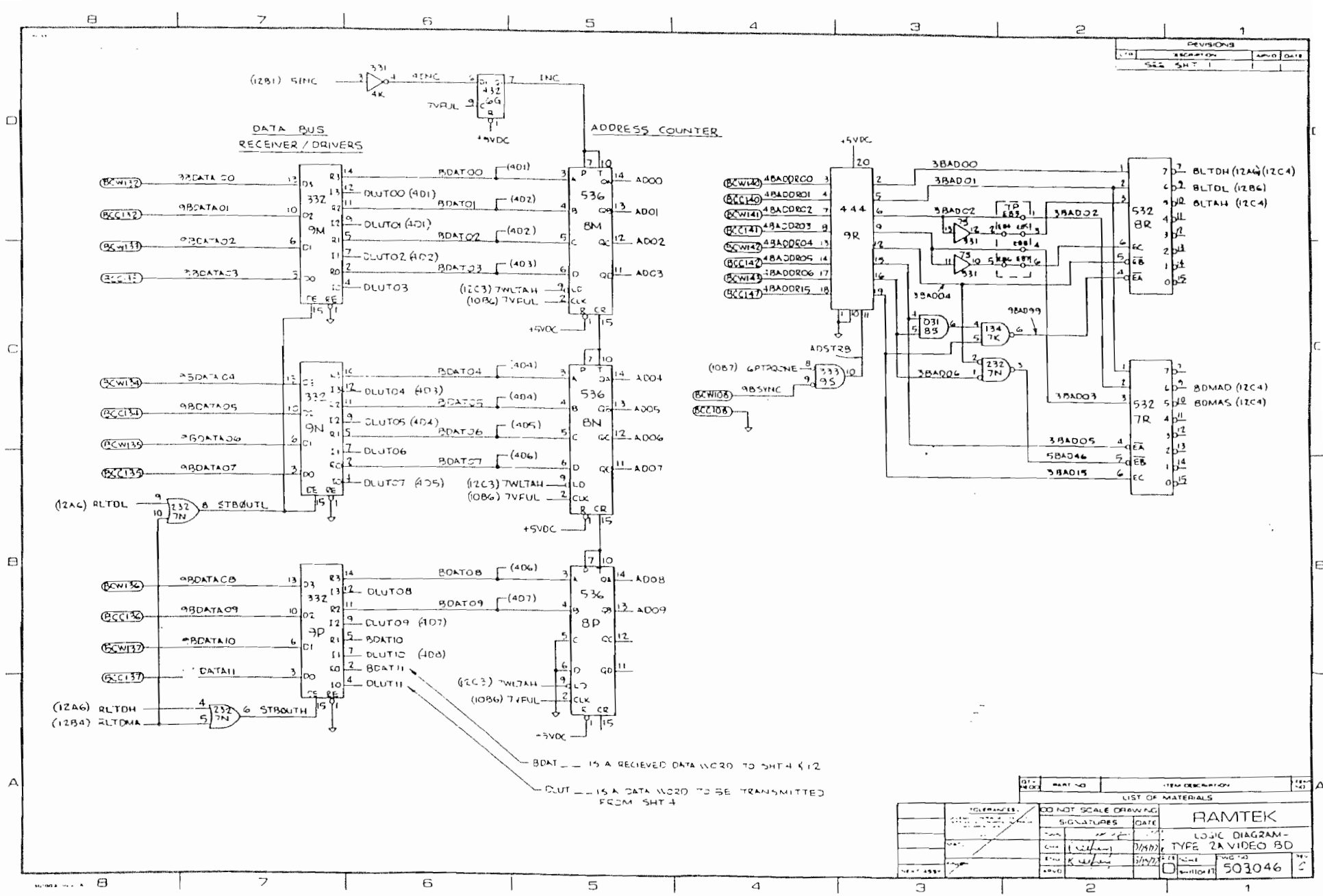

REVISIONS
SEE SHEET 1
GREEN 4BIT DAC & VIDEO AMP
VIDO7
VIDO6
VIDO5
VIDO4
3VOFUL
5VDAC B2
VDAC B2
6VDAC B2
5VDAC A2
VDAC A2
6VDAC A2
5VDAC 22
VDAC 22
6VDAC 22
5VDAC 12
VDAC 12
6VDAC 12
+5F
-5F
CR9 IN4454
CR10 IN4454
CR11 IN4454
CR12 IN4454
CR13 IN4454
CR14 IN4454
CR15 IN4454
CR16 IN4454
Q5 2N3646
Q6 2N3646
Q7 2N3646
Q8 2N3646
4CURS1
4CURS2
7CBLK
7CSYN
DIVIDE Ø2
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
LOGIC DIAGRAM-
TYPE 2A VIDEO BD
503046
LIST OF MATERIALS

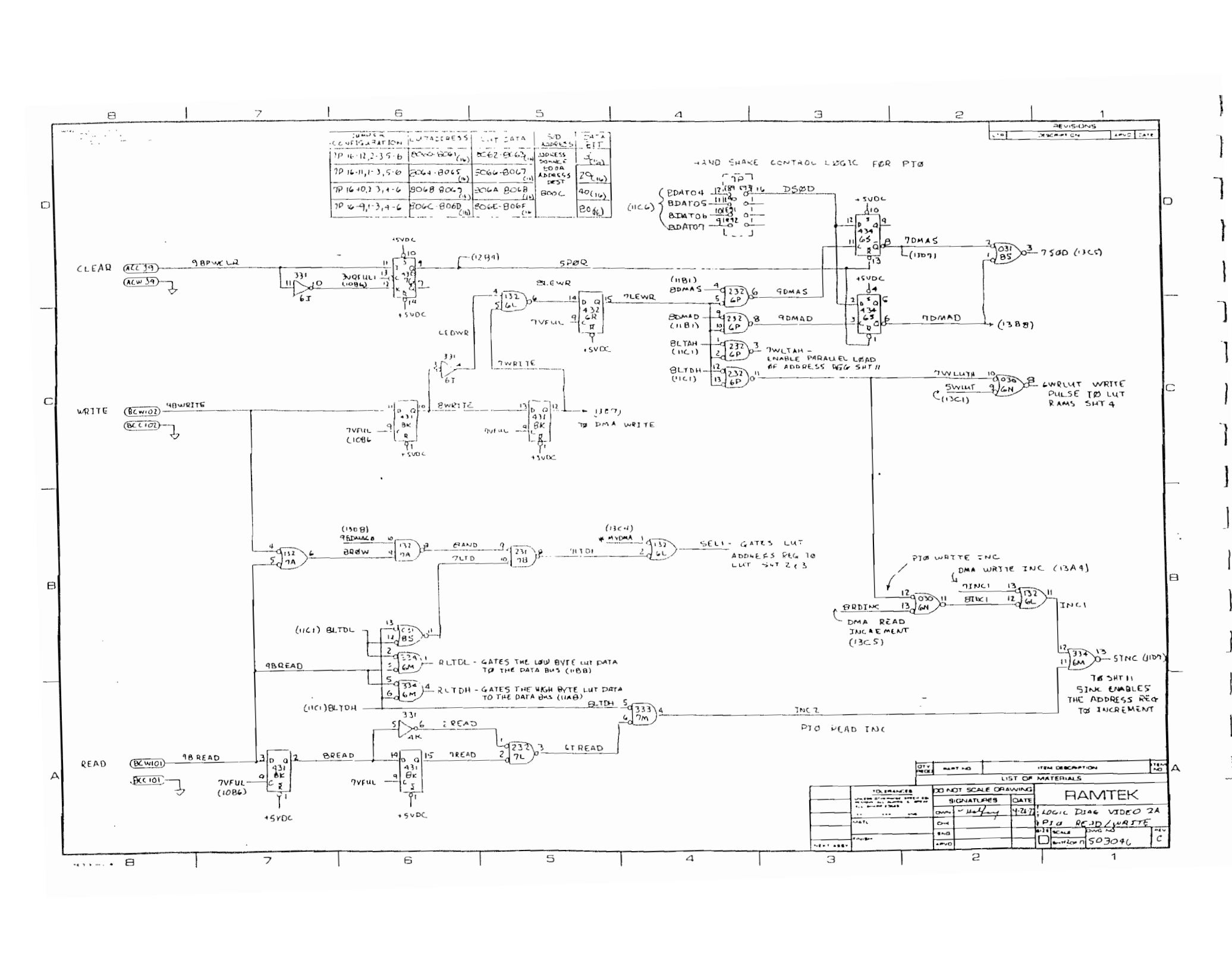

RED 4BIT DAC & VIDEO AMP
REVISIONS
LTR DESCRIPTION APVD DATE
SEE SHEET 1
3VQFUL
+5F
-5F
VID11
VID10
VID09
VID08
(4A1)
5VDAC83
VDAC83
6VDAC83
5VDAC43
VDAC43
6VDAC43
5VDAC23
VDAC23
6VDAC23
5VDAC13
VDAC13
6VDAC13
CR17 IN4454
CR18 IN4454
CR19 IN4454
CR20 IN4454
CR21 IN4454
CR22 IN4454
CR23 IN4454
CR24 IN4454
Q9 2N3646
Q10 2N3646
Q11 2N3646
Q12 2N3646
R71 270
R72 150
R73 1.5K
R74 680
R75 180
R76 270
R77 150
R78 1.5K
R79 680
R80 180
R81 270
R82 150
R83 1.5K
R84 680
R85 180
R86 270
R87 150
R88 1.5K
R89 680
R90 180
R91 220
R92 75
R93 75
R94 75
R95 150
R169 680
R96 36
R97 68
DIVID#03
DCWI23
DCWI24
C74 0.1
C75 0.1
C76 0.1
C77 0.1
C78 0.1
C79 0.1
C80 0.1
C81 0.1
C83 6.8
C84 0.1
C85 0.1
C86 6.8
C91 6.8
C92 0.1
C93 0.1
C94 6.8
4CURS1
4CURS2
7CBLK
7CSYN
R98 270
R99 680
R100 270
R101 680
R102 510
R103 1K
R104 100
R105 100
C87 47PF
C88 47PF
C89 220PF
C90 220PF
LIST OF MATERIALS
QTY PER UNIT
PART NO
ITEM DESCRIPTION
ITEM NO
DO NOT SCALE DRAWING
SIGNATURES
DATE
DRAWN
CHK
ENG
APVD
RAMTEK
LOGIC DIAGRAM-
TYPE 2A VIDEO BD
SCALE —
DWG NO
503046
REV
C

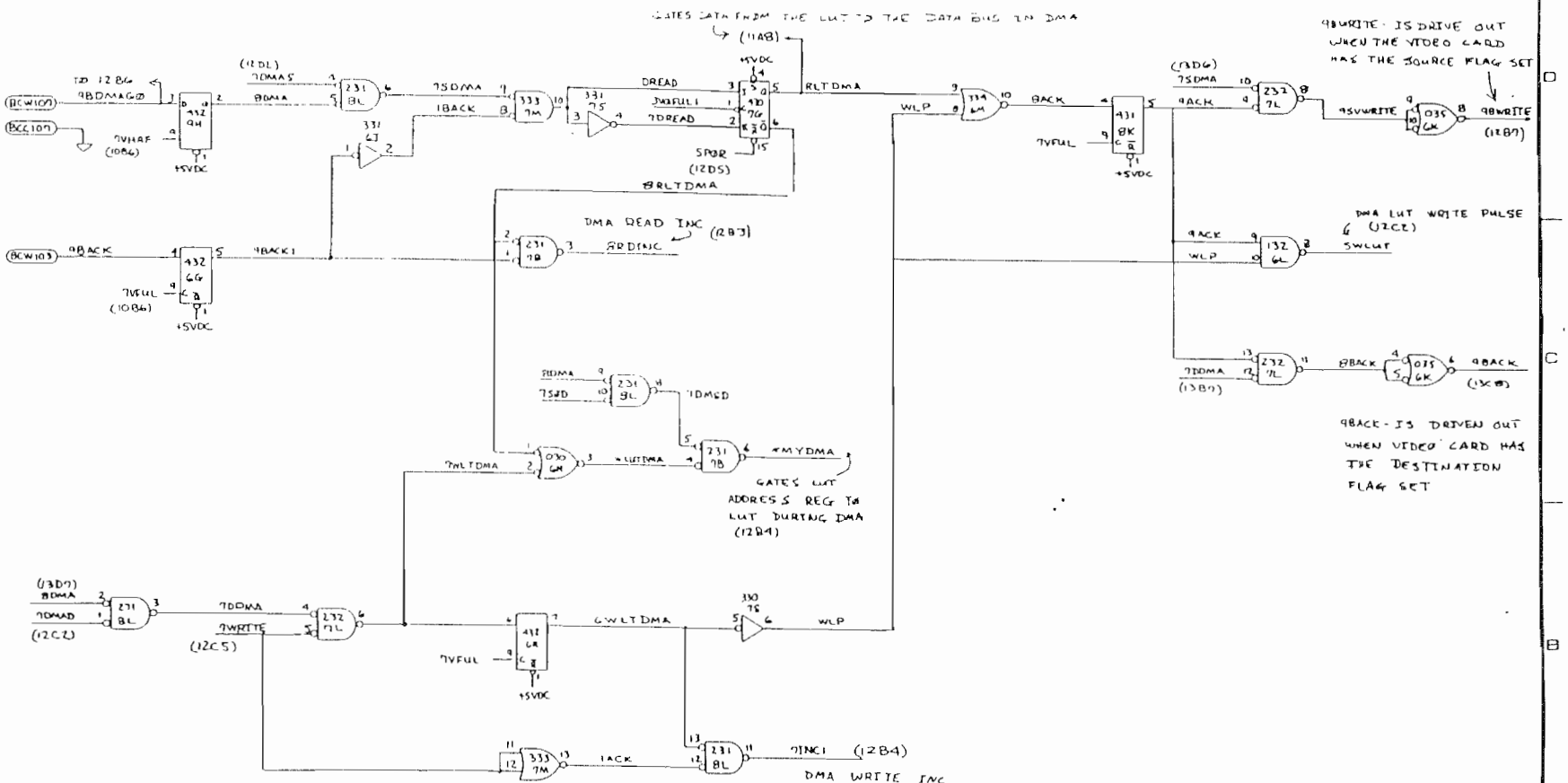

MSB 4BITS OF 8BIT DAC
REVISIONS
SEE SHEET 1
+5F
R172 10K
R173 680 1/8W
R174 2K
C124 0.1
R175 220 1/8W
R176 100
(10A5) FRAMP
3VQF7
331
3D
5VDAC84
VDAC84
6VDAC84
430
2E
CR25 IN4454
CR26 IN4454
R106 150
Q13 2N3646
R110 500
R108 750
R109 300
C96 0.1
C99 0.1
+1.4VDC (9B4)
R126 150
R107 150
R170 660
R171 4.7K
-5F
C104 6.8
C105 0.1
C106 0.1
C107 6.8
1E 318
R131 36
1F 318
C112 6.8
C113 0.1
C114 0.1
C115 6.8
R132 68
DIVIDE04
(2CW129)
(2CW130)
R177 10K
R178 680 1/8W
R179 2K
C125 0.1
R180 220 1/8W
R181 100
C126 0.1
3VQF6
VDAC44
6VDAC44
5VDAC44
CR27 IN4454
CR28 IN4454
R111 150
Q14 2N3646
R113 750
R114 300
C98 0.1
C97 0.1
R127 75
R112 150
3C
DVID07
DVID06
DVID05
DVID04
(4B4)
4CURS1
4CURS2
(4A4)
R133 220
R134 680
C108 47PF
R135 220
R136 680
C109 47PF
(10B3)
7CBLK1
7CSYN1
R137 510
R138 1K
C110 220PF
R139 100
R140 100
C111 220PF
R190 10K
R191 680 1/8W
R192 2K
C127 0.1
R193 220 1/8W
R194 100
3VQF5
VDAC24
6VDAC24
5VDAC24
CR29 IN4454
CR30 IN4454
R116 150
Q15 2N3646
R118 750
R119 300
C100 0.1
C99 0.1
R128 75
R117 150
2D
3E
R195 10K
R196 680
R197 2K
R198 220 1/8W
R199 100
C128 0.1
3VQF4
VDAC14
6VDAC14
5VDAC14
CR31 IN4454
CR32 IN4454
R121 150
Q16 2N3646
R123 750
R124 300
C102 0.1
C101 0.1
R129 75
R122 150
R130 75
3BDAC TO LSB OF 8BIT DAC (9D4)
LIST OF MATERIALS
QTY REQ
PART NO
ITEM DESCRIPTION
ITEM NO
TOLERANCES
DO NOT SCALE DRAWING
SIGNATURES
DATE
DWN
CHK
ENG
APVD
NEXT ASSY
RAMTEK
LOGIC DIAGRAM—
TYPE 2A VIDEO BD
SIZE D
SCALE —
DWG NO 503046
REV C

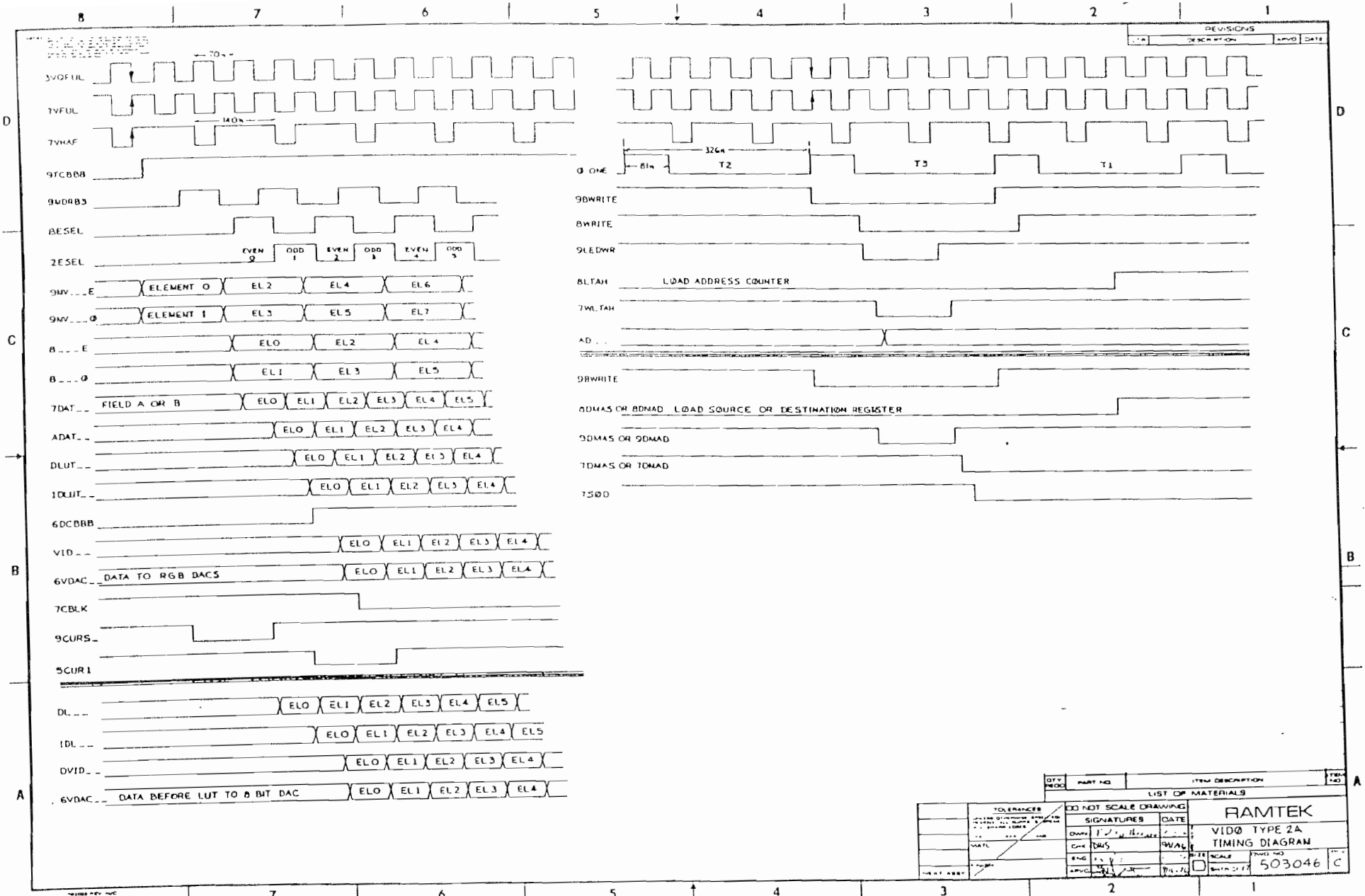

LSB 4BITS OF 8BIT DAC
8BDAC TO LSB OF 8BIT DAC (8A4)
REVISIONS
SEE SHEET 1
+5F
-5F
R220 10K
R201 680 1/8W
R202 2K
C129 0.1
R203 220 1/8W
R204 100
(10A5) FRAMP
R205 10K
R206 680 1/8W
R207 2K
C130 0.1
R208 220 1/8W
R209 100
C131 0.1
R210 10K
R211 680 1/8W
R212 2K
C132 0.1
R213 220 1/8W
R214 100
R215 10K
R216 680 1/8W
R217 2K
C133 0.1
R218 220 1/8W
R219 100
C134 0.1
331
3D
4A
5VDAC 8S
3VQF3
VDAC 8S
6VDAC 8S
5VDAC 4S
3VQF2
VDAC 4S
6VDAC 4S
5VDAC 2S
3VQF1
VDAC 2S
6VDAC 2S
5VDAC 1S
3VQF0
VDAC 1S
6VDAC 1S
J 430 K
3C
(4C4)
DVIDO3
DVIDO2
DVIDO1
DVIDO0
CR33 IN4454
CR34 IN4454
CR35 IN4454
CR36 IN4454
CR37 IN4454
CR38 IN4454
CR39 IN4454
CR40 IN4454
CR41 IN4454
CR42 IN4454
R141 150
R142 150
R143 750
R144 300
R145 500
R146 150
R147 150
R148 750
R149 300
R150 500
R151 150
R152 150
R153 750
R154 300
R155 500
R156 150
R157 150
R158 750
R159 300
R160 500
C116 0.1
C117 0.1
C118 0.1
C119 0.1
C120 0.1
C121 0.1
C122 0.1
C123 0.1
Q17 2N3646
Q18 2N3646
Q19 2N3646
Q20 2N3646
R161 75
R162 75
R163 75
R164 150
+5VDC
R220 150
C184 33
(8D4) +1.4VDC
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
LOGIC DIAGRAM-
TYPE 2A VIDEO BD
SCALE —
SIZE D
DWG NO 503046
REV C


SYNC & BLANKING
8080 CLOCK
SYSTEM CLOCKS
TO VIDEO AMPS (SHT 5,6,7,8)
SCBLK-TO BLANK DATA DURING CUT TRANSFERS OR BLANKING TIME TO SHT 4
BBBLK-TO BLANK 8BIT DAC DATA IF CONFIGURED BEFORE THE LUT TO SHT 4
NOTE 8 WHEN 9DSRBI = 0, 7GCLK = 7VHAF
WHEN 9DSRBI = 1, 7GCLK = 7VFUL
COMPOSITE BLANKING 9VCMPBLE
HORIZONTAL DRIVE 9VHORZE
COMPOSIT SYNC 9VCMSYE
VERTICAL DRIVE 9VVERTE
7CBLK1 (8B4)
7CSYN1 (8B4)
FRAMP (SHT 8,9)
REVISIONS
SEE SHT 1
DO NOT SCALE DRAWING
LIST OF MATERIALS
RAMTEK
LOGIC DIAGRAM-
TYPE 2AVIDEO BD
503046


DATA BUS
RECEIVER / DRIVERS
ADDRESS COUNTER
(12B1) SINC
SYNC
INC
7VFUL
+5VDC
BCWI32
BCCI32
BCWI34
BCCI34
BCWI36
BCCI36
BCWI35
BCCI35
BCWI37
BCCI37
BDATA00
BDATA01
BDATA02
BDATA03
BDATA04
BDATA05
BDATA06
BDATA07
BDATA08
BDATA09
BDATA10
DATA11
DLUT00 (401)
DLUT01 (401)
DLUT02 (402)
DLUT03
DLUT04 (403)
DLUT05 (404)
DLUT06
DLUT07 (405)
DLUT08
DLUT09 (407)
BDAT10
DLUT10 (408)
BDAT11
DLUT11
(12C3) 7WLTAH
(10B6) 7VFUL
(12A6) RLTDL
(12B4) RLTDMA
STBOUTL
STBOUTH
ADS00
ADS01
ADS02
ADS03
ADS04
ADS05
ADS06
ADS07
ADS08
ADS09
BDAT___ IS A RECIEVED DATA WORD TO SHT 4 & 12
DLUT___ IS A DATA WORD TO BE TRANSMITTED FROM SHT 4
4BADDRC0
4BADDR01
4BADDRC2
4BADD203
4BADD504
4BADDR05
4BADDR06
4BADDR15
3BADD0
3BADD1
3BADD2
3BADD3
3BADD4
3BADD5
3BADD6
9BAD99
ADSTRB
(10B7) 6PTRZONE
9BSYNC
BCWI08
BCCI08
BLTDH (12A6) (12C4)
BLTDL (12B6)
BLTAH (12C4)
BDMAD (12C4)
BDMAS (12C4)
REVISIONS
LTR
DESCRIPTION
APVD
DATE
SHT 1
LIST OF MATERIALS
QTY PER ASSY
PART NO
ITEM DESCRIPTION
REF DES
DO NOT SCALE DRAWING
SIGNATURES
DATE
DRWN
CHKD
ENGR
APVD
RAMTEK
LOGIC DIAGRAM-
TYPE 2A VIDEO BD
SIZE
D
DWG NO
503046
REV
C
SCALE
SHEET
8
7
6
5
4
3
2
1
A
B
C
D


JUMPER CONFIGURATION
LUT ADDRESS
LUT DATA
SD ADDRESS
DATA BIT
JP 16-12,2-3,5-6
8066-8067 (16)
8062-8063 (16)
JP 16-11,1-3,5-6
8064-8065 (16)
8066-8067 (16)
JP 16-10,2-3,4-6
8068-806B (16)
806A-806B (16)
JP 16-9,1-3,4-6
806C-806D (16)
806E-806F (16)
ADDRESS SOURCE FOR ADDRESS DEST
8000
29 (16)
40 (16)
80 (16)
HAND SHAKE CONTROL LOGIC FOR PIØ
REVISIONS
DESCRIPTION
APVD
DATE
CLEAR
WRITE
READ
9BPWCLR
5PØR
7LEWR
8WRITE
9BREAD
BREAD
7READ
7WLTAH - ENABLE PARALLEL LOAD OF ADDRESS REG SHT 11
6WRLUT WRITE PULSE TØ LUT RAMS SHT 4
TØ DMA WRITE
SELI - GATES LUT ADDRESS REG TØ LUT SHT 2 & 3
PIØ WRITE INC
DMA WRITE INC (13A9)
DMA READ INCREMENT (13C5)
INC1
SINC (J109)
TØ SHT 11 SINK ENABLES THE ADDRESS REG TØ INCREMENT
RLTDL - GATES THE LOW BYTE LUT DATA TØ THE DATA BUS (11BB)
RLTDH - GATES THE HIGH BYTE LUT DATA TO THE DATA BUS (11AB)
INC2
PIØ READ INC
+5VDC
LIST OF MATERIALS
QTY PER
PART NO
ITEM DESCRIPTION
ITEM NO
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
LOGIC DIAG VIDEO 2A
PIØ READ/WRITE
SCALE
DWG NO
503046
REV
C


GATES DATA FROM THE LUT TO THE DATA BUS IN DMA
(11A8)
9BWRITE - IS DRIVE OUT WHEN THE VIDEO CARD HAS THE SOURCE FLAG SET
(12B7)
DMA READ INC (12B3)
DMA LUT WRITE PULSE (12C2)
9BACK - IS DRIVEN OUT WHEN VIDEO CARD HAS THE DESTINATION FLAG SET
GATES LUT ADDRESS REG TO LUT DURING DMA (12B4)
DMA WRITE INC
(12B4)
RAMTEK
1041C DIAG VIDEO & 2A BD DMA READ/WRITE
503046



REVISIONS			
	DESCRIPTION	APVD	DATE

QTY PROD	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

TOLERANCES

DO NOT SCALE DRAWING

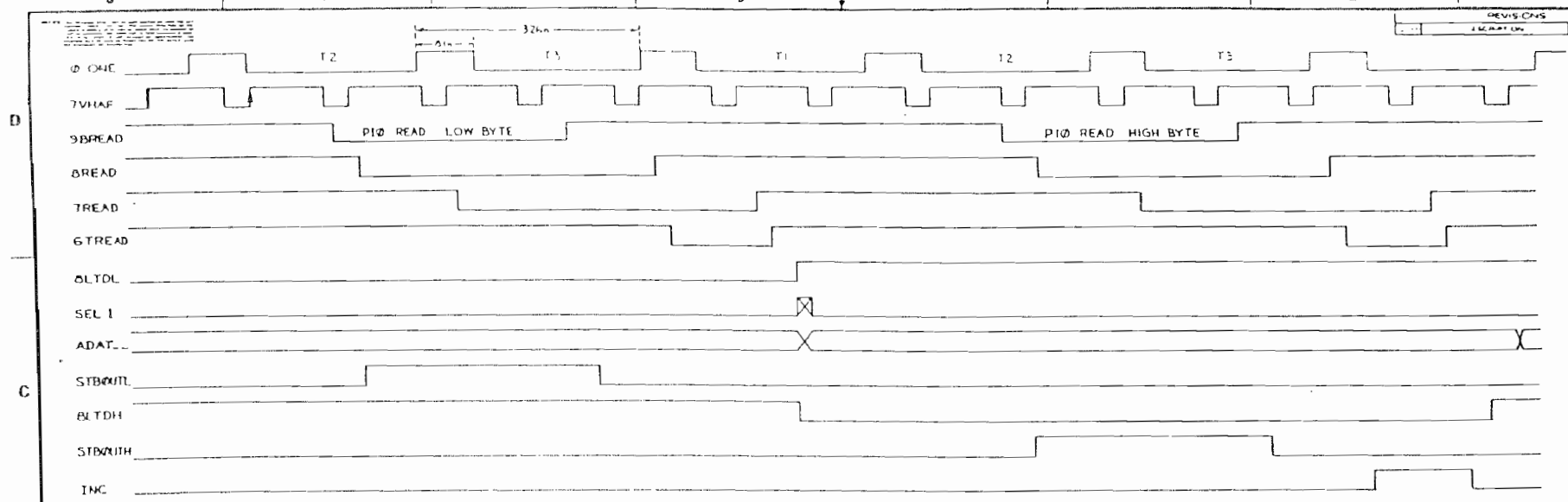
SIGNATURES		DATE
DWN		
CHK	DWS	9/4/86
ENG		
APVD		9/4/86

RAMTEK

VIDØ TYPE 2A
TIMING DIAGRAM

SIZE C | SCALE | DWG NO 503046 | REV C

NEXT ASSY



REVISIONS

ZONE	DESCRIPTION	APVD	DATE

QTY PROD | PART NO | ITEM DESCRIPTION | ITEM NO

LIST OF MATERIALS

TOLERANCES

DO NOT SCALE DRAWING

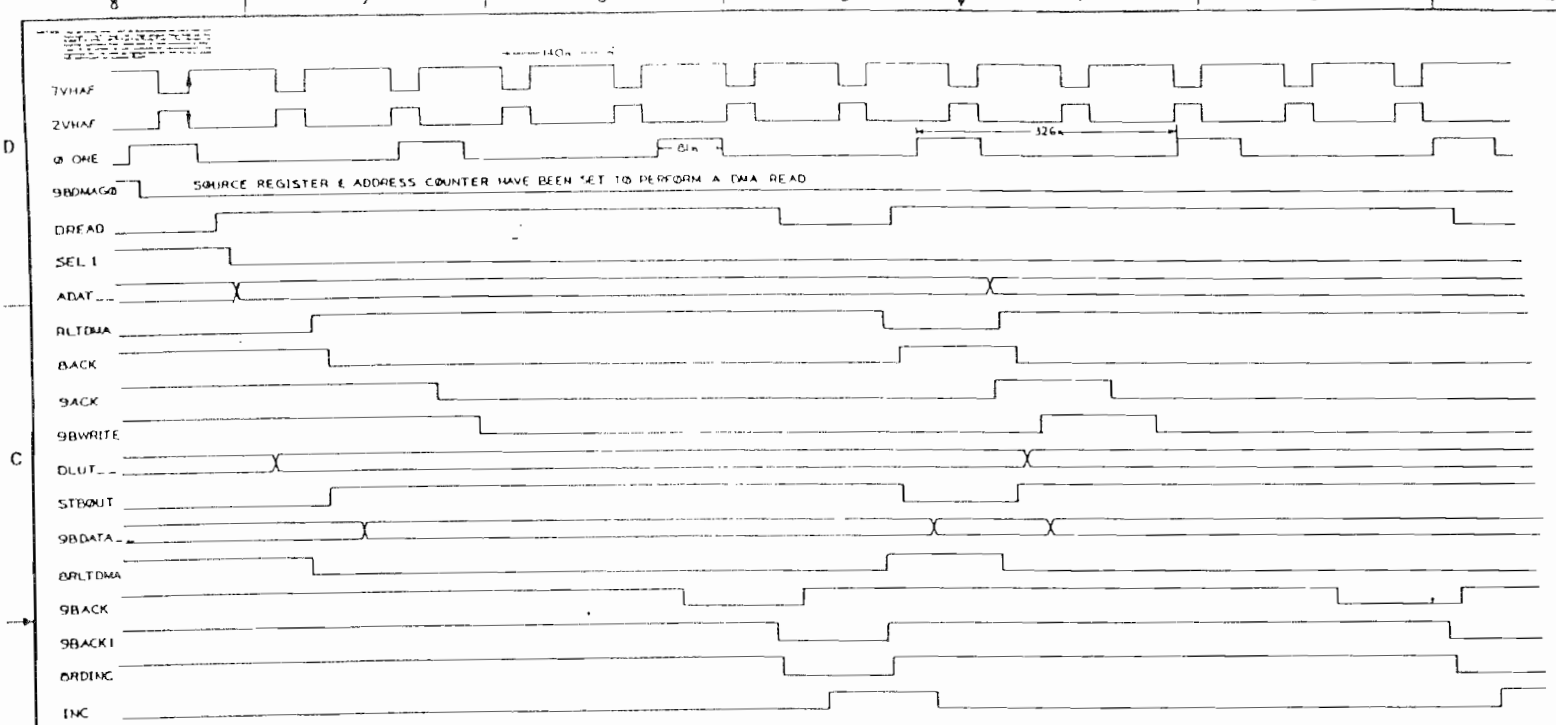
SIGNATURES		DATE
DRWN	[illegible]	[illegible]
CHK	DJG	[illegible]
ENG	[illegible]	[illegible]
APVD	[illegible]	11/6/84

RAMTEK

VIDEO TYPE 2A
TIMING DIAGRAM

SIZE | SCALE | DWG NO | REV

C | 503046 | C



REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHT 1		

QTY REQD	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

TOLERANCES

DO NOT SCALE DRAWING

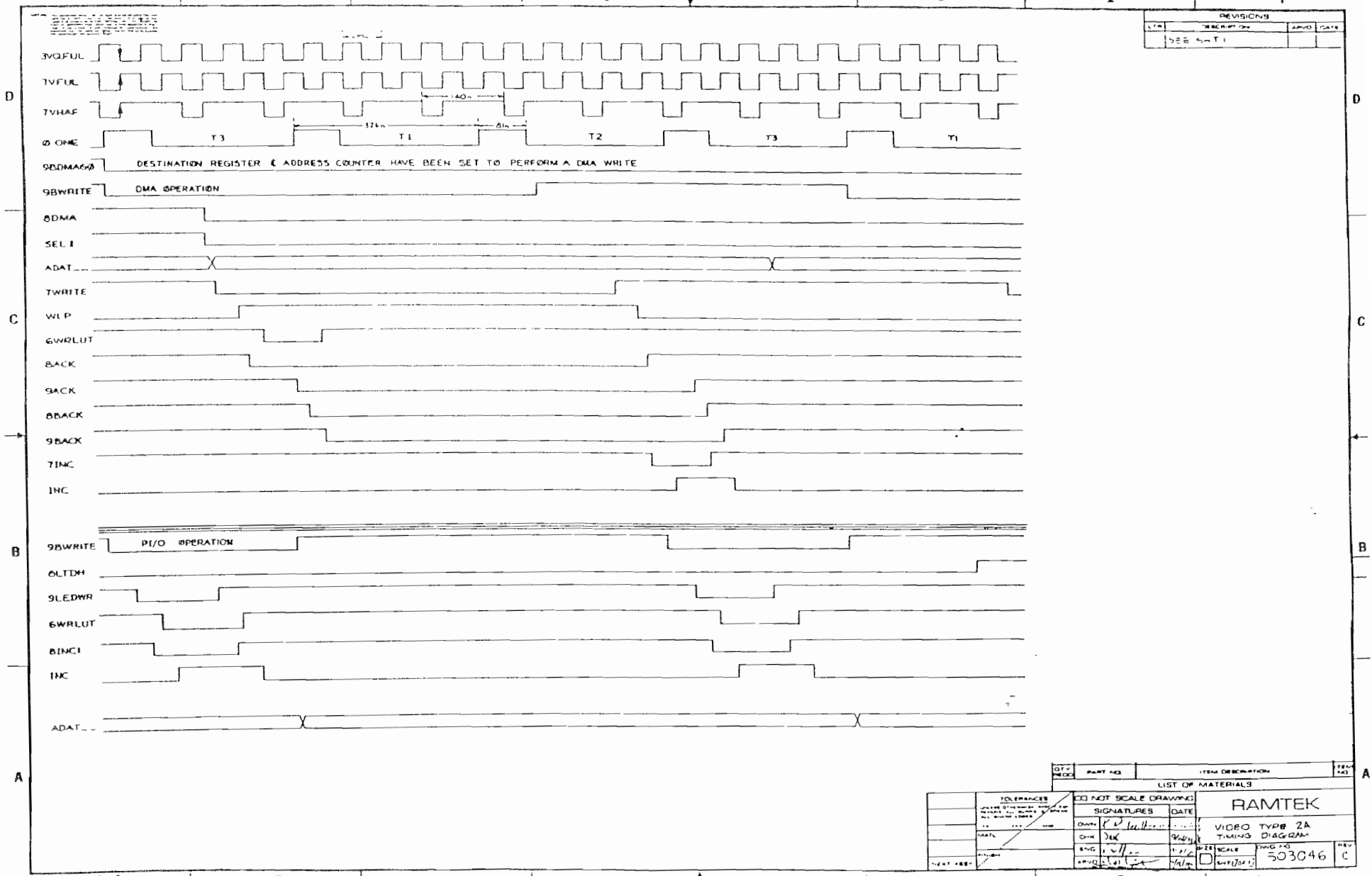
	SIGNATURES	DATE
DWN		
CHK		
ENG		
APVD		

RAMTEK

VIDEO TYPE 2A
TIMING DIAGRAM

SIZE D | SCALE | DWG NO 503046 | REV C

NEXT ASSY



REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHT 1		

QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

TOLERANCES

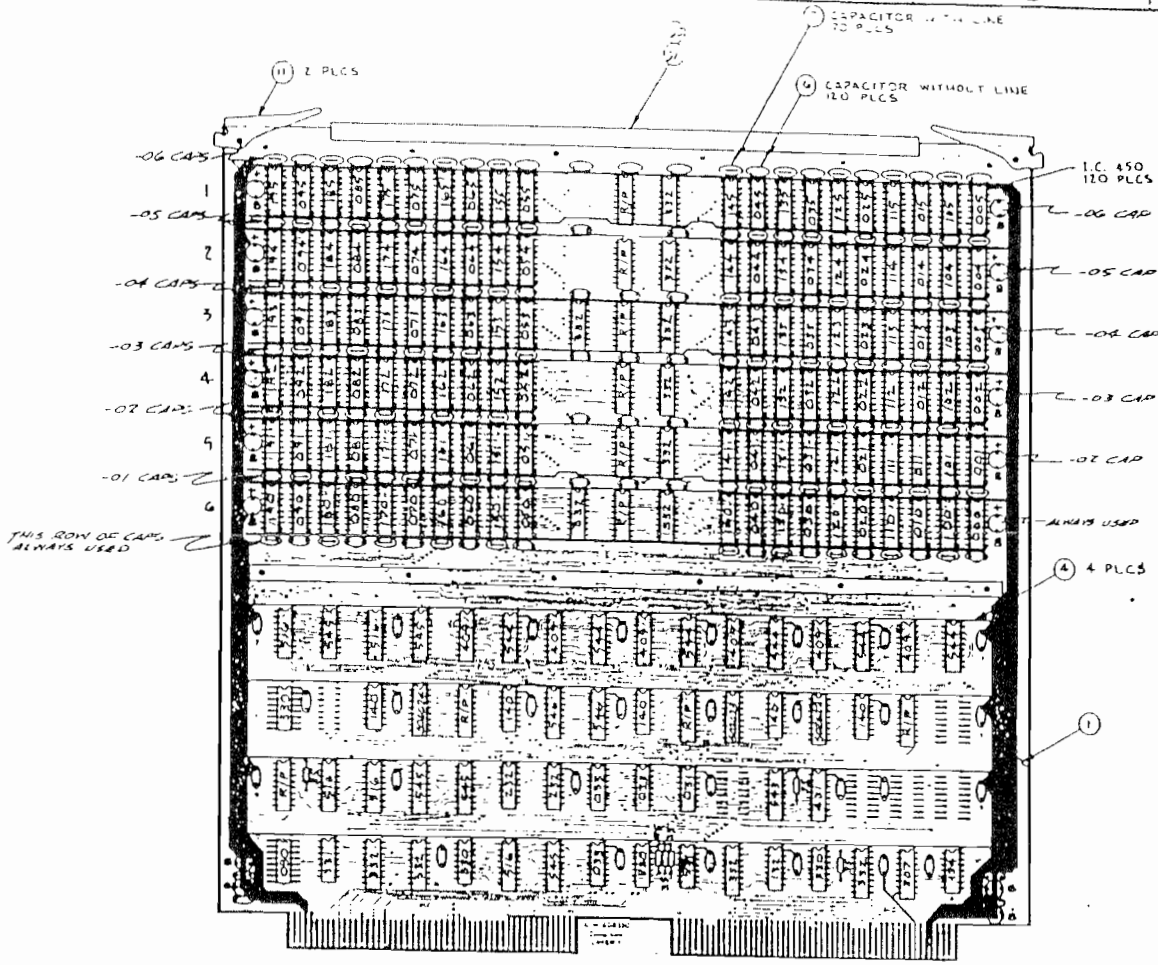
DO NOT SCALE DRAWING

SIGNATURES		DATE
DWN	[illegible]	[illegible]
CHK	DEK	9/4/84
ENG	[illegible]	11/1/84
APVD	[illegible]	11/1/84

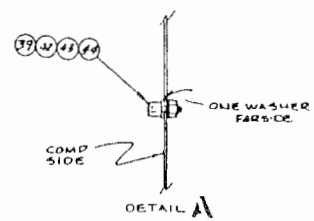
RAMTEK

VIDEO TYPE 2A
TIMING DIAGRAM

SIZE D | SCALE | SHT 1 OF 1 | DWG NO 503046 | REV C



NOTE: NUMBERS ON IC'S ARE FOR MEMORY REF & SUBSTITUTE FOR LACK OF ZONE LOCATION.



NOTE

1. ASSEMBLE TO THE FOLLOWING DASH NUMBERS:
   - -01 – ROW 6 ONLY
   - -02 – 6 & 5
   - -03 – 6,5 & 4
   - -04 – 6,5,4 & 3
   - -05 – 6,5,4,3 & 2
   - -06 – FULL
2. LOCATIONS 7D, 7D, 7E, 7H, 7K & 7M ARE ASSEMBLED WITH EITHER THE I.C. TRIED OUT ON A JUMPER OR THE DASH NUMBERS SHOWN IN THE FOLLOWING TABLE:

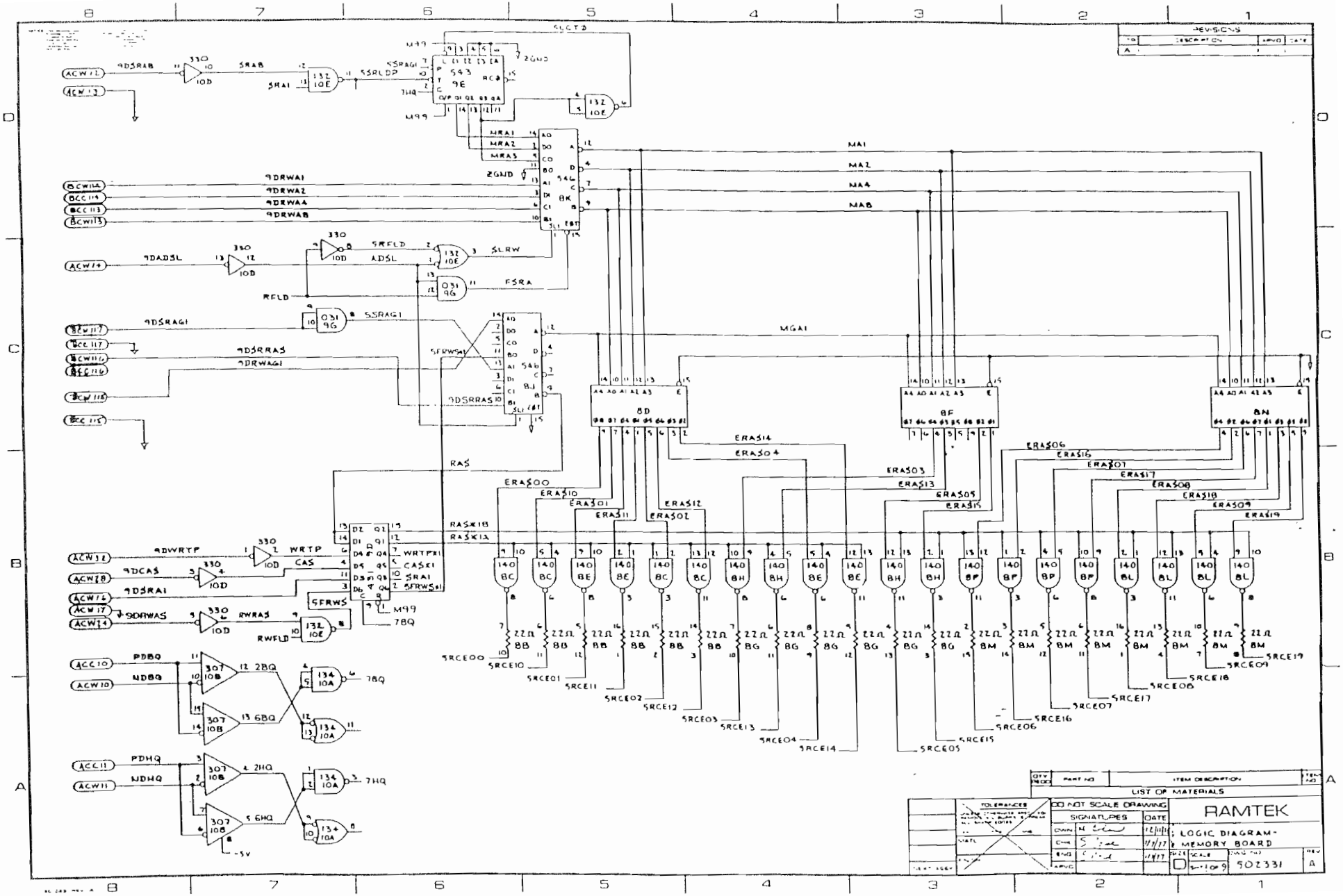
DASH NO.	7D	7D	7E	7H	7K	7M
-01	409	7D-13 to 7D-16	7E-13 & 7E-16	7H-13 = 7H-16	7K-13 & 7K-16	7M-13 & 7M-16
-02	409	409	-	-	-	-
-03	409	409	409	-	-	-
-04	409	409	409	409	-	-
-05	409	409	409	409	409	-
-06	409	409	409	409	409	409

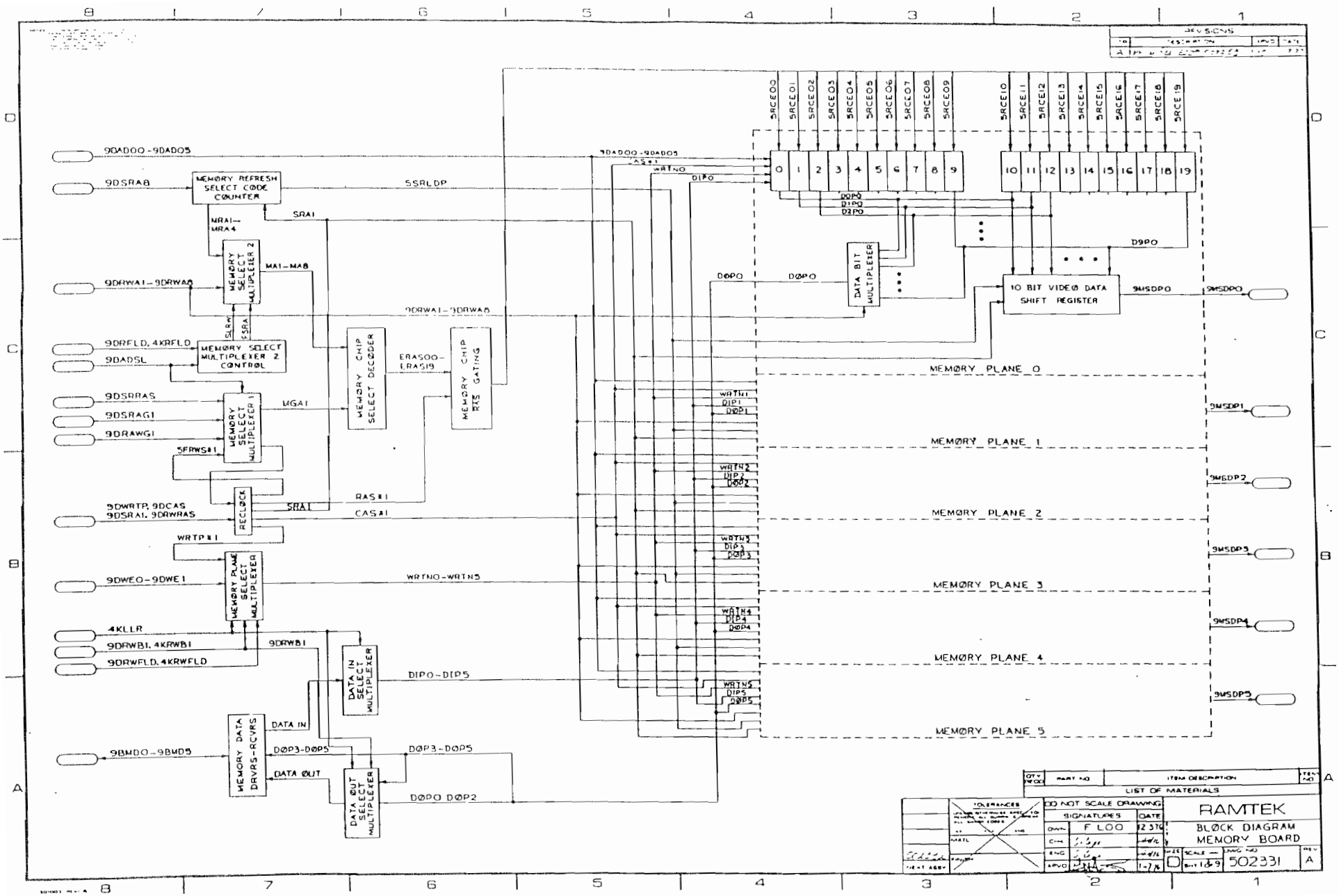
QTY PER BOARD	PART NO	ITEM DESCRIPTION	ITEM NO

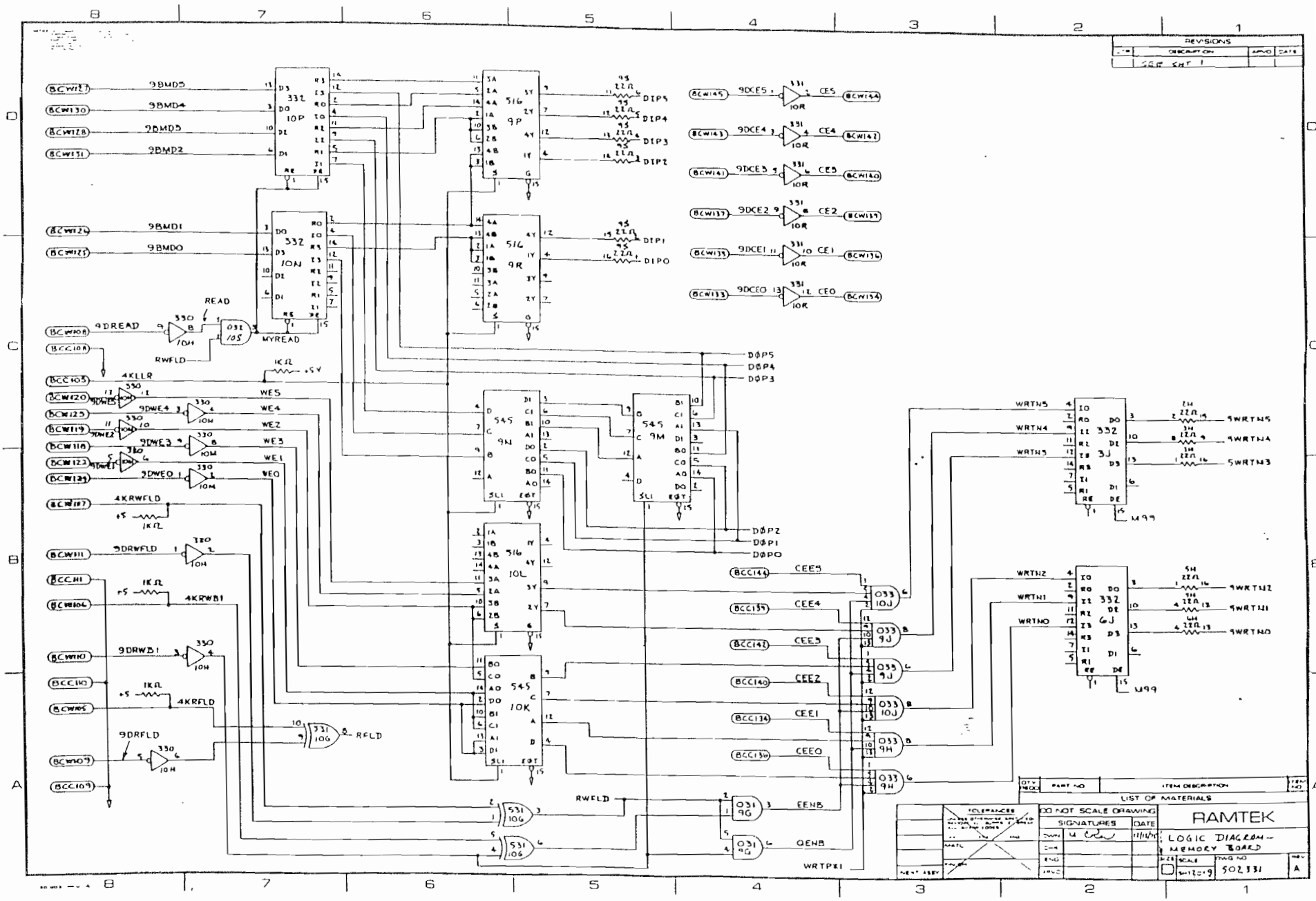
LIST OF MATERIALS

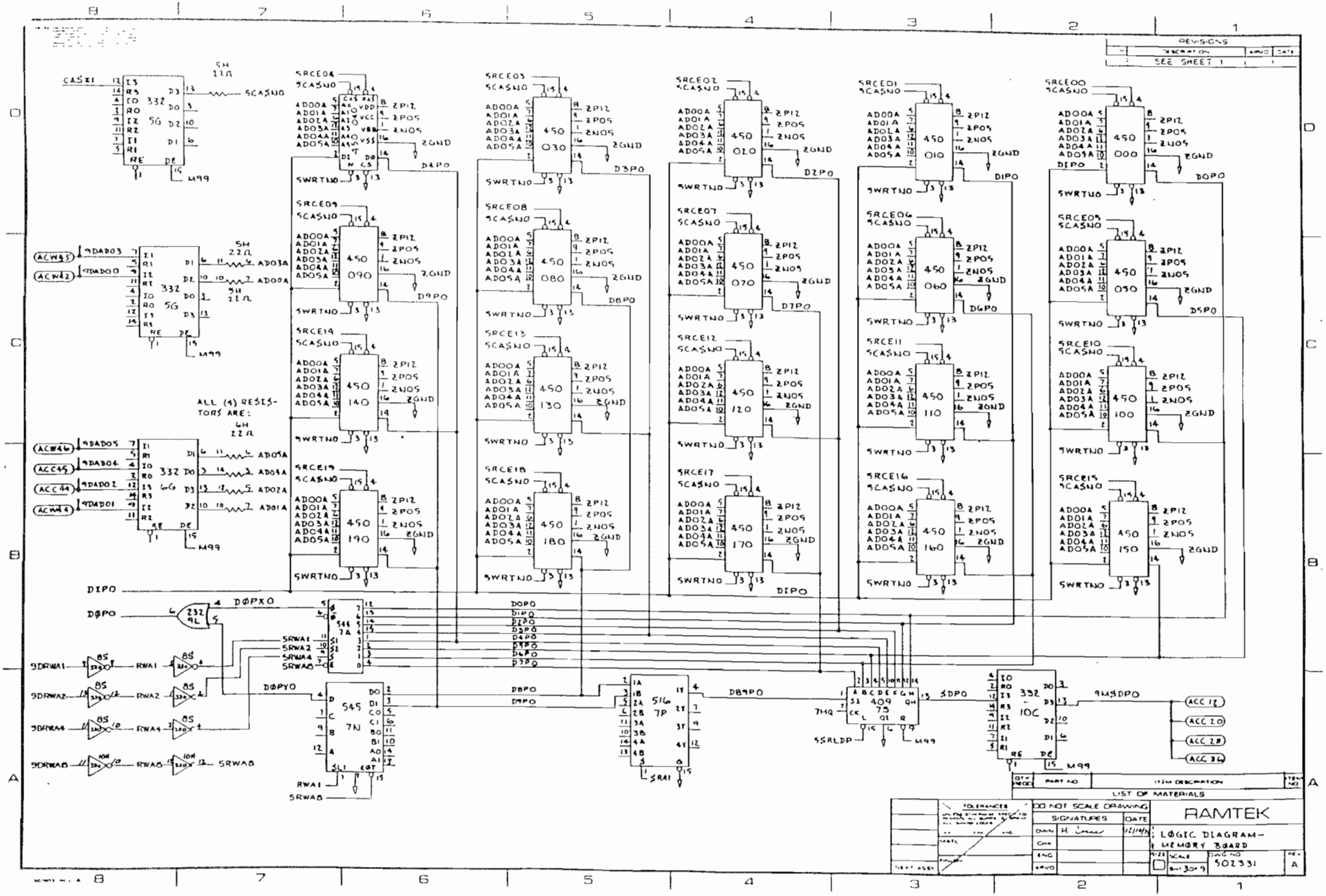
REVISIONS			
LTR	DESCRIPTION	DR'G	DATE
A	RSL PER ECO 506951	[illegible]	[illegible]
B	[illegible]	[illegible]	[illegible]

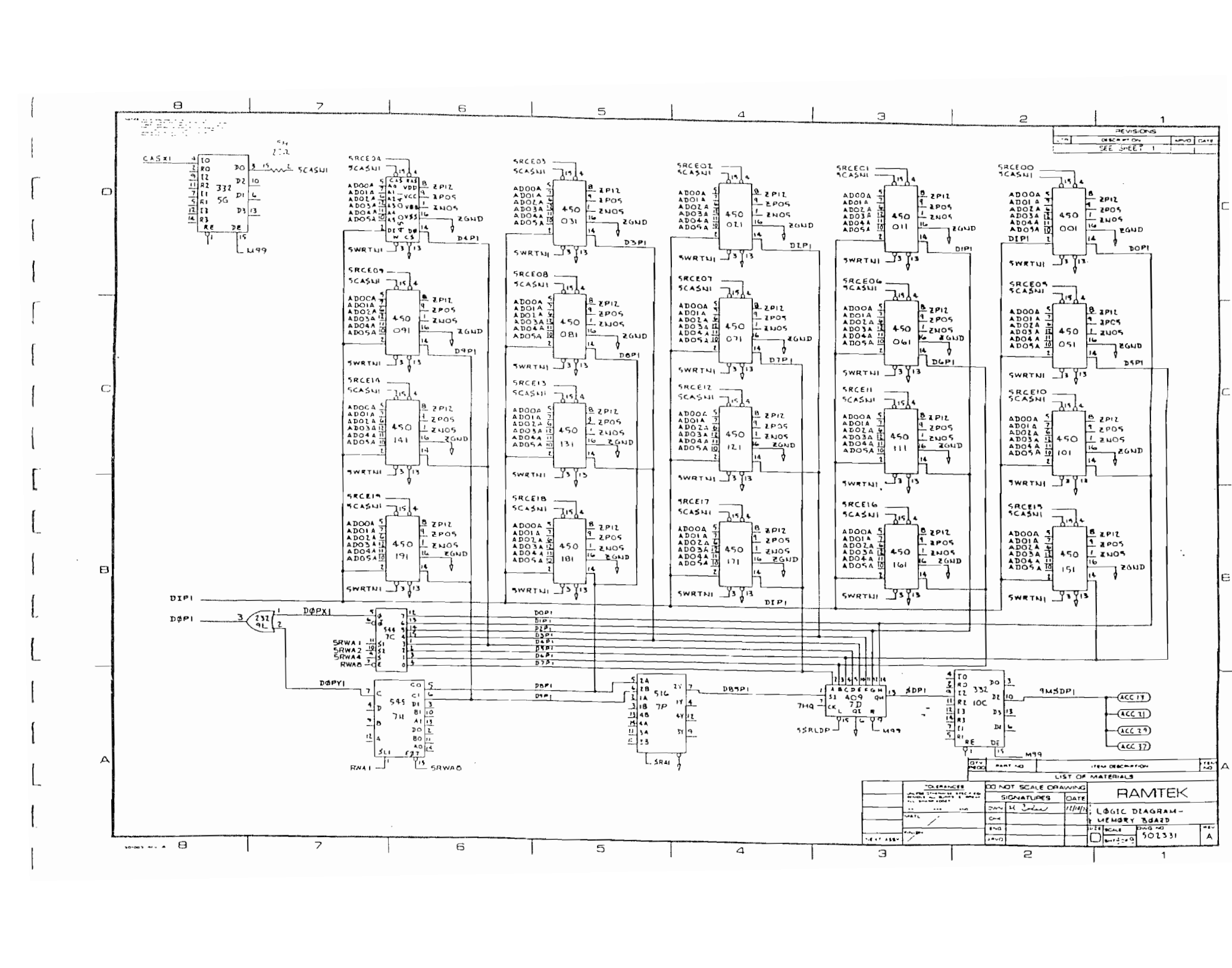
TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
	DRWN M. Cohen	11/9/76	ASSEMBLY DRAWING -
MATL	CHK [illegible]	11/16	320 x 256 MEMORY PC BD
502341	ENG [illegible]	11/16	SIZE B SCALE – SHT 1 OF 1 DWG NO 502332 REV B
NEXT ASSY	APVD [illegible]	11/16	

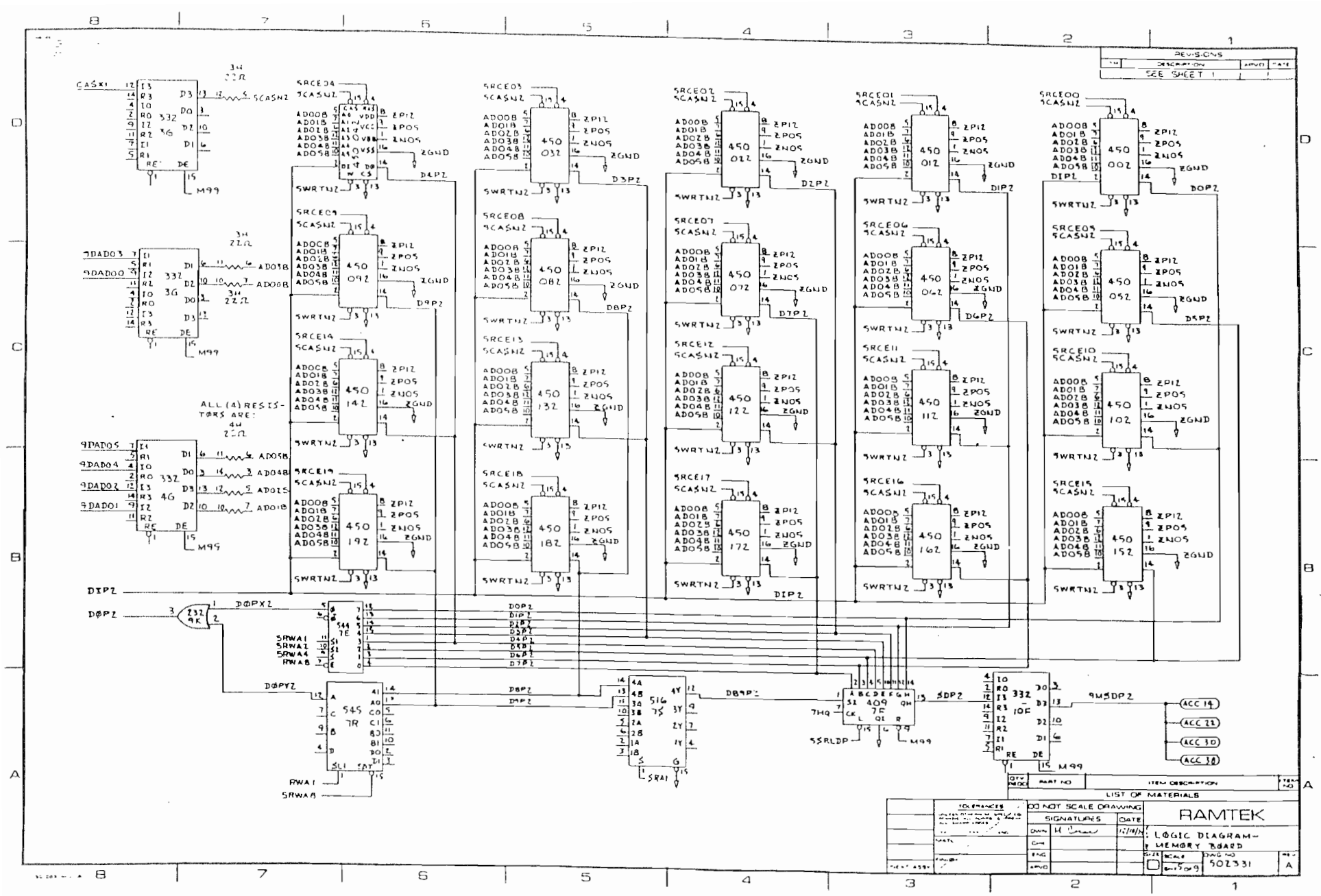

REVISIONS
DESCRIPTION
APVD
DATE
SLCTD
ACW12
ACW13
9DSRAB
SRAB
SRAI
SSRAGI
SSRLDP
M99
7HQ
2GND
MRA1
MRA2
MRA3
9DRWAI
9DRWA2
9DRWA4
9DRWAB
BCW11A
BCC11A
BCC11B
BCW11B
MAI
MA2
MA4
MAB
9DADSL
ADSL
SLRW
RFLD
FSRA
9DSRAGI
SSRAGI
9DSRRAS
9DRWAGI
SFRWS#1
MGAI
RAS
ERA$00
ERA$10
ERA$01
ERA$11
ERA$12
ERA$02
ERA$13
ERA$03
ERA$14
ERA$04
ERA$15
ERA$05
ERA$16
ERA$06
ERA$17
ERA$07
ERA$18
ERA$08
ERA$19
ERA$09
RAS#18
RAS#13
9DWRTP
WRTP
WRTP#1
9DCAS
CAS
CAS#1
9DSRAI
SRAI
9DRWAS
RWRAS
RWFLD
SFRWS
M99
7BQ
PDBQ
NDBQ
2BQ
6BQ
PDHQ
NDHQ
2HQ
5HQ
7HQ
-5V
SRCE00
SRCE10
SRCE01
SRCE11
SRCE02
SRCE12
SRCE03
SRCE13
SRCE04
SRCE14
SRCE05
SRCE15
SRCE06
SRCE16
SRCE07
SRCE17
SRCE08
SRCE18
SRCE09
SRCE19
LIST OF MATERIALS
QTY/INDEX
PART NO
ITEM DESCRIPTION
DO NOT SCALE DRAWING
SIGNATURES
DATE
DWN
CHK
ENG
APVD
RAMTEK
LOGIC DIAGRAM - MEMORY BOARD
SIZE
SCALE
DWG NO
REV
502331
A

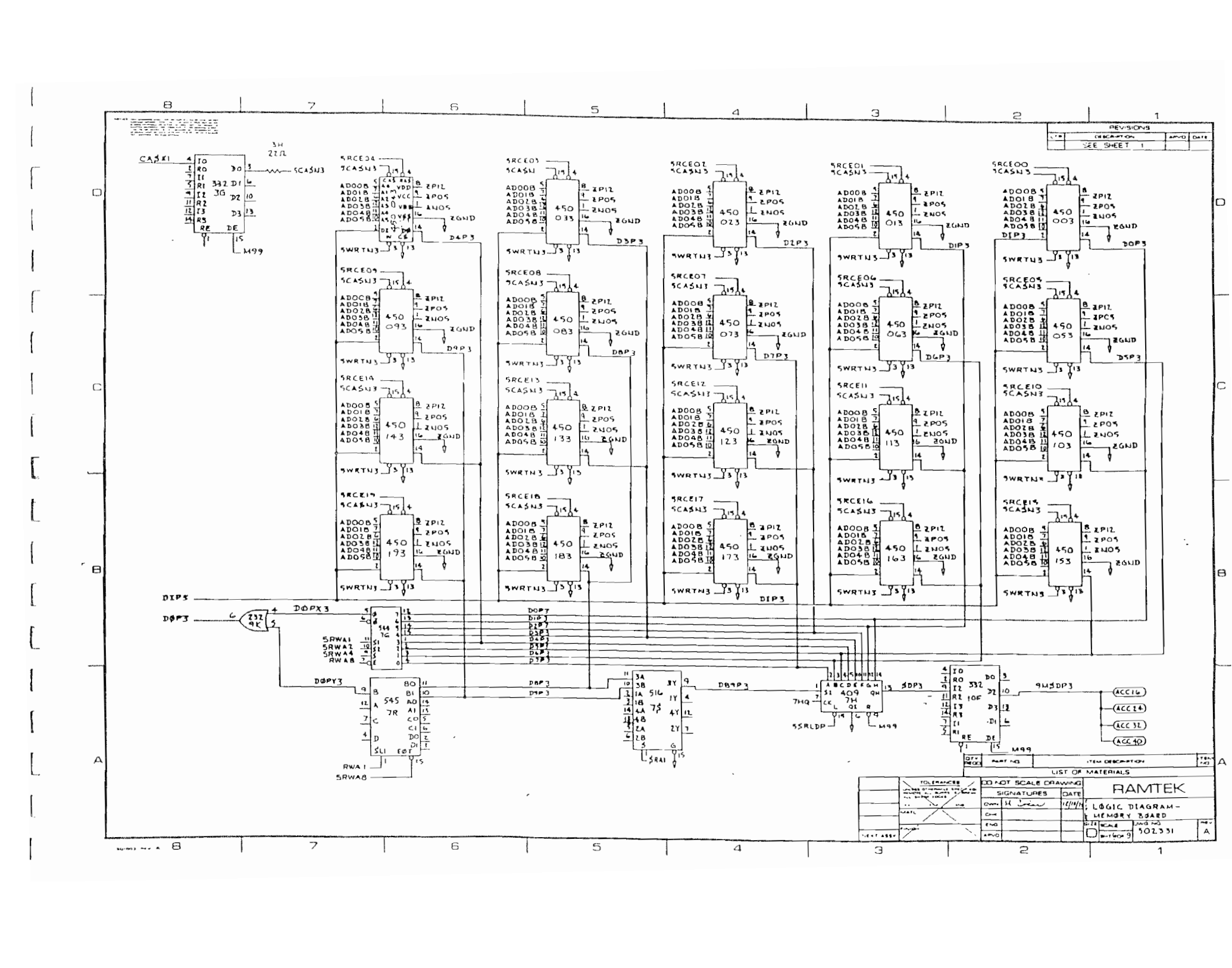

9DADO0-9DAD05
9DSRA8
MEMORY REFRESH SELECT CODE COUNTER
SSRLDP
SRA1
MRA1-MRA4
MEMORY SELECT MULTIPLEXER 2
MA1-MA8
9DRWA1-9DRWA8
SLRA
FSRA
9DRFLD, 4KRFLD
9DADSL
MEMORY SELECT MULTIPLEXER 2 CONTROL
MEMORY CHIP SELECT DECODER
ERASO0-ERAS19
MEMORY CHIP RIS GATING
9DSRRAS
9DSRAG1
9DRAWG1
MEMORY SELECT MULTIPLEXER 1
UGA1
SFRWS81
RECLOCK
9DWRTP, 9DCAS
9DSRA1, 9DRWRAS
RAS81
CAS81
WRTP81
MEMORY PLANE SELECT MULTIPLEXER
9DWE0-9DWE1
WRTN0-WRTN5
4KLLR
9DRWB1, 4KRWB1
9DRWFLD, 4KRWFLD
9DRWB1
DATA IN SELECT MULTIPLEXER
DIP0-DIP5
MEMORY DATA DRVRS-RCVRS
DATA IN
9BMD0-9BMD5
D0P3-D0P5
DATA OUT
DATA OUT SELECT MULTIPLEXER
D0P3-D0P5
D0P0 D0P2
SRCE00 SRCE01 SRCE02 SRCE03 SRCE04 SRCE05 SRCE06 SRCE07 SRCE08 SRCE09
SRCE10 SRCE11 SRCE12 SRCE13 SRCE14 SRCE15 SRCE16 SRCE17 SRCE18 SRCE19
0 1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19
9DADO0-9DAD05
WRTN0
DIP0
D0P0
D1P0
D2P0
D9P0
DATA BIT MULTIPLEXER
D0P0
D0P0
10 BIT VIDEO DATA SHIFT REGISTER
9WSDP0
MEMORY PLANE 0
WRTN1
DIP1
D0P1
9WSDP1
MEMORY PLANE 1
WRTN2
DIP2
D0P2
9WSDP2
MEMORY PLANE 2
WRTN3
DIP3
D0P3
9WSDP3
MEMORY PLANE 3
WRTN4
DIP4
D0P4
9WSDP4
MEMORY PLANE 4
WRTN5
DIP5
D0P5
9WSDP5
MEMORY PLANE 5
REVISIONS
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DRWN F LOO
RAMTEK
BLOCK DIAGRAM
MEMORY BOARD
SIZE D
SCALE —
DWG NO 502331
REV A
SHEET 1 OF 9

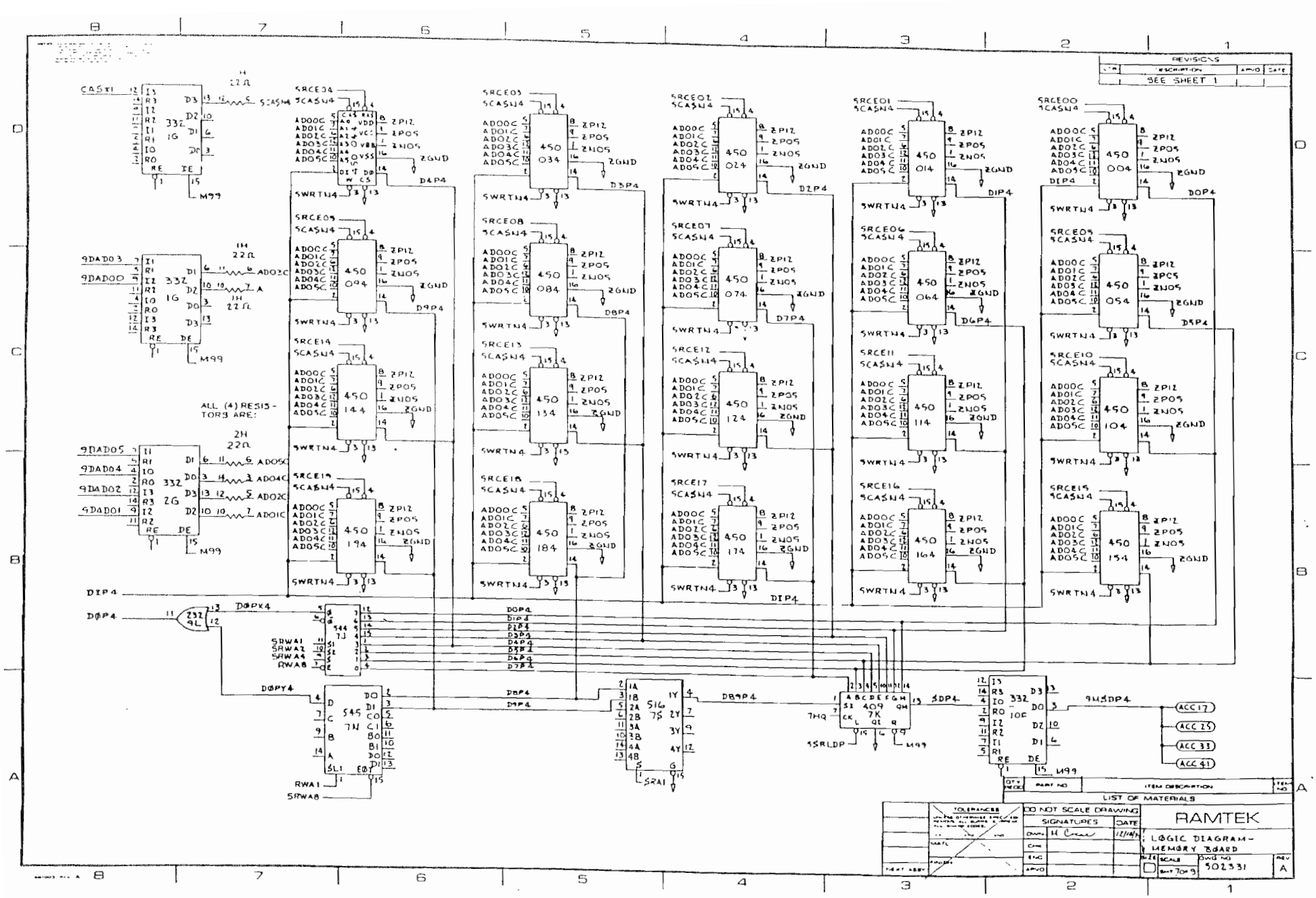

REVISIONS
LOGIC DIAGRAM - MEMORY BOARD
RAMTEK
502331
LIST OF MATERIALS
DO NOT SCALE DRAWING
9BMD5
9BMD4
9BMD3
9BMD2
9BMD1
9BMD0
9DREAD
READ
MYREAD
RWFLD
4KLLR
9DWE4
9DWE3
9DWE2
9DWE1
WE5
WE4
WE2
WE3
WE1
WE0
4KRWFLD
9DRWFLD
4KRWB1
9DRWB1
4KRFLD
9DRFLD
RFLD
9DCE5
9DCE4
9DCE3
9DCE2
9DCE1
9DCE0
CE5
CE4
CE3
CE2
CE1
CE0
DIP5
DIP4
DIP3
DIP2
DIP1
DIP0
D0P5
D0P4
D0P3
D0P2
D0P1
D0P0
CEE5
CEE4
CEE3
CEE2
CEE1
CEE0
EENB
OENB
WRTPE1
WRTN5
WRTN4
WRTN3
WRTN2
WRTN1
WRTN0
9WRTN5
9WRTN4
9WRTN3
9WRTN2
9WRTN1
9WRTN0

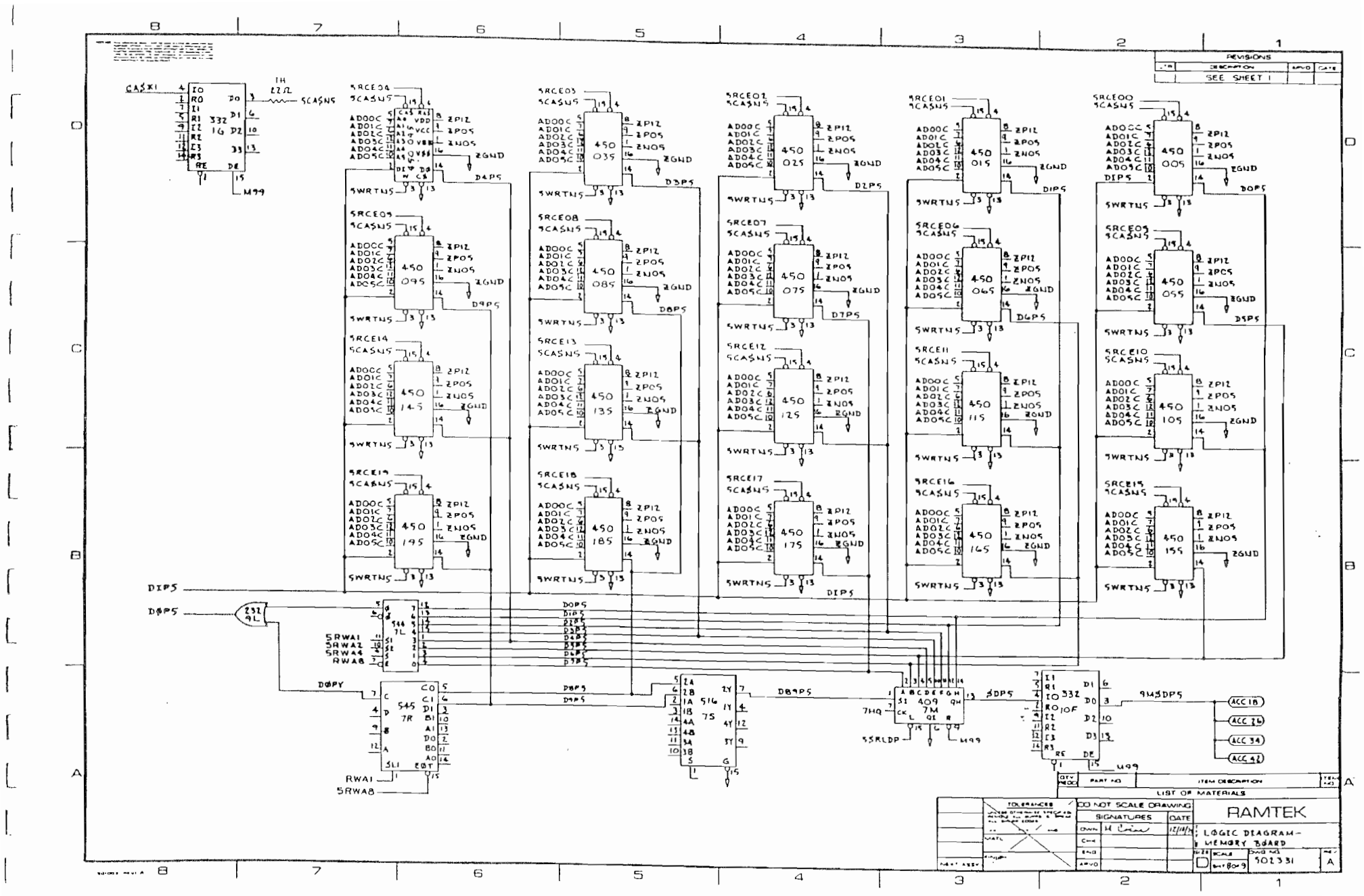

REVISIONS
DESCRIPTION
APVD
DATE
SEE SHEET 1
CASE1
SCASNO
M99
SRCE04
SRCE03
SRCE02
SRCE01
SRCE00
SRCE09
SRCE08
SRCE07
SRCE06
SRCE05
SRCE19
SRCE13
SRCE12
SRCE11
SRCE10
SRCE18
SRCE17
SRCE16
SRCE15
SWRTNO
ZGND
ZPIZ
ZPOS
ZNOS
ADD0A
ADD1A
ADD2A
ADD3A
ADD4A
ADD5A
D4PO
D3PO
D2PO
D1PO
D0PO
D8PO
D7PO
D6PO
D5PO
DIPO
ACW45
ACW42
ACW46
ACC45
ACC44
ACW41
9DAD03
9DAD00
9DAD05
9DAD04
9DAD02
9DAD01
ADD3A
ADD0A
ADD5A
ADD4A
ADD2A
ADD1A
ALL (4) RESIS-TORS ARE:
6H
22Ω
SH
22Ω
D0PXO
D0PO
D0PY0
SRWA1
SRWA2
SRWA4
SRWA8
9DRWA1
9DRWA2
9DRWA4
9DRWA8
RWA1
RWA2
RWA4
SRWA8
D8PO
D7PO
DB7PO
7HQ
SSRLDP
SSDPO
9MSDPO
ACC 1Z
ACC 2O
ACC 2B
ACC 3O
QTY PER
PART NO
ITEM DESCRIPTION
ITEM NO
LIST OF MATERIALS
TOLERANCES
DO NOT SCALE DRAWING
SIGNATURES
DATE
DWN
CHK
ENG
APVD
RAMTEK
LOGIC DIAGRAM-
MEMORY BOARD
SIZE
DWG NO
902331
REV
A
SCALE
SHEET 9 OF 9


REVISIONS
SEE SHEET 1
CASXI
SCASNI
SRCE00
SRCE01
SRCE02
SRCE03
SRCE04
SRCE05
SRCE06
SRCE07
SRCE08
SRCE09
SRCE0A
SRCE0B
SRCE0C
SRCE0D
SRCE0E
SRCE0F
SRCE10
SRCE11
SRCE12
SRCE13
SRCE14
SRCE15
SRCE16
SRCE17
SRCE18
SRCE19
SWRTNI
ZPIZ
ZPOS
ZNOS
ZGND
DIPI
D0PI
D1PI
D2PI
D3PI
D4PI
D5PI
D6PI
D7PI
D8PI
D9PI
DAPI
DBPI
DCPI
DDPI
DEPI
DFPI
DØPI
DØPXI
DØPYI
SRWA1
SRWA2
SRWA4
RWA8
RWA1
SRWA8
SRAI
SSRLDP
M99
ACC 17
ACC 15
ACC 13
ACC 37
LIST OF MATERIALS
QTY PKGE
PART NO
ITEM DESCRIPTION
ITEM NO
TOLERANCES
DO NOT SCALE DRAWING
SIGNATURES
DATE
DWN
CHK
ENG
APVD
RAMTEK
LOGIC DIAGRAM-
MEMORY BOARD
SIZE
SCALE
DWG NO
502331
REV
A


REVISIONS
SEE SHEET 1
ALL (4) RESISTORS ARE: 4W 22Ω
LIST OF MATERIALS
DO NOT SCALE DRAWING
RAMTEK
LOGIC DIAGRAM-
MEMORY BOARD
502331

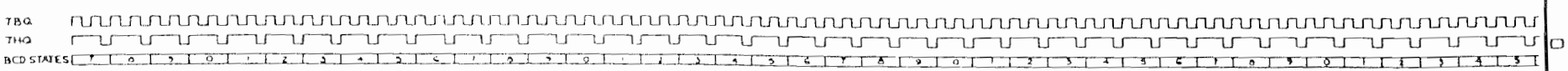

REVISIONS
SEE SHEET 1
RAMTEK
LOGIC DIAGRAM - MEMORY BOARD
502331
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DATE
SCALE
SHEET 9
ACC16
ACC24
ACC32
ACC40
450 033
450 023
450 013
450 003
450 093
450 083
450 073
450 063
450 053
450 143
450 133
450 123
450 113
450 103
450 193
450 183
450 173
450 163
450 153


REVISIONS
SEE SHEET 1
ALL (4) RESIS-
TORS ARE:
22Ω
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
LOGIC DIAGRAM-
MEMORY BOARD
502331

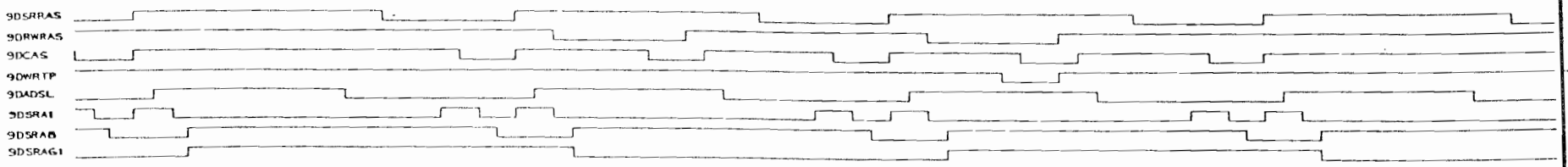

REVISIONS
SEE SHEET 1
CASX1
SCASNS
M99
SRCE04
SRCE05
SRCE14
SRCE19
SRCE03
SRCE08
SRCE13
SRCE18
SRCE02
SRCE07
SRCE12
SRCE17
SRCE01
SRCE06
SRCE11
SRCE16
SRCE00
SRCE09
SRCE10
SRCE15
SWRTNS
ZGND
D4PS
D9PS
D3PS
D8PS
D2PS
D7PS
D1PS
D6PS
D0PS
D5PS
DIPS
D0PS
SRWA1
SRWA2
SRWA4
RWA8
D0PY
RWA1
SRWA8
DB9PS
SDPS
SSRLDP
9W3DPS
ACC 18
ACC 26
ACC 34
ACC 42
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
LOGIC DIAGRAM - MEMORY BOARD
SIZE
SCALE
DWG NO
902331
REV
A

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

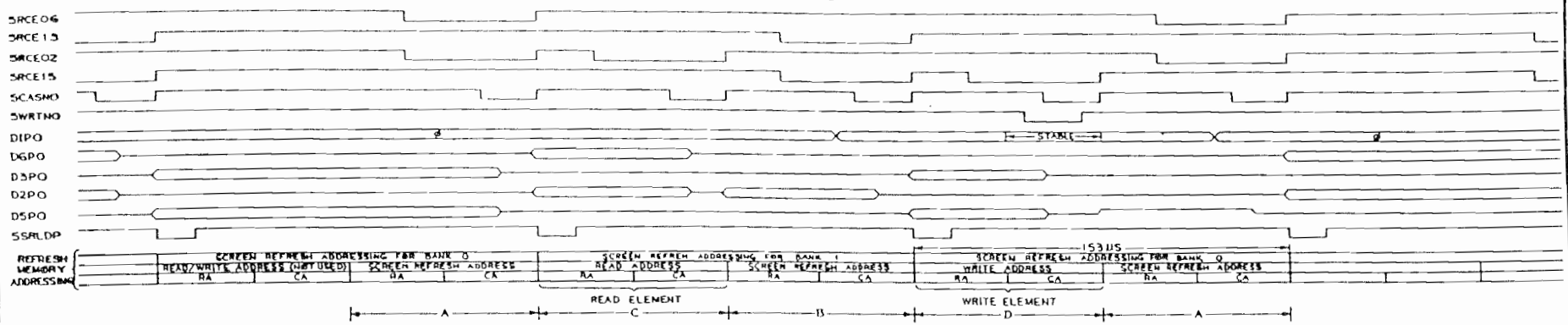
MEMORY TIMING



MEMORY TIMING SIGNALS AT THE CONNECTOR



MEMORY TIMING SIGNALS APPLIED TO REFRESH MEMORY



NOTES: 1. TIMING SHOWN FOR PLANE 0 ONLY.

2. FOUR PAIRS OF SIGNALS ARE SHOWN:
   - A. 5RCE06 – D6PO
   - B. 5RCE13 – D3PO
   - C. 5RCE02 – D2PO
   - D. 5RCE15 – D5PO

   EACH PAIR WERE SELECTED TO DEMONSTRATE THE FOLLOWING:
   - A. SCREEN REFRESH ONLY IN BANK 0 IN RELATION TO BANK 1.
   - B. SCREEN REFRESH ONLY IN BANK 1 IN RELATION TO BANK 0.
   - C. THE CONTROL CARD READING AN ELEMENT.
   - D. THE CONTROL CARD WRITING AN ELEMENT.

QTY/WDG	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING	SIGNATURES	DATE
		DWN F LOO	12 4 74
		CHK	
		ENG	
		APVD	

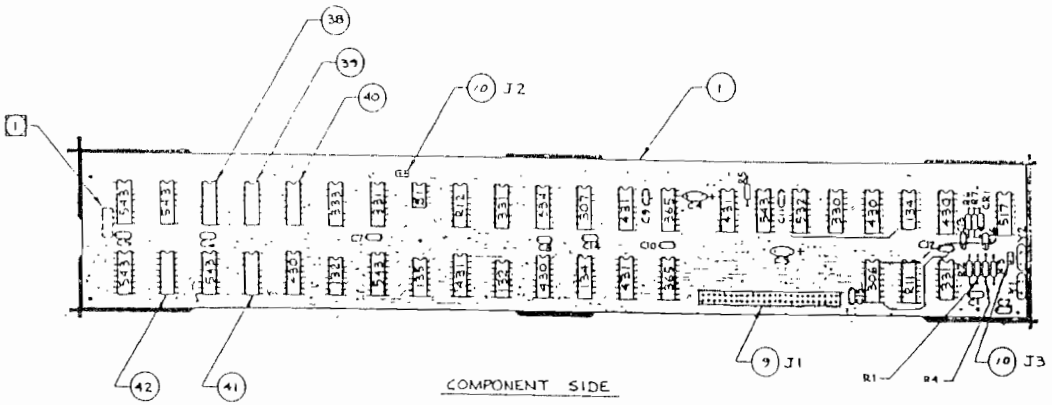
RAMTEK

TIMING DIAGRAM
MEMORY BOARD

SCALE — DWG NO 502331 REV A

SHEET 9 OF 9

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	RELEASED PER ECO 506809		
B	REVISED PER ECO 506909	[illegible]	[illegible]
C	REVISED PER ECO 506925	[illegible]	4/9/96
D	REVISED PER ECO 507059	DMN	10/3/96
E	REVISED PER ECO 507304	MTA	3.6.97



COMPONENT SIDE

-01, -02 & -03 SHOWN
(-01)

NOTES: UNLESS OTHERWISE SPECIFIED

1. INK STAMP SERIAL NUMBER AND ASSY REVISION LEVEL IN AREA SHOWN.
2. REFERENCE DRAWINGS –
   LOGIC DIAGRAM : 502334
   FABRICATION DWG: 502333C
3. LOGIC DEVICE TYPE NUMBERS ARE RAMTEK STANDARD PART NUMBERS 1301XXX.

QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO

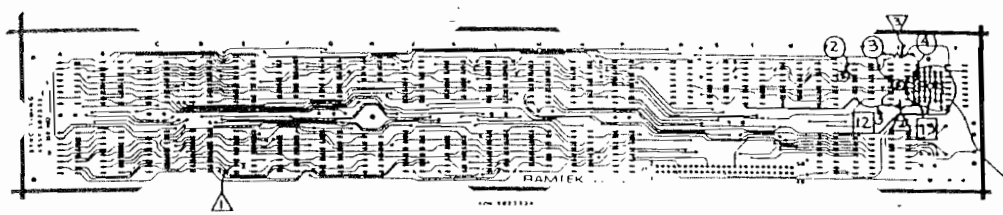
LIST OF MATERIALS

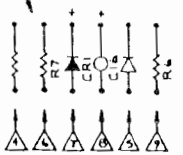
TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
MATL	DWN	8/13	P.C. ASSEMBLY -01, -02 & -03
FINISH	CHK	9/5/96	MULTI-RESOLUTION SYNC TIMING
NEXT ASSY	ENG	9/11/96	SIZE D SCALE 1:1 SHT 1 OF 3 DWG NO 502335 REV E
	APVD		

8 7 6 5 4 3 2 1

REVISIONS			
LTR	DESCRIPTION	APVD	DATE

THIS CUT AND PATCH DRAWING APPLIES TO REVISION 'A' ARTWORK BOARDS ONLY





REVISION 'B'

REVISION 'B' IS FUNCTIONALLY EQUIVALENT TO REVISION 'C'

CUT P.C. TRACES AS INDICATED TO DELETE THE FOLLOWING CONNECTIONS:

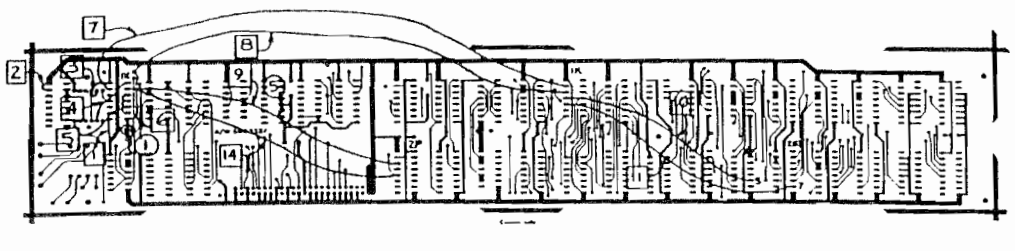
1. IX-07 TO FEED THRU
2. IV-14 TO IY-03
3. IX-10 TO FEED THRU
4. IX-12 TO COMPONENT

ADD THE INDICATED WIRES TO MAKE THE FOLLOWING CONNECTIONS:

1. IX-08 TO FEED THRU
2. IY-15 TO IY-16
3. COMPONENT TO COMPONENT
4. IX-01 TO COMPONENT
5. TIE TOGETHER IX-03, IX-04, IX-05, IX-06
6. IX-07 TO FEED THRU
7. IX-13 TO IK-13
8. IK-12 TO FEED THRU
9. IY-02 TO ZP-14
10. IK-11 TO ZF-05
11. IK-10 TO ZE-07
12. TIE TOGETHER IW-07 TO BENT I.C. PIN AT IX AND TO IX-06
13. BENT PIN AT IX TO COMPONENT HOLE

MAKE COMPONENT ADDS AND DELETES AND ADDITIONAL CHANGES AS NOTED:

1. CUT PIN 7 OF THE I.C. AT LOCATION ZE. DO NOT CUT THE TRACE.
2. REMOVE THE I.C. AT LOCATION IX. INSTALL I.C. 1301597 (SN74161) AT LOCATION IX. THIS REQUIRES BENDING PINS 8 AND 9 OF THE I.C. AS INDICATED.
3. REMOVE RESISTOR
4. REMOVE RESISTOR
5. REMOVE DIODE
6. REPLACE EXISTING COMPONENT WITH 10K, 1/4 W, 5% RESISTOR. R7 (3109103)
7. REPLACE EXISTING COMPONENT WITH 1N4454 DIODE. CR1 (3202201) NOTE POLARITY
8. REPLACE EXISTING COMPONENT WITH 6.8 µF, 15V, 20% CAPACITOR. C16 (4706885) NOTE POLARITY
9. REPLACE EXISTING COMPONENT WITH 220 Ω, 1/4 W, 5% RESISTOR. R6 (3109221)



REVISION 'C'

REVISION 'C' IS FUNCTIONALLY EQUIVALENT TO REVISION 'B' ABOVE

REVISION 'D'

REMOVE THE INDICATED WIRE TO DELETE THE FOLLOWING CONNECTION

5. IX-02 TO ZP-14

ADD THE INDICATED WIRES TO MAKE THE FOLLOWING CONNECTION

14. IX-02 TO ZP-12

QTY PER	PART NO.	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING			RAMTEK	
	SIGNATURES		DATE		
	DRWN	Earl Hamlet	10/1/76	P.C. ASSEMBLY-01-0241-03	
	CHK	Earl Hamlet	10/1/76	MULTI-RESOLUTION SYNC TIMING	
	ENG	Earl J. Hamlet	10/1/76	SIZE D	SCALE / SHT 2 OF 3
NEXT ASSY	APVD	S Cooke	11/1/76	DWG NO 502335	REV E

THIS CUT AND PATCH DIAGRAM APPLIES TO REVISION 'C' ARTWORK ONLY.

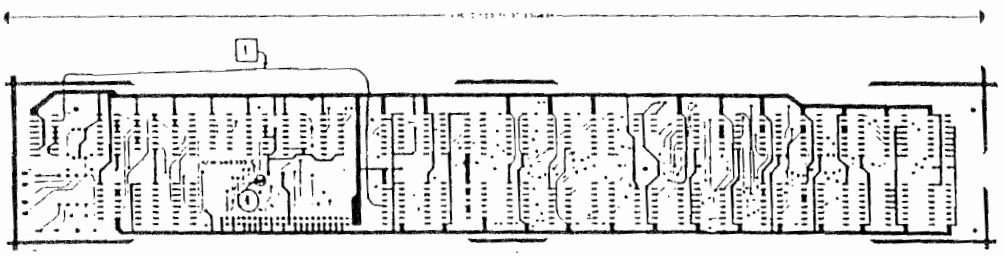
REVISION 'D'

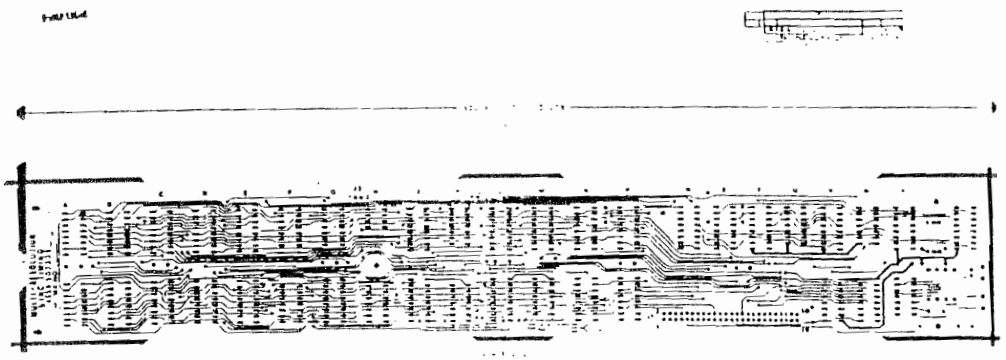
CUT P.C. TRACES AS INDICATED TO DELETE THE FOLLOWING CONNECTIONS:

(1) IN-OE TO 2P-16

ADD THE INDICATED WIRES TO MAKE THE FOLLOWING CONNECTIONS:

[1] IN-OE TO 2P-12



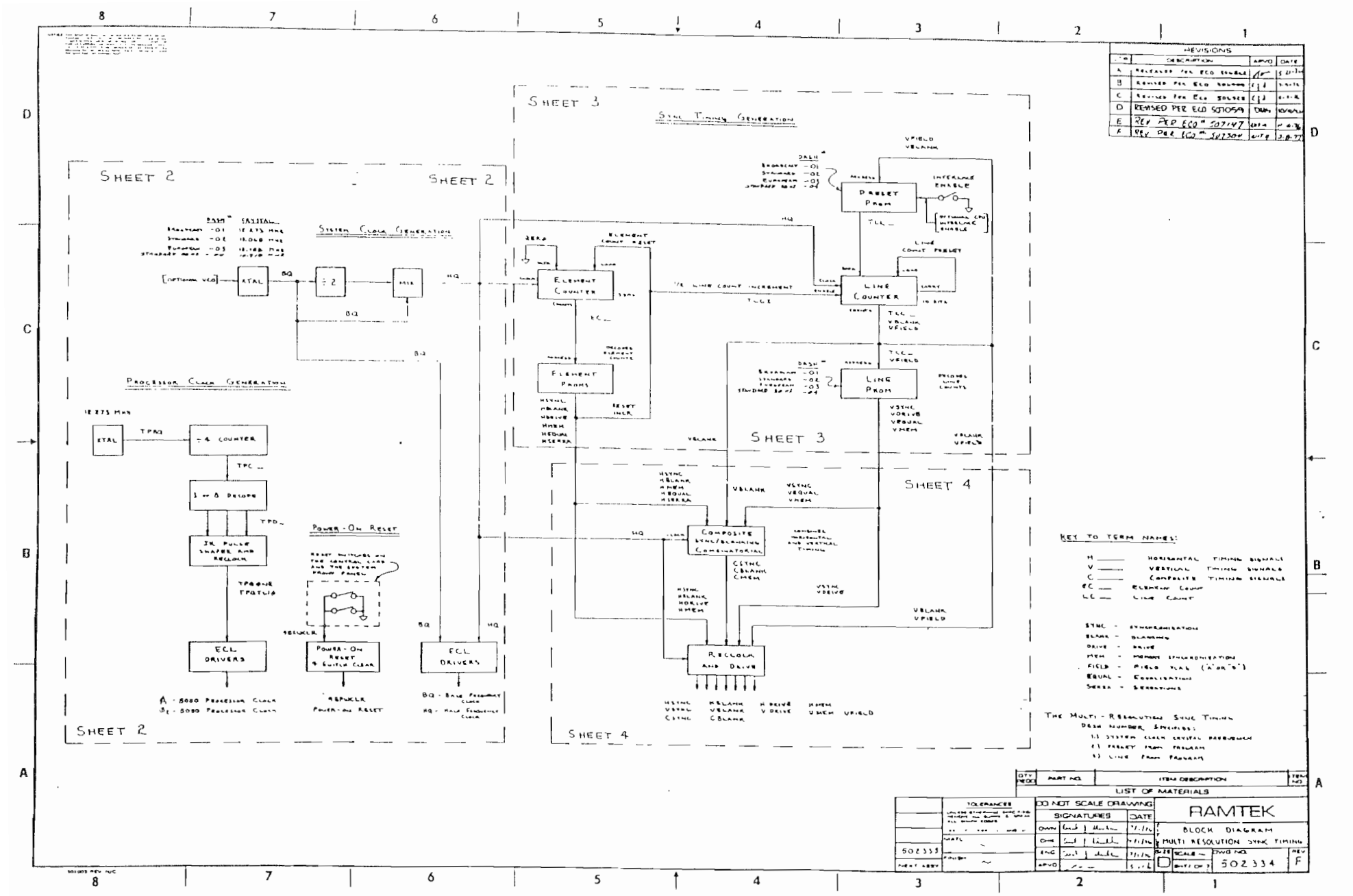


DO NOT SCALE DRAWING		
SIGNATURES		DATE
DRWN		4/1/84
CHK		4/1/84
ENG		4/1/84
APVD		4/4/84

RAMTEK

PC ASSEMBLY -04,-02 & -01 TO MULTI-RESOLUTION SYNC TIMIN

SIZE	SCALE	DWG NO
D	SHEET OF	502335


SHEET 2
SYSTEM CLOCK GENERATION
XTAL
÷ 2
MUX
PROCESSOR CLOCK GENERATION
÷ 4 COUNTER
1 OF 8 DECODE
INTERLACE ENABLE
ELEMENT COUNTER
LINE COUNTER
PRESET PROM
ELEMENT PROMS
LINE PROM
SHEET 3
SYNC TIMING GENERATION
COMPOSITE SYNC/BLANKING COMBINATORIAL
RECLOCK AND DRIVE
SHEET 4
POWER-ON RESET
ECL DRIVERS
KEY TO TERM NAMES:
H —— HORIZONTAL TIMING SIGNALS
V —— VERTICAL TIMING SIGNALS
C —— COMPOSITE TIMING SIGNALS
EC —— ELEMENT COUNT
LC —— LINE COUNT
SYNC - SYNCHRONIZATION
BLANK - BLANKING
DRIVE - DRIVE
MEM - MEMORY SYNCHRONIZATION
FIELD - FIELD FLAG ('A' OR 'B')
EQUAL - EQUALIZATION
SERRA - SERRATIONS
THE MULTI-RESOLUTION SYNC TIMING
DASH NUMBER SPECIFIES:
1) SYSTEM CLOCK CRYSTAL FREQUENCY
2) PRESET FROM PROGRAM
3) LINE FROM PROGRAM
REVISIONS
DESCRIPTION
RELEASED FOR ECO ENABLE
REVISED PER ECO S07059
REVISED PER ECO S07147
REV PER ECO # S07304
LIST OF MATERIALS
QTY REQ
PART NO.
ITEM DESCRIPTION
ITEM NO.
DO NOT SCALE DRAWING
SIGNATURES
DATE
DRAWN
CHK'D
ENG
APVD
TOLERANCES
NEXT ASSY
502333
RAMTEK
BLOCK DIAGRAM
MULTI RESOLUTION SYNC TIMING
SIZE
SCALE
DWG NO.
502334
REV
F

XTAL

SYSTEM CLOCK GENERATION

SEE CRYSTAL SELECTION TABLE FOR SYSTEM CLOCK FREQUENCY VALUE

Y2 · J3-2 TO OPTIONAL VCO · J3-1 · R3, 470 · R4, 470 · C2 .01 · 331 · TPSC2 · TPSC4 · 2X

CRYSTAL SELECTION TABLE

DASH NO	CRYSTAL FREQUENCY	FORMAT	VISABLE LINES
-01	12.273 MHZ	BROADCAST	240/480 60HZ
-02	13.068 MHZ	STANDARD	256/512 60HZ
-03	12.188 MHZ	EUROPEAN	256/512 50HZ
-04	10.910 MHZ	STANDARD 50HZ	256/512 50HZ

ECL DRIVERS

-5VDC · 1K R5 · 2W R11 510 · 2K R11 510 · 306 2V · MIX · THQSQ · BQ · TP96 · PTBQ · NTBQ · PTHQ · NTHQ · J1-48 · J1-47 · J1-44 · J1-43

2V; +5V= PIN 9, GND= PIN 16, -5V = PIN 8

2W; GND= PIN 1, 16

ECL RECEIVERS

307 1M · 6BQ (NOT USED) · ZBQ (NOT USED) · 6HQ · 3HQ TO SHT 3 · 7HQ TO SHT. 2, 7, 8. · 2 HQ

1M; +5V= PIN 9, GND= PIN 16, -5V = PIN 8

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET ONE		

PROCESSOR CLOCK GENERATION

XTAL

THE PROCESSOR CLOCK CRYSTAL FREQUENCY REMAINS THE SAME FOR ALL DASH NUMBERS.

Y1 12.273 MHZ · R1, 470 · R2, 470 · C1 .01 · 331 · TPOSC1 · TPOSC2 · TPOSC3 · TPOSC4 · 2X

÷4 COUNTER

1 OF 8 DECODE

5439C IS Q_A Q_B · TP82 · TP81 · 532 1T · TP96 · *TPBQ · *TPD3 · *TPD2 · *TPD0 · TPHQ

JK PULSE SHAPER AND RECLOCK

430 1V · TPDONE (NOT USED) · *TPDONE · TPD3 · TPBQ · TPD0 · STPBQ · *TPBQ · TPD2 · TPQTWB (NOT USED) · *TPQTWB

THESE TWO INVERTERS DELAY Ø2 ABOUT 20 NSEC. WITH RESPECT TO Ø1

ECL DRIVERS

PHASE ONE - Ø1 · PHASE TWO - Ø2 · 306 2V · PTPDONE · NTPDONE · PTPQTWB · NTPQTWB · J1-30 · J1-29 · J1-34 · J1-33

2V; +5V= PIN 9, GND = PIN 16, -5V = PIN 8

POWER-ON RESET AND SWITCH CLEAR

TO RESET SWITCHES ON CONTROL BOARD AND SYSTEM FRONT PANEL

J1-8 · J1-7 · 98SWCLR · C13 0.1 μF · R6 220 · (SWITCH CLEAR) · CR1 IN4454 · (POWER-ON RESET) · R7 10K · C16 6.8 μF · +5V

AT RESET, THIS COUNTER COUNTS 15 HORIZONTAL LINE TIMES AND STOPS. WITH 64 μ SEC PER LINE, POWER-ON RESET EXISTS FOR ABOUT 1.0 MSEC (15 X 64 μ SEC). SWITCH RESETS ARE ACTIVE WHILE THE SWITCH IS HELD ON AND REMAIN ACTIVE 1.0 μSEC AFTER THE SWITCH IS RELEASED

*TVMMM (4 AS) · 517 1F · *TP8R · TP8R · 1K · TP8R#1 · 431 1Z · TP999 (38S) · TP0R

BUS CONTROL LINE: POWER-ON RESET/SWITCH CLEAR · 98PWCLR · J1-42 · J1-47

8080A-1 CLOCKS

325.92 CYCLE TIME · 10 MAX. · TPQONE · TPQTWB · Ø1 · Ø2 · 10 MAX. · 152.96 · 81.480 · 61.480

ALL TIMES SHOWN IN NS

LIST OF MATERIALS

QTY PER	MATERIAL	DESCRIPTION	TEMA PRT

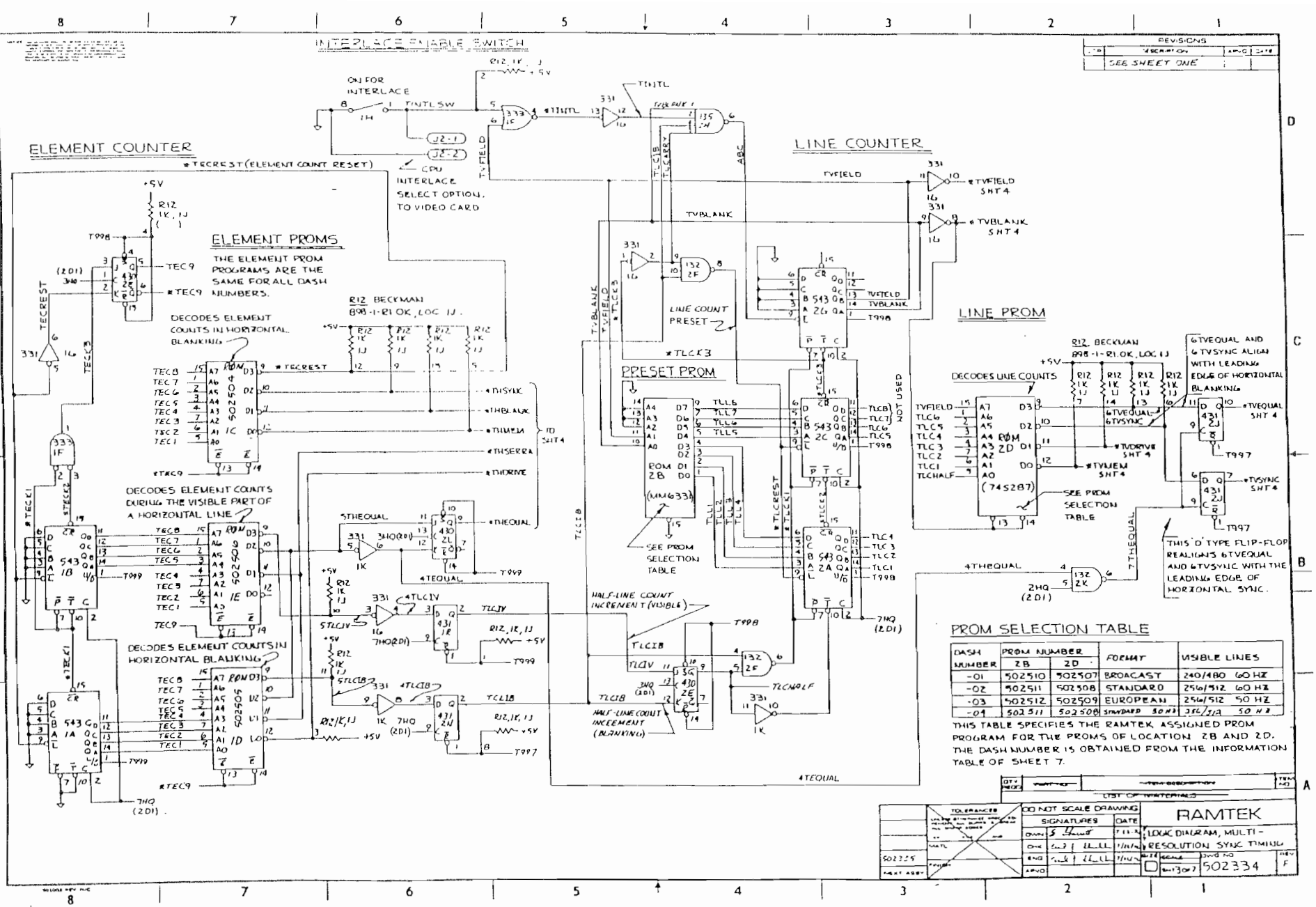
TOLERANCES	DO NOT SCALE DRAWING	SIGNATURES	DATE
		DWN	
		CHK	
		ENG	
		APVD	

RAMTEK

LOGIC DIAGRAM, MULTI-RESOLUTION SYNC TIMING

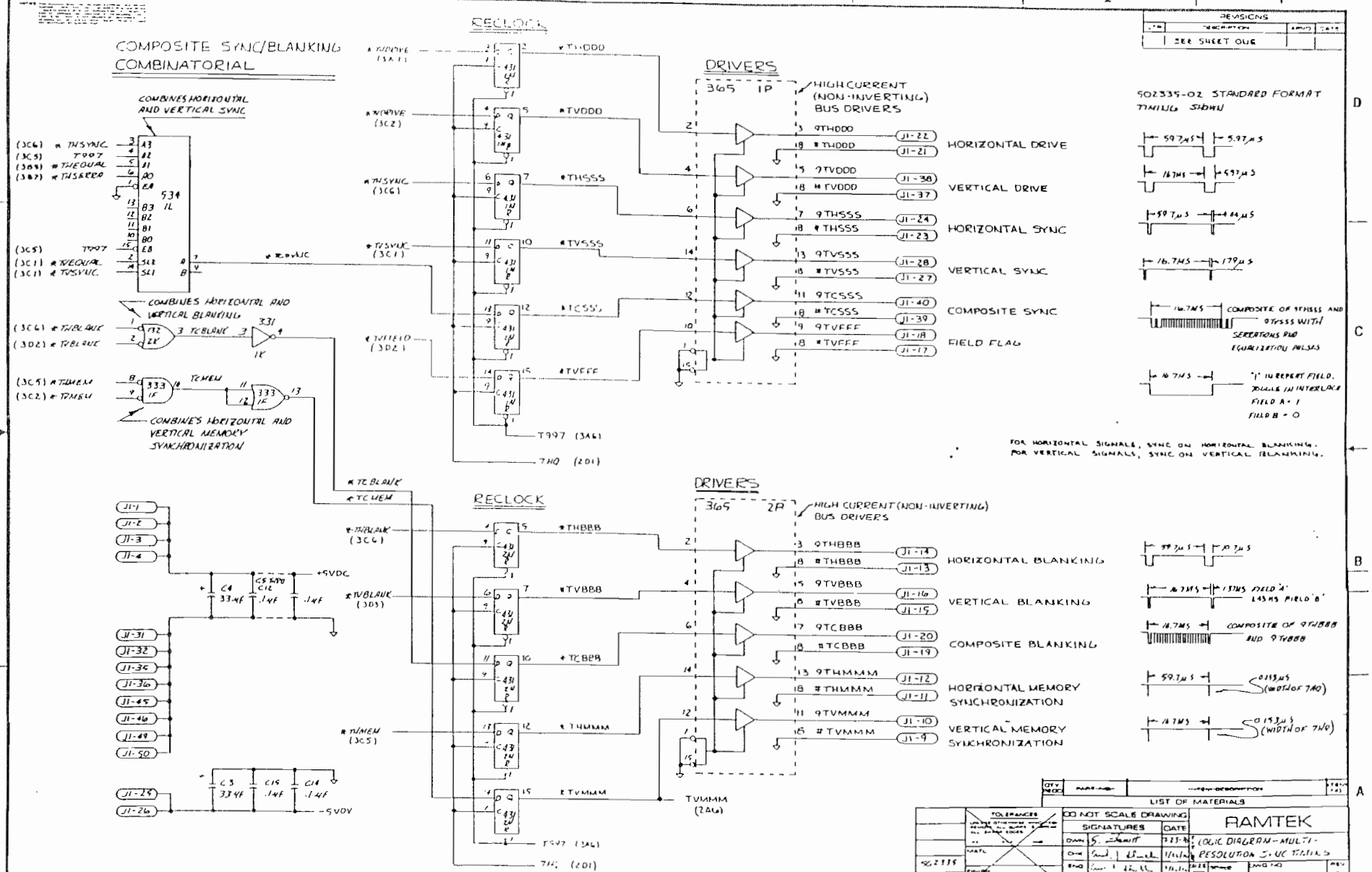
SIZE B · DWG NO 502334 · REV F · SHEET 2 OF 7

502335 · NEXT ASSY



DASH NUMBER	PROM NUMBER 2B	PROM NUMBER 2D	FORMAT	VISIBLE LINES
-01	502510	502507	BROADCAST	240/480 60 HZ
-02	502511	502508	STANDARD	256/512 60 HZ
-03	502512	502509	EUROPEAN	256/512 50 HZ
-04	502511	502508	STANDARD 50 HZ	256/512 50 HZ

COMPOSITE SYNC/BLANKING COMBINATORIAL



502335-02 STANDARD FORMAT TIMING SHOWN

REVISIONS

LTR	DESCRIPTION	APVD	DATE
	SEE SHEET ONE		

LIST OF MATERIALS

DO NOT SCALE DRAWING

SIGNATURES		DATE
DWN	S. Schmitt	7-23-82
CHK	[illegible]	7/23/82
ENG	[illegible]	7/23/82
APVD		

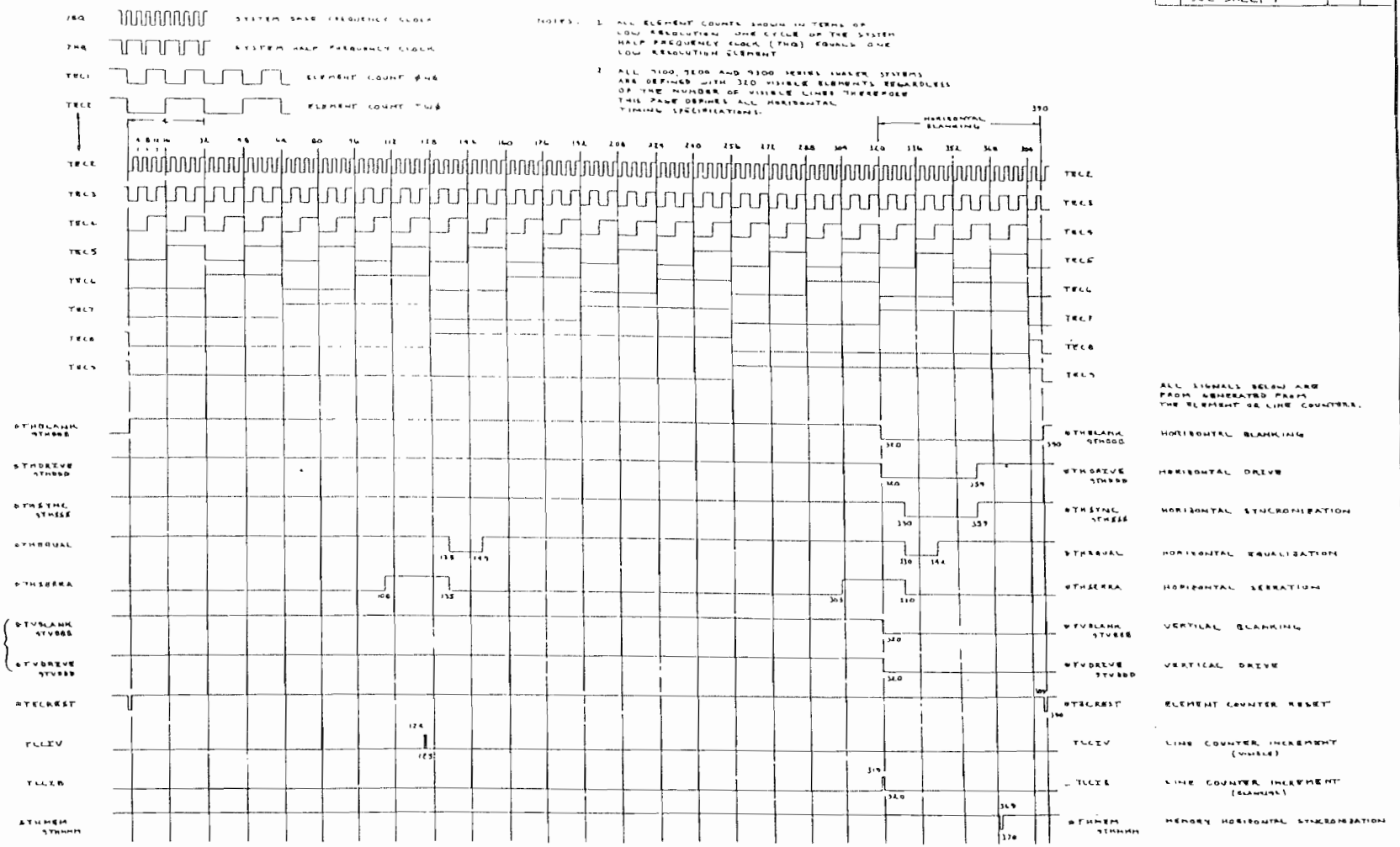
TOLERANCES

NEXT ASSY 502335

RAMTEK

COLOR DIAGRAM-MULTI-RESOLUTION SYNC TIMING

SIZE D | SHEET 7 of 7 | DWG NO 502324 | REV F



NOTES:
1. ALL ELEMENT COUNTS SHOWN IN TERMS OF LOW RESOLUTION. ONE CYCLE OF THE SYSTEM HALF FREQUENCY CLOCK (/HQ) EQUALS ONE LOW RESOLUTION ELEMENT.
2. ALL 9100, 9200 AND 9300 SERIES RASTER SYSTEMS ARE DEFINED WITH 320 VISIBLE ELEMENTS REGARDLESS OF THE NUMBER OF VISIBLE LINES. THEREFORE THIS PAGE DEFINES ALL HORIZONTAL TIMING SPECIFICATIONS.

REVISIONS

ZONE	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

LIST OF MATERIALS

QTY REQD	PART NO	ITEM DESCRIPTION	ITEM NO

DO NOT SCALE DRAWING

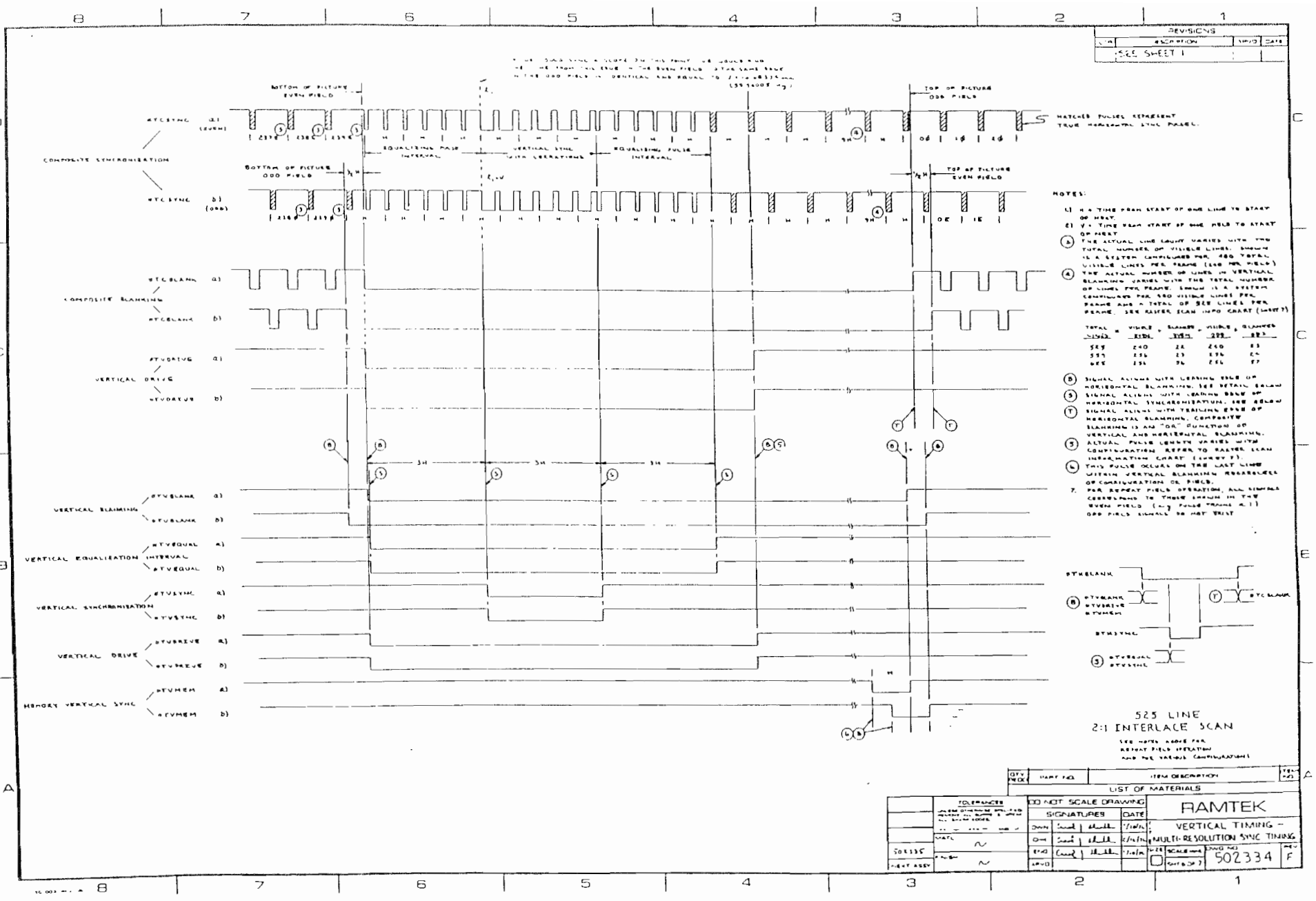
SIGNATURES		DATE
DWN	[illegible]	7/9/84
CHK	[illegible]	7/9/84
ENG	[illegible]	7/9/84
APVD		

RAMTEK

HORIZONTAL TIMING — MULT-RESOLUTION SYNC TIMING

SIZE D | SCALE NONE | DWG NO 502334 | REV F

NEXT ASSY 502335



NOTES:

1. H = TIME FROM START OF ONE LINE TO START OF NEXT.
2. V = TIME FROM START OF ONE FIELD TO START OF NEXT.
3. THE ACTUAL LINE LENGTH VARIES WITH THE TOTAL NUMBER OF VISIBLE LINES, SHOWN IS A SYSTEM CONFIGURED FOR 480 TOTAL VISIBLE LINES PER FRAME (240 PER FIELD)
4. THE ACTUAL NUMBER OF LINES IN VERTICAL BLANKING VARIES WITH THE TOTAL NUMBER OF LINES PER FRAME, SHOWN IS A SYSTEM CONFIGURED FOR 480 VISIBLE LINES PER FRAME AND A TOTAL OF 525 LINES PER FRAME. SEE RASTER SCAN INFO CHART (SHEET 7)

TOTAL LINES	= VISIBLE LINES	+ BLANKED LINES	VISIBLE LINES	BLANKED LINES
525	240	22	240	23
525	256	23	256	24
625	256	25	256	57

5. SIGNAL ALIGNS WITH LEADING EDGE OF HORIZONTAL BLANKING. SEE DETAIL BELOW
6. SIGNAL ALIGNS WITH LEADING EDGE OF HORIZONTAL SYNCHRONISATION. SEE DETAIL BELOW
7. SIGNAL ALIGNS WITH TRAILING EDGE OF HORIZONTAL BLANKING. COMPOSITE BLANKING IS AN "OR" FUNCTION OF VERTICAL AND HORIZONTAL BLANKING.
8. ACTUAL PULSE LENGTH VARIES WITH CONFIGURATION REFER TO RASTER SCAN INFORMATION CHART (SHEET 7).
9. THIS PULSE OCCURS ON THE LAST LINE WITHIN VERTICAL BLANKING REGARDLESS OF CONFIGURATION OR FIELD.
10. FOR REPEAT FIELD OPERATION, ALL SIGNALS CORresponD TO THOSE SHOWN IN THE EVEN FIELD (e.g. PULSE TRAINS 4, 5) ODD FIELD SIGNALS DO NOT EXIST

REVISIONS

LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

LIST OF MATERIALS

QTY PER	PART NO.	ITEM DESCRIPTION	ITEM NO.

	TOLERANCES	DO NOT SCALE DRAWING			RAMTEK
		SIGNATURES		DATE	VERTICAL TIMING – MULTI-RESOLUTION SYNC TIMING
	DECIMALS	DWN			
	DATE	CHK			
502334		ENG			SIZE D SCALE NONE DWG NO 502334 REV F
NEXT ASSY	ANGLES	APVD			SHT 6 OF 7

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET ONE		

MODEL	CONFIGURATION: VISIBLE ELEMENTS	CONFIGURATION: FORMAT VARIABLES	FRAME REFRESH RATE * (Hz)	FIELD REFRESH RATE * (Hz)	RECOMMENDED VIDEO LINE FREQUENCY (Hz)	TOTAL LINES PER FRAME	TOTAL LINES FIELD 'A'	TOTAL LINES FIELD 'B'	VISIBLE LINES PER FRAME	VISIBLE LINES FIELD 'A'	VISIBLE LINES FIELD 'B'	BLANKED LINES PER FRAME	BLANKED LINES FIELD 'A'	BLANKED LINES FIELD 'B'	TOTAL ELEMENTS PER LINE	VISIBLE ELEMENTS PER LINE	BLANKED ELEMENTS PER LINE	CRYSTAL FREQUENCY (MHz)	PIXEL TIME (nSEC)	EXTERNAL SYNC LOCK (VCR) AVAILABLE	MULTI-RESOLUTION SYNC TIMING CARD DASH NUMBER
RM9100	240×320 R	BROADCAST	60	60	60	262	262	–	240	240	–	22	22	–	390	320	70	12.273	162.96	–	502335 – 01
	240×320 I	BROADCAST	30	60	60	525	262	263	480	240	240	45	22	23	390	320	70	12.273	162.96	YES	– 01
	256×320 R	STANDARD	60	60	60	279	279	–	256	256	–	23	23	–	390	320	70	13.068	153.08	–	502335 – 02
	256×320 I	STANDARD	30	60	60	559	279	280	512	256	256	47	23	24	390	320	70	13.068	153.08	–	– 02
	256×320 R	EUROPEAN	50	50	50	312	312	–	256	256	–	56	56	–	390	320	70	12.188	164.10	–	502335 – 03
	256×320 I	EUROPEAN	25	50	50	625	312	313	512	256	256	113	56	57	390	320	70	12.188	164.10	–	– 03
	256×336 R	STANDARD 50HZ	50	50	50	319	319	–	256	256	–	33	33	–	390	336	70	10.910	183.33	–	502335 – 04
	256×336 I	STANDARD 25HZ	25	50	50	599	299	300	512	256	256	87	33	34	390	336	70	10.910	183.33	–	– 04
RM9200	240×640 R	BROADCAST	60	60	60	262	262	–	240	240	–	22	22	–	780	640	140	12.273	81.481	–	502335 – 01
	240×640 I	BROADCAST	30	60	60	525	262	263	480	240	240	45	22	23	780	640	140	12.273	81.481	YES	– 01
	256×640 R	STANDARD	60	60	60	279	279	–	256	256	–	23	23	–	780	640	140	13.068	76.526	–	502335 – 02
	256×640 I	STANDARD	30	60	60	559	279	280	512	256	256	47	23	24	780	640	140	13.068	76.526	–	– 02
	256×640 R	EUROPEAN	50	50	50	312	312	–	256	256	–	56	56	–	780	640	140	12.188	82.051	–	502335 – 03
	256×640 I	EUROPEAN	25	50	50	625	312	313	512	256	256	113	56	57	780	640	140	12.188	82.051	–	– 03
	256×640 R	STANDARD 50HZ	50	50	50	319	319	–	256	256	–	33	33	–	780	640	140	10.910	91.666		502335 – 04
	256×640 I	STANDARD 25HZ	25	50	50	599	319	300	512	256	256	87	33	34	780	640	140	10.910	91.666		– 04
RM9300	480×640 I	BROADCAST	30	60	60	525	262	263	480	240	240	45	22	23	780	640	140	12.273	81.481	YES	502335 – 01
	512×640 I	STANDARD	30	60	60	559	279	280	512	256	256	47	23	24	780	640	140	13.068	76.526	–	502335 – 02
	512×640 I	EUROPEAN	25	50	50	625	312	313	512	256	256	113	56	57	780	640	140	12.188	82.051	YES	502335 – 03
	512×640 I	STANDARD 50HZ	25	50	50	599	299	300	512	256	256	87	33	34	780	640	140	10.910	91.659	–	502335 – 04

LEGEND: R = REPEAT FIELD. FIELD 'A' IS IDENTICAL TO FIELD 'B'
I = 2:1 INTERLACED SCAN.

* THE DASH NUMBER SPECIFIES:
1) SYSTEM CLOCK CRYSTAL FREQUENCY
2) TWO LINE COUNT PROM PROGRAMS

*: AN INDICATED 60 HZ IN THIS COLUMN ACTUALLY IS 59.940 HZ
" " 50 HZ " " 50.000 HZ
" " 30 HZ " " 29.970 HZ
" " 25 HZ " " 25.000 HZ

EXCEPTIONS: STANDARD 50HZ FORMAT:
AN INDICATED 30 HZ IN THIS COLUMN ACTUALLY IS 30.044 HZ
AN INDICATED 25 HZ IN THIS COLUMN ACTUALLY IS 25.022 HZ

IMPORTANT NOTE.

IN AN INTERLACED SYSTEM ONE FRAME = TWO FIELDS
THAT IS, THERE ARE TWO FIELDS PER FRAME.

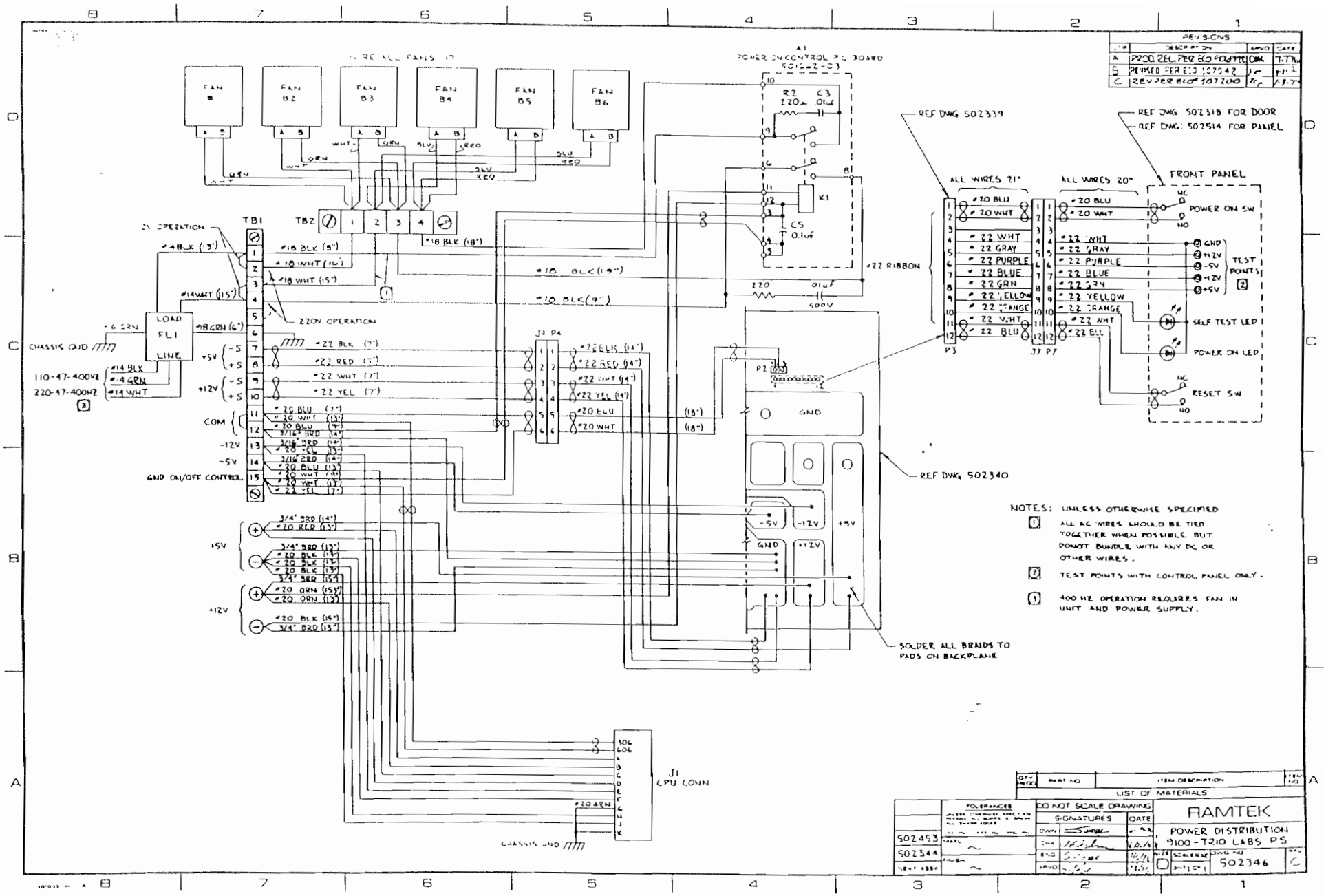
IN A REPEAT FIELD SYSTEM ONE FRAME = ONE FIELD
THAT IS THERE IS ONE FIELD PER FRAME.
ONE FRAME-TIME = 2 FIELD TIME

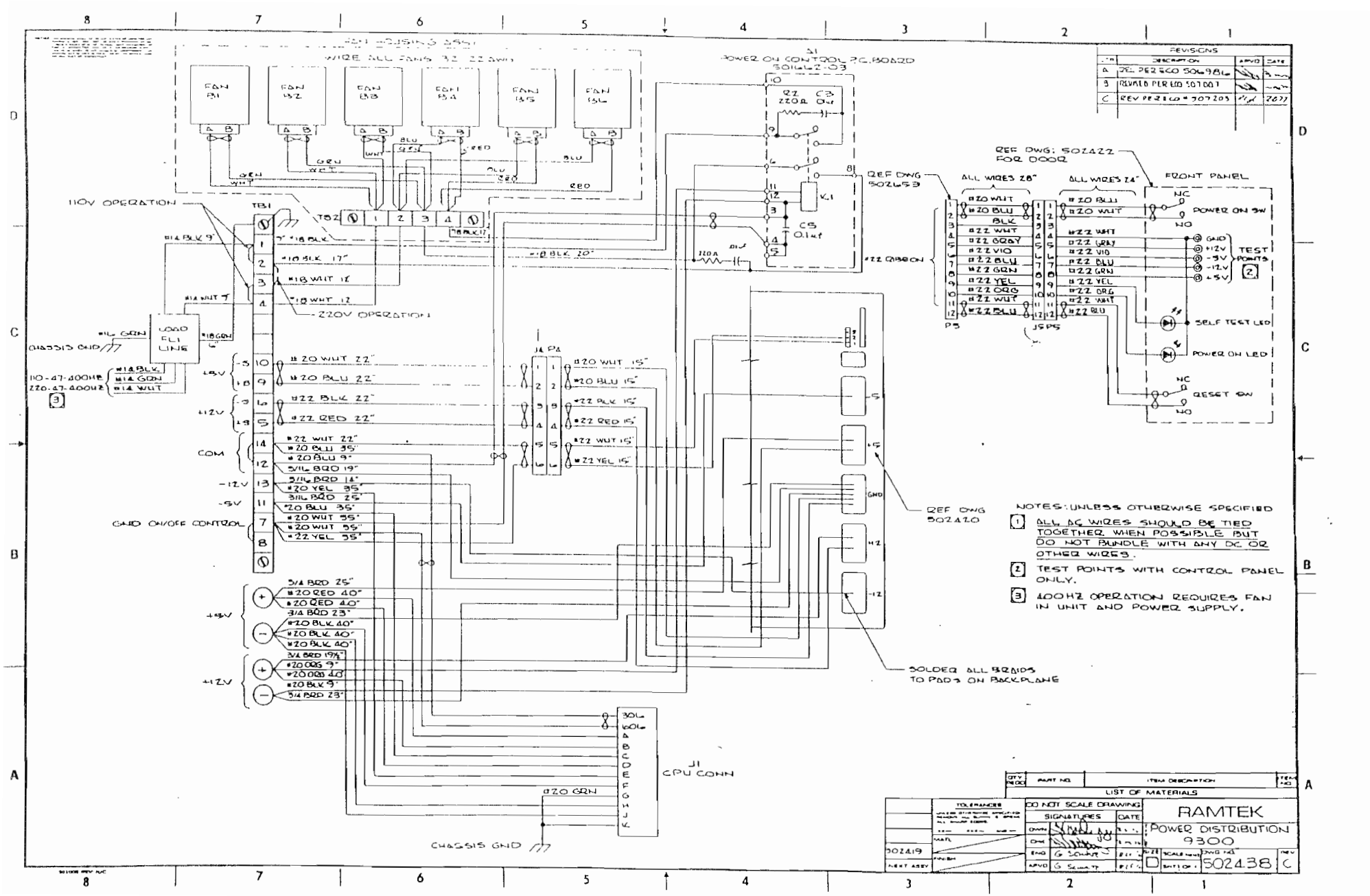
QTY PER UNIT	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

	TOLERANCES	DO NOT SCALE DRAWING			RAMTEK		
		SIGNATURES		DATE	RASTER SCAN INFORMATION		
	MATL ~	DWN		9/10/82	MULTI-RESOLUTION SYNC TIMING		
502335		CH		9/10/82			
NEXT ASSY	FINISH ~	ENG		9/10/82	SIZE D	SCALE –	DWG NO. 502334	REV F
		APVD				SHT 1 OF 1	

501003 REV N/C

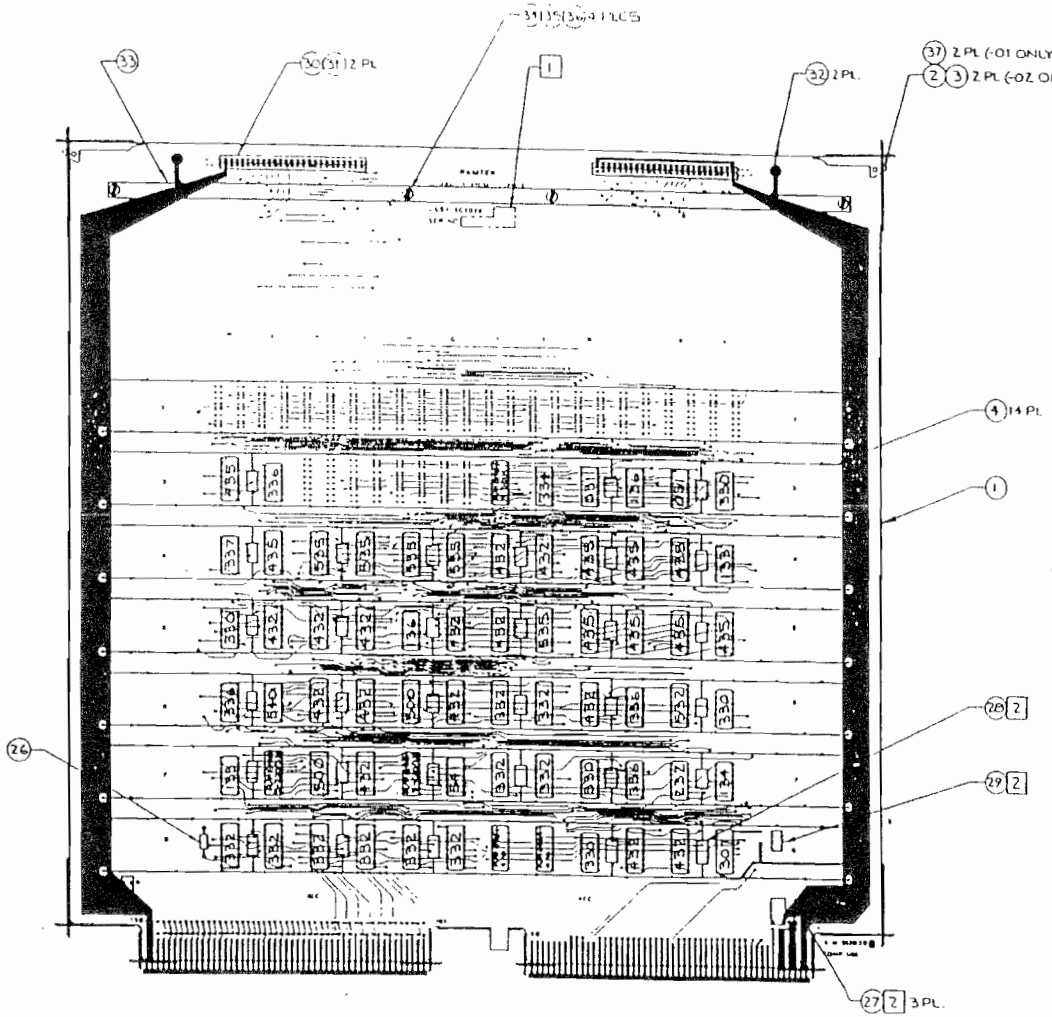

REVISIONS
A 220 VAC PER ECO 507200 DRK 7-7-94
B REVISED PER ECO 507242 JM 11-1-94
C 24V PER ECO 507200 RC 1-27-95
FAN B
FAN B2
FAN B3
FAN B4
FAN B5
FAN B6
A1
POWER SUPPLY CONTROL PC BOARD
502453-03
R2 220Ω
C3 .01uf
K1
C5 0.1uf
220
.01uf 500V
#22 RIBBON
REF DWG 502339
REF DWG 502318 FOR DOOR
REF DWG 502514 FOR PANEL
FRONT PANEL
ALL WIRES 21"
ALL WIRES 20"
P3
J7 P7
POWER ON SW
TEST POINTS
SELF TEST LED
POWER ON LED
RESET SW
TB1
TB2
J3 P4
P2
REF DWG 502340
LOAD
FL1
LINE
CHASSIS GND
110-47-400HZ
220-47-400HZ
COM
GND O/I/OFF CONTROL
-12V
-5V
+5V
+12V
GND
SOLDER ALL BRAIDS TO PADS ON BACKPLANE
J1
CPU CONN
NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL AC WIRES SHOULD BE TIED TOGETHER WHEN POSSIBLE. BUT DONOT BUNDLE WITH ANY DC OR OTHER WIRES.
2. TEST POINTS WITH CONTROL PANEL ONLY.
3. 400 HZ OPERATION REQUIRES FAN IN UNIT AND POWER SUPPLY.
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
RAMTEK
POWER DISTRIBUTION
9100-T210 LABS PS
502453
502344
502346


FAN BUSING ASSY
WIRE ALL FANS #22 AWG
FAN B1
FAN B2
FAN B3
FAN B4
FAN B5
FAN B6
J1
POWER ON CONTROL PC BOARD
502442-03
REF DWG 502453
REF DWG: 502422 FOR DOOR
ALL WIRES 28"
ALL WIRES 24"
FRONT PANEL
POWER ON SW
TEST POINTS
SELF TEST LED
POWER ON LED
RESET SW
110V OPERATION
220V OPERATION
TB1
TB2
LOAD FILTER
CHASSIS GND
110-47-400HZ
220-47-400HZ
+5V
+12V
COM
-12V
-5V
GND ON/OFF CONTROL
J4 P4
REF DWG 502420
SOLDER ALL BRAIDS TO PADS ON BACKPLANE
J1 CPU CONN
CHASSIS GND
NOTES: UNLESS OTHERWISE SPECIFIED
1 ALL AC WIRES SHOULD BE TIED TOGETHER WHEN POSSIBLE BUT DO NOT BUNDLE WITH ANY DC OR OTHER WIRES.
2 TEST POINTS WITH CONTROL PANEL ONLY.
3 400 HZ OPERATION REQUIRES FAN IN UNIT AND POWER SUPPLY.
REVISIONS
A REL PER ECO 506986
B REVISED PER ECO 507007
C REV PER ECO # 507205
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DRWN
CHK
ENG G SCHMITT
APVD G SCHMITT
RAMTEK
POWER DISTRIBUTION
9300
SIZE D
DWG NO 502438
REV C

INTERFACE AND OPTIONAL ASSEMBLIES

502028-	2 sheets
502029	7 sheets
502440	2 sheets
502442	6 sheets
502641	1 sheet
502643	16 sheets
502769	3 sheets
502635	1 sheet

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A1	PROTO RELEASE		
A	PROD REL PER ECO #		
B	REV PER ECO #		
C	REV PER ECO # 5017?4		
D	REV PER ECO # 5017?4		
E	REV PER ECO # 5017?1		



NOTES:

[1] STAMP SERIAL (NO. ASSY. REV. LEVEL WITH DASH NO. WITHIN AREA INDICATED.

[2] CAPACITORS TO BE INSTALLED LYING FLAT, NOT TO EXCEED .430 ABOVE BOARD SURFACE

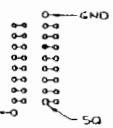
3. LOGIC DIAGRAM NO. 502029

4. FAB DWG. NO. 502030

5. LOGIC DEVICE TYPE NUMBERS ARE RAMTEK TTL STANDARD PART NUMBERS 1301XXX

6. ALL I.C.'S ARE ORIENTED AS SHOWN:

7. * SPARE I.C. LOCATIONS ARE ORIENTED AS SHOWN:



NOTE: (A) LOCATIONS ARE APPLICABLE FOR 14/16 PIN SOCKETS.

(B) PWR / GND ARE AVAILABLE AT BUSS BAR TERMINATIONS.

(C) PARALLEL PLATED-THRU HOLES PROVIDE WIRE TO PIN CONNECTIONS

* THESE I.C. LOCATIONS ARE INTENDED FOR CUSTOMER OPTION USE.

[3] BREAK OFF SECTIONS AS REQUIRED.

QTY PER BOARD	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

-02	RM9000	MATL	
-01	FS2000		
DASH NO.	NEXT ASSY		

TOLERANCES

DO NOT SCALE DRAWING

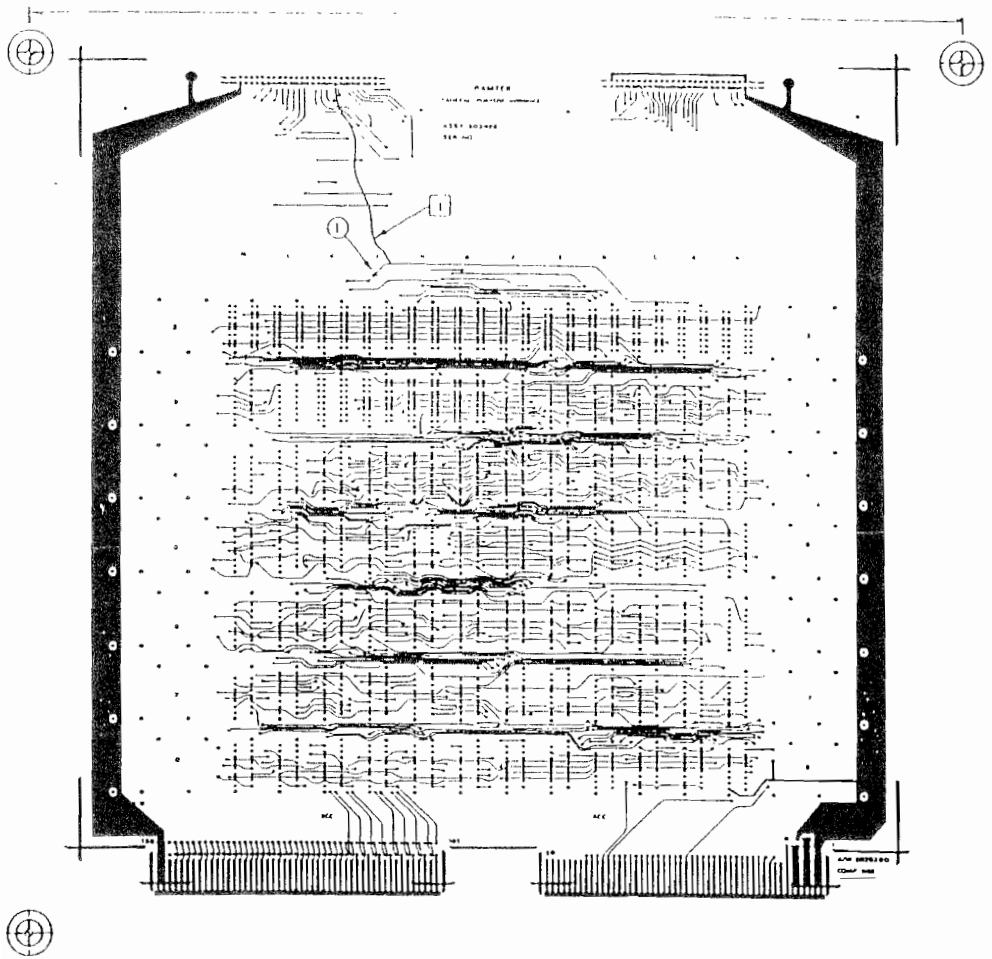
SIGNATURES		DATE
DWN	D Dragon	6 2 ?
CHK	[illegible]	9 ? ?
ENG	[illegible]	3 ? ?
APVD	[illegible]	3 ? ?

RAMTEK

PC B. ASSY, UTILITY GENERAL PURPOSE INTFC

SCALE 1/1 | SHEET 1 of 1 | DWG NO. 502028 -01 | REV E

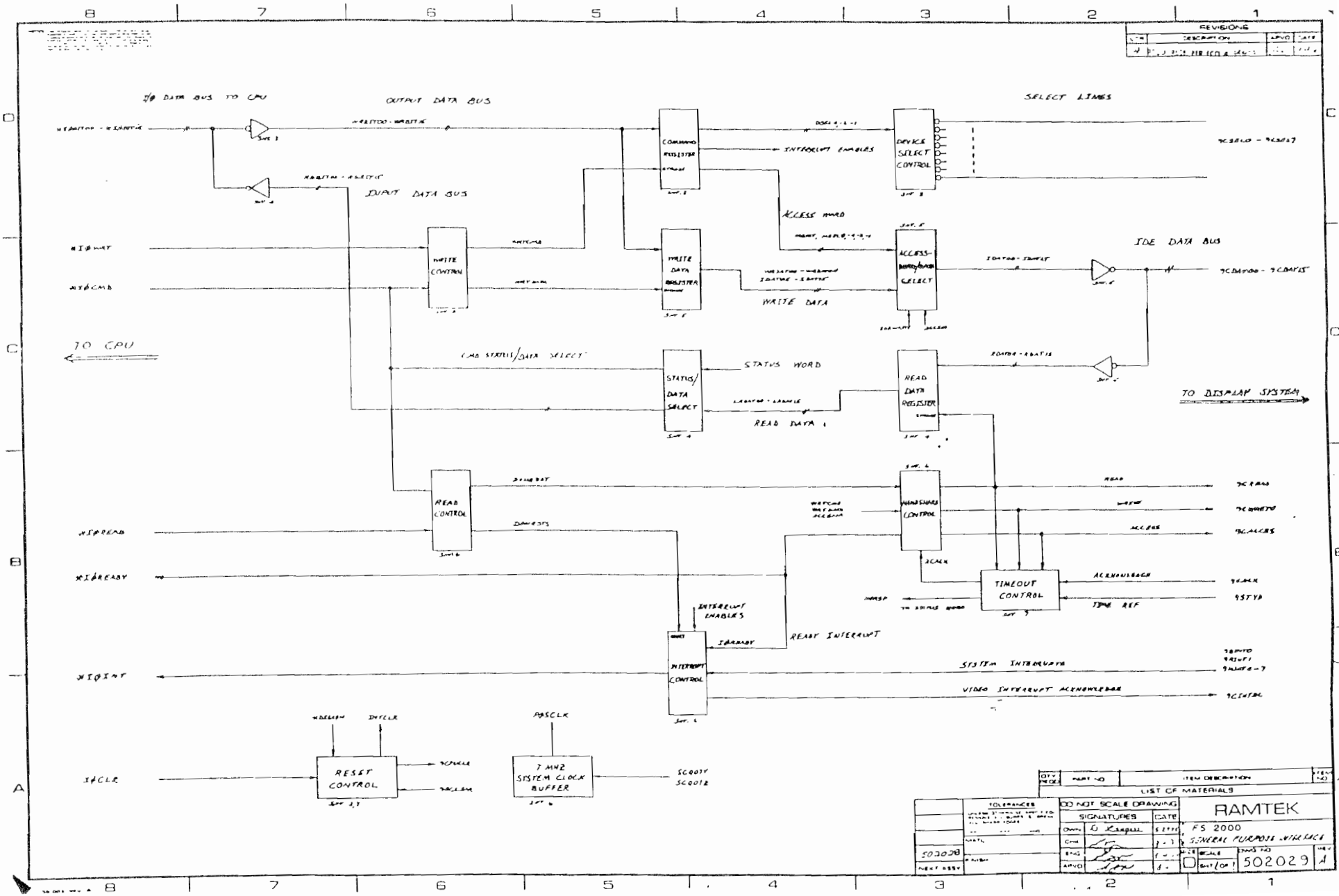
REVISIONS			
LTR	DESCRIPTION	APVD	DATE



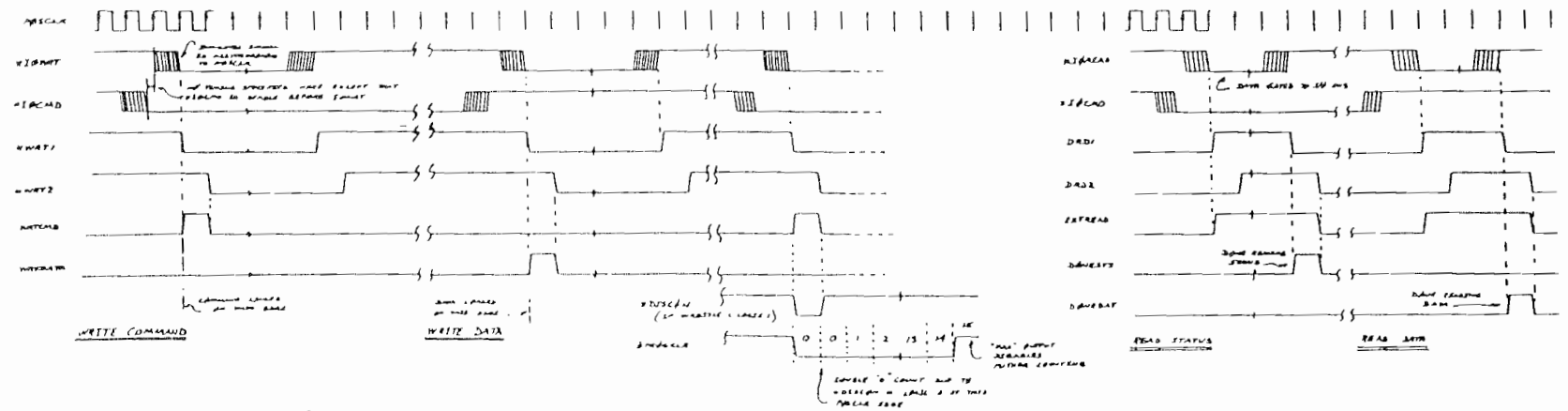
(1) CUT TRACE AS SHOWN

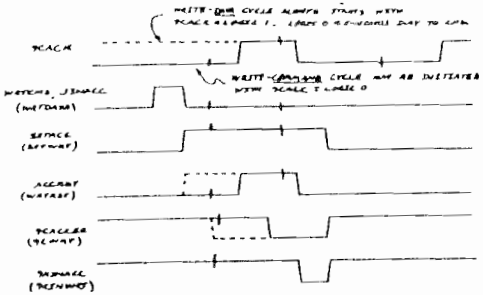
[1] ADD WIRE FROM TCU233 TO TRACE AS INDICATED.

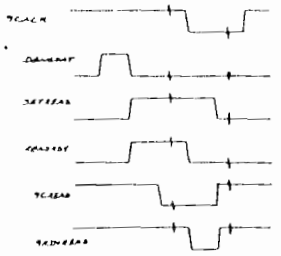
DO NOT SCALE DRAWING			RAMTEK
SIGNATURES		DATE	
DWN			CUT & PATCH, UTILITY
CHK		5/6/70	GENERAL PURPOSE INTERFACE
ENG		5/5/70	SIZE: D SCALE: 1/1 DWG NO: 502028 REV: E
APVD		5/5/70	SHT 2 OF 2

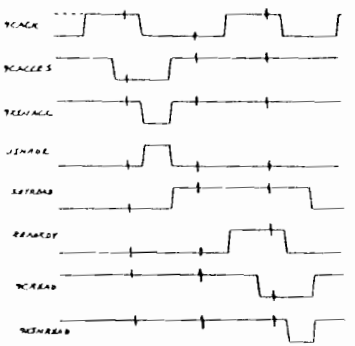

I/O DATA BUS TO CPU
OUTPUT DATA BUS
SELECT LINES
INPUT DATA BUS
ACCESS WORD
IDE DATA BUS
TO CPU
CMD STATUS/DATA SELECT
STATUS WORD
READ DATA
WRITE DATA
TO DISPLAY SYSTEM
INTERRUPT ENABLES
READY INTERRUPT
SYSTEM INTERRUPT
VIDEO INTERRUPT ACKNOWLEDGE
COMMAND REGISTER
DEVICE SELECT CONTROL
WRITE CONTROL
WRITE DATA REGISTER
ACCESS-WORD/BYTE SELECT
STATUS/ DATA SELECT
READ DATA REGISTER
READ CONTROL
HANDSHAKE CONTROL
TIMEOUT CONTROL
INTERRUPT CONTROL
RESET CONTROL
7 MHZ SYSTEM CLOCK BUFFER
REVISIONS
DESCRIPTION
APVD
DATE
LIST OF MATERIALS
QTY PER
PART NO
ITEM DESCRIPTION
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
FS 2000
GENERAL PURPOSE INTERFACE
SCALE
DWG NO
502029
REV
A
SIZE
SHEET OF
TOLERANCES
NEXT ASSY
502028

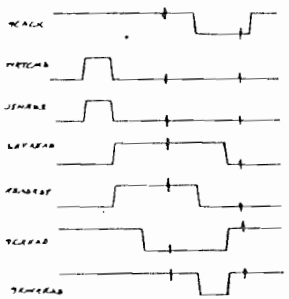
REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	[illegible]		

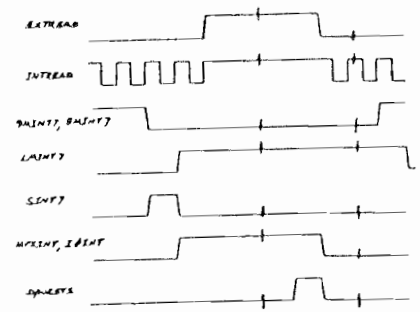


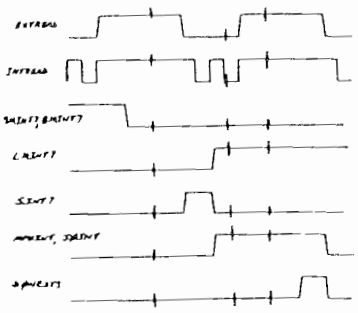










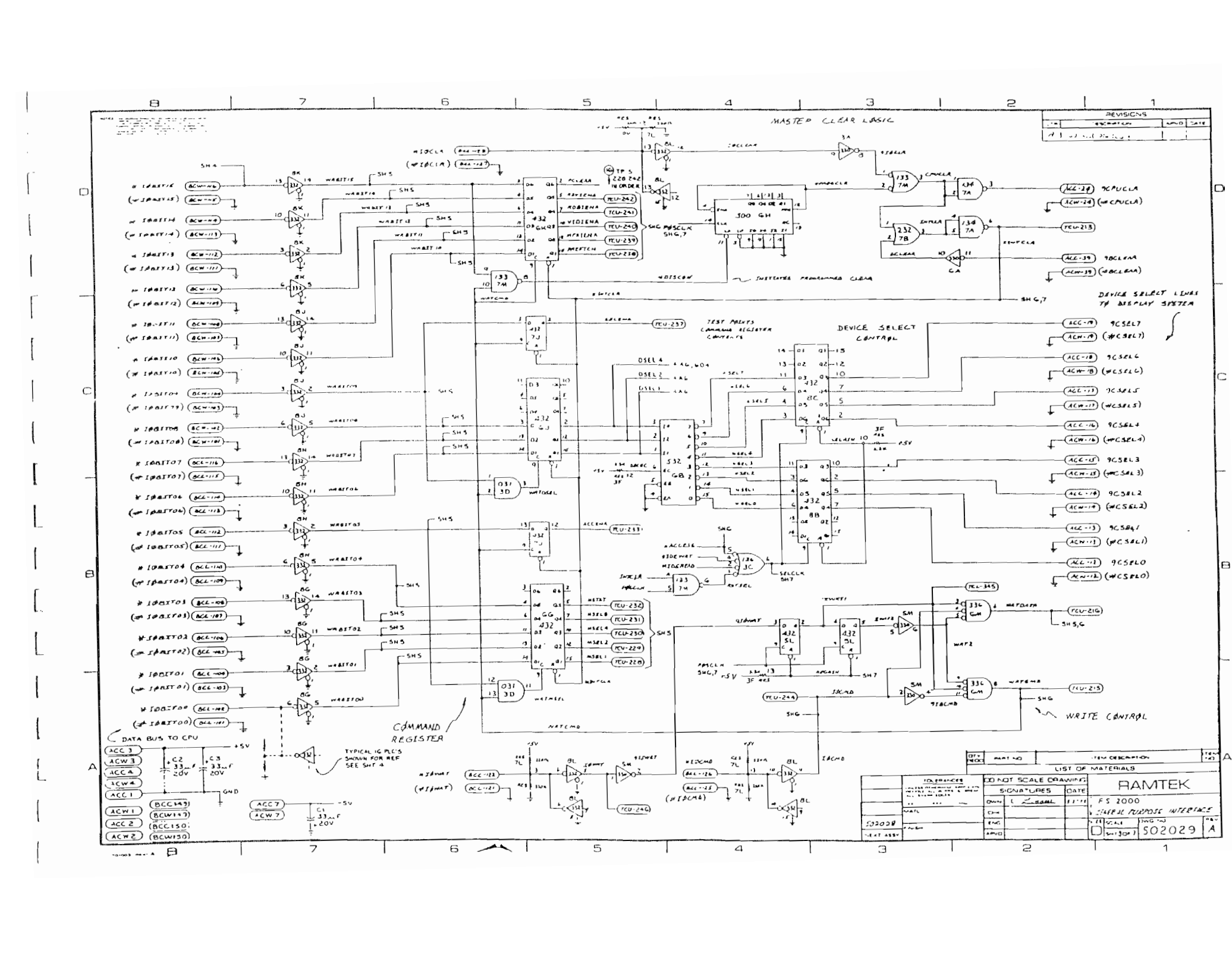


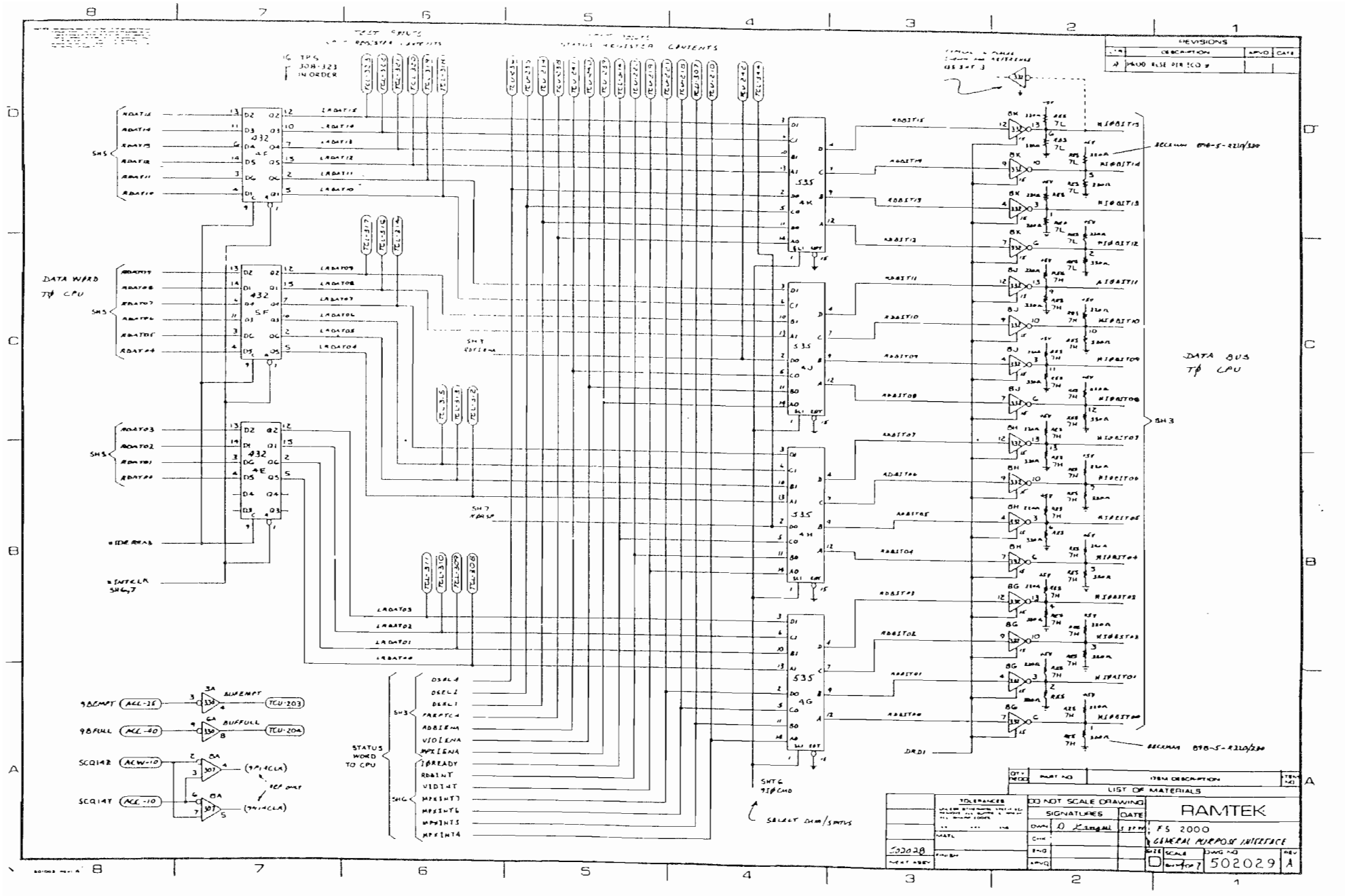
INTERRUPT CYCLES

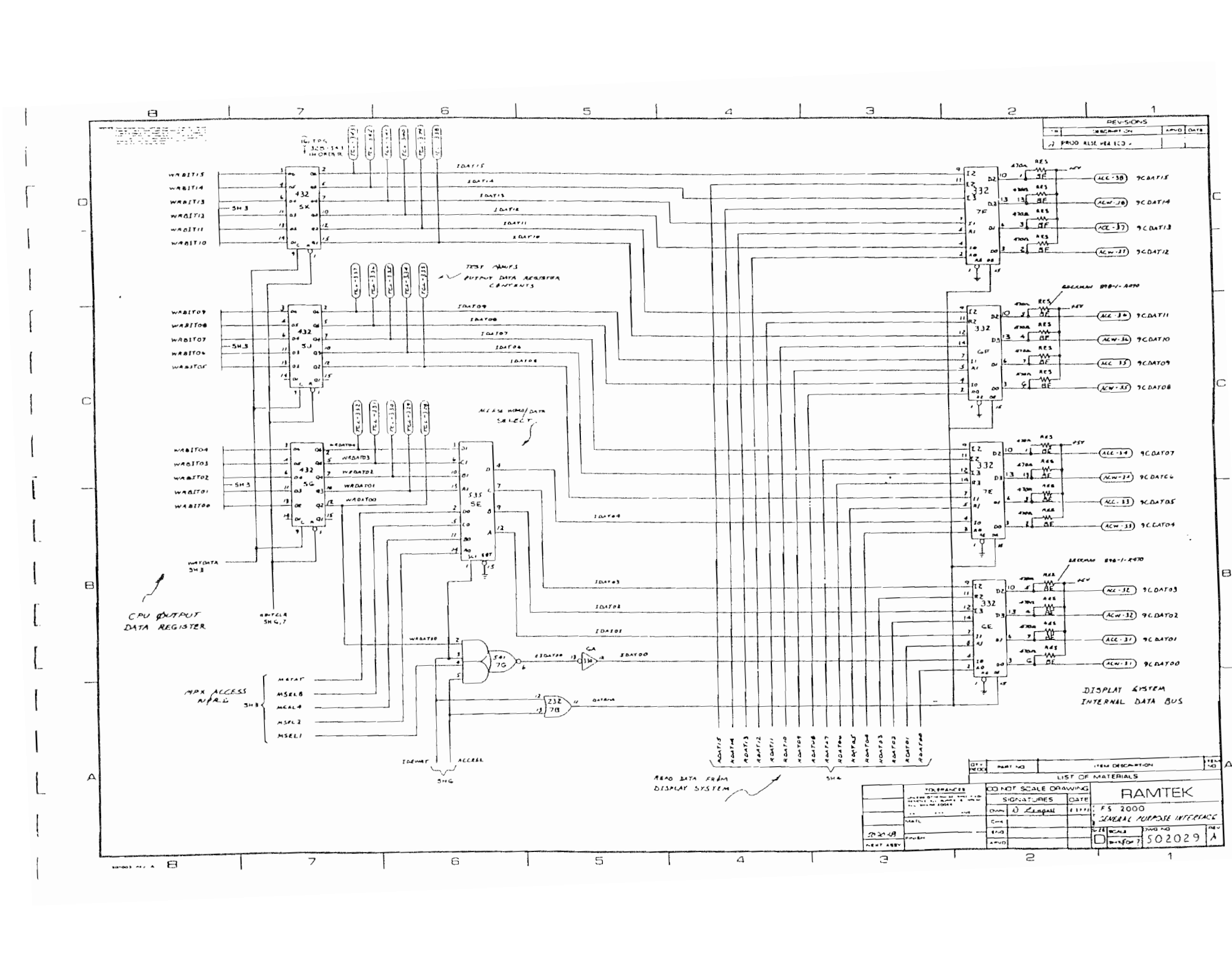
(IN LEFT: INTERRUPTS WHEN CPU NOT READING
(IN RIGHT: INTERRUPTS WHEN CPU READING

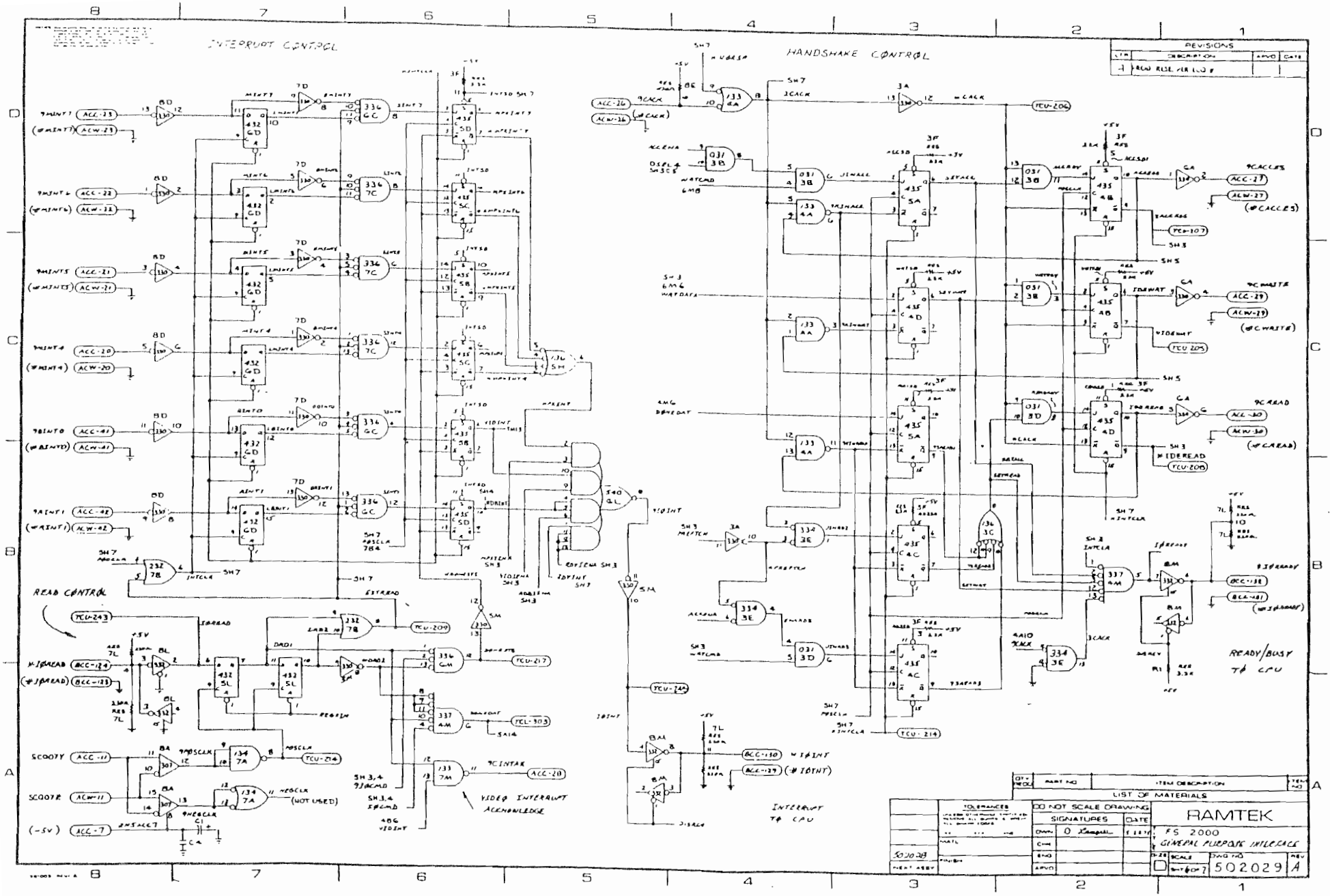
QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING		RAMTEK
	SIGNATURES	DATE	FS 2000
	DWN O Kangas	5 JAN 84	GENERIC MIPROSE INTERFACE
	CHK		
502028	ENG		SIZE D SCALE SHT 2 OF 7 DWG NO 502029 REV A
NEXT ASSY	APVD		

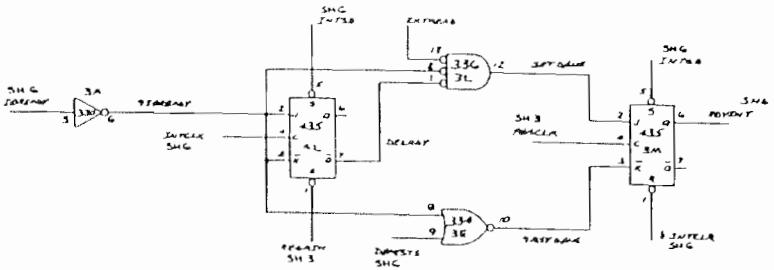

MASTER CLEAR LOGIC
DEVICE SELECT CONTROL
DEVICE SELECT LINES TO DISPLAY SYSTEM
TEST POINTS COMMAND REGISTER CONTENTS
COMMAND REGISTER
DATA BUS TO CPU
WRITE CONTROL
INSTALLER PROGRAMMED CLEAR
TYPICAL IC PLC'S SHOWN FOR REF SEE SHT 4
LIST OF MATERIALS
DO NOT SCALE DRAWING
RAMTEK
FS 2000
GENERAL PURPOSE INTERFACE
502029
A

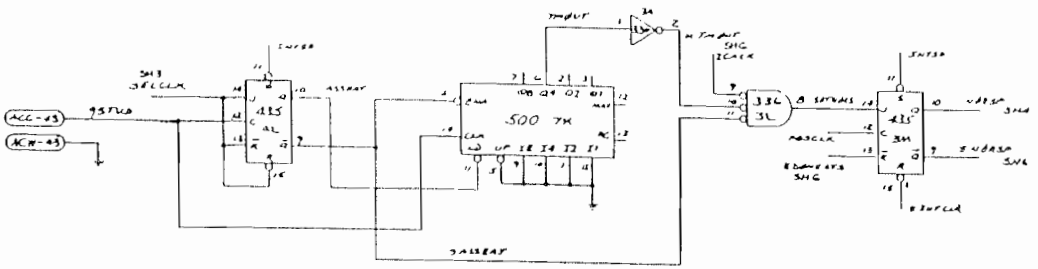

REVISIONS
DESCRIPTION
ADVD
DATE
DATA WORD TO CPU
DATA BUS TO CPU
STATUS WORD TO CPU
SELECT DMM/STATUS
SHT 9 TO CMD
SHT 7 TO DMA
SHT 7 TO VIDEMA
SHT 7 TO INTCLR SH6,7
SHT 3
SHT 6
SHT 7
SHT 9
DRDI
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
FS 2000
GENERAL PURPOSE INTERFACE
502029
SIZE
SCALE
DWG NO
REV
A


REVISIONS
DESCRIPTION
APVD
DATE
PROD RLSE PER ECO
WABIT15
WABIT14
WABIT13
WABIT12
WABIT11
WABIT10
WABIT09
WABIT08
WABIT07
WABIT06
WABIT05
WABIT04
WABIT03
WABIT02
WABIT01
WABIT00
SH3
IDAT15
IDAT14
IDAT13
IDAT12
IDAT11
IDAT10
IDAT09
IDAT08
IDAT07
IDAT06
IDAT05
IDAT04
IDAT03
IDAT02
IDAT01
IDAT00
TEST POINTS
TEST POINTS
OUTPUT DATA REGISTER CONTENTS
MEMORY WORD/DATA SELECT
CPU OUTPUT DATA REGISTER
MPX ACCESS MPXL
MSTAT
MSEL3
MCAL4
MSPL2
MSEL1
IDENAT
ACCESS
SH6
READ DATA FROM DISPLAY SYSTEM
ACC-38
ACW-38
ACC-37
ACW-37
ACC-36
ACW-36
ACC-35
ACW-35
ACC-34
ACW-34
ACC-33
ACW-33
ACC-32
ACW-32
ACC-31
ACW-31
9CDAT15
9CDAT14
9CDAT13
9CDAT12
9CDAT11
9CDAT10
9CDAT09
9CDAT08
9CDAT07
9CDAT06
9CDAT05
9CDAT04
9CDAT03
9CDAT02
9CDAT01
9CDAT00
DISPLAY SYSTEM INTERNAL DATA BUS
LIST OF MATERIALS
QTY
PART NO
ITEM DESCRIPTION
REV NO
DO NOT SCALE DRAWING
SIGNATURES
DATE
DRWN
CHK'D
ENG'D
APV'D
RAMTEK
FS 2000
GENERAL PURPOSE INTERFACE
SIZE
SCALE
DWG NO
REV
502029
A


INTERRUPT CONTROL
HANDSHAKE CONTROL
READ CONTROL
REVISIONS
DESCRIPTION
NEW RELEASE PER ECO #
LIST OF MATERIALS
ITEM DESCRIPTION
DO NOT SCALE DRAWING
SIGNATURES
DRWN
CHK
ENG
APVD
RAMTEK
FS 2000
GENERAL PURPOSE INTERFACE
SCALE
DWG NO
502029
REV
A
READY/BUSY TO CPU
INTERRUPT TO CPU
VIDEO INTERRUPT ACKNOWLEDGE

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	ENGR RELEASE		

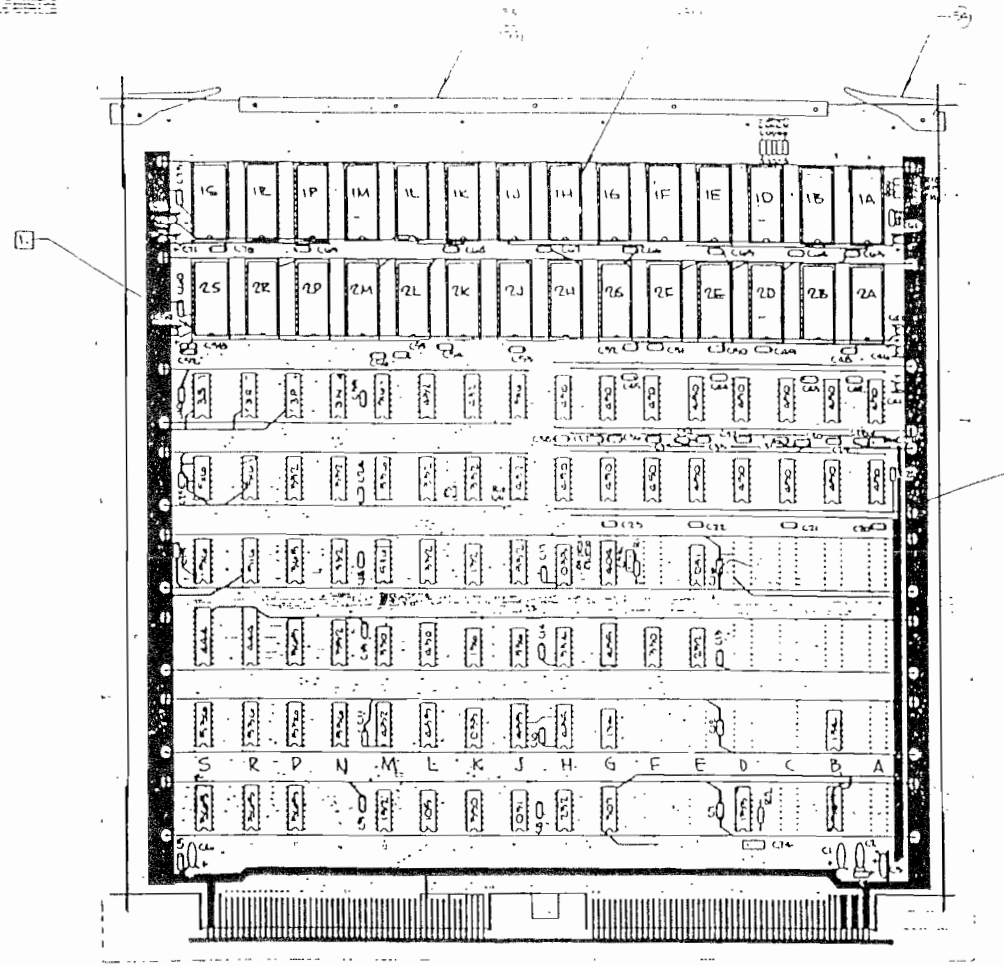




QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING	RAMTEK	
	SIGNATURES / DATE		
MATL	DWN O. FARGHL	FS 2000	
	CHK	GENERAL PURPOSE INTERFACE	
502018	ENG	SIZE SCALE DWG NO	REV
NEXT ASSY	APVD	502029	A

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	RELEASED PER ECO 507015	DMS	7-77
B	ECO # 507052	DM	9-9-77
C	REV PER ECO # 507120	[illegible]	1-26-78
D	REV PER ECO # 507155	AAC	2-10-78
E	REV PER ECO # 507228	RE	2-27-78
F	REV PER ECO # 507339	DMD	9-8-78
	ZEN # 327	[illegible]	4-25-79



D	C	507155	NONE REQ'D
C	B	507124	CUT PADS AT SOLDER SPILL TO PREVENT SHORTS
B	B	507052	—
A	A	507015	—
ASST REV	A/W REV	ECO #	WIRES & CUTS REQ'D

FAB 502441

QTY REQD	PART NO	ITEM DESCRIPTION	ITEM NO

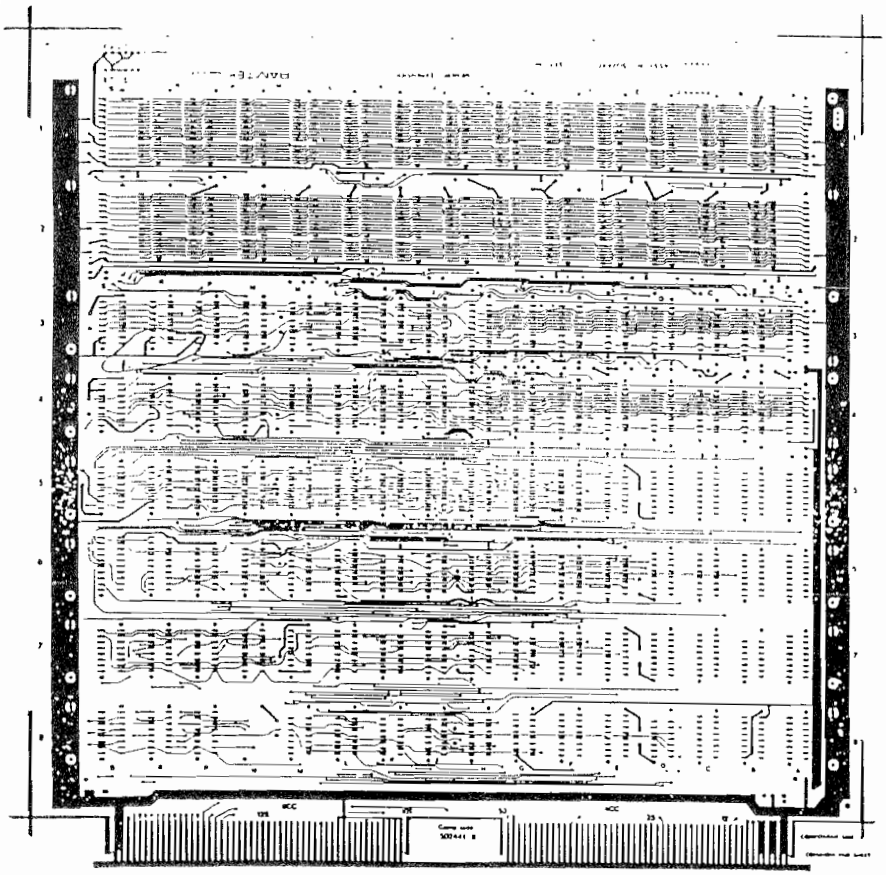
LIST OF MATERIALS

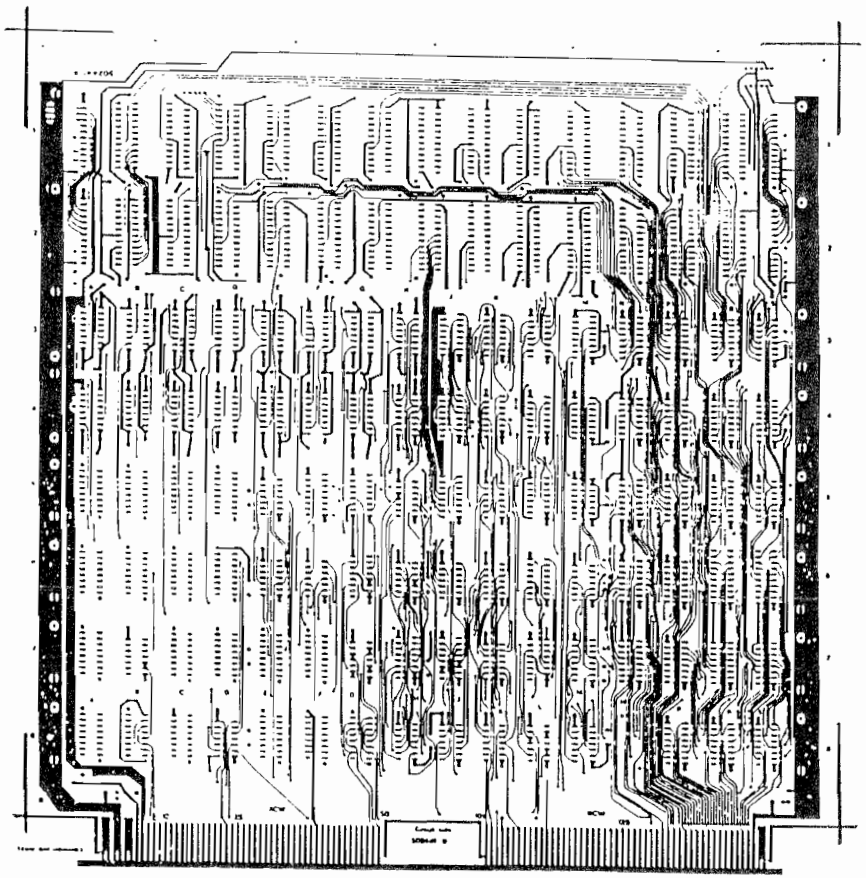
TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES		DATE
MATL	DWN SIMILA		7-[illegible]-77
FINISH	CHK [illegible]		9/8/78
NEXT ASSY	ENG [illegible]		7-[illegible]-78
	APVD [illegible]		9-[illegible]-78

RAMTEK

ASSEMBLY MEMORY EXPANSION

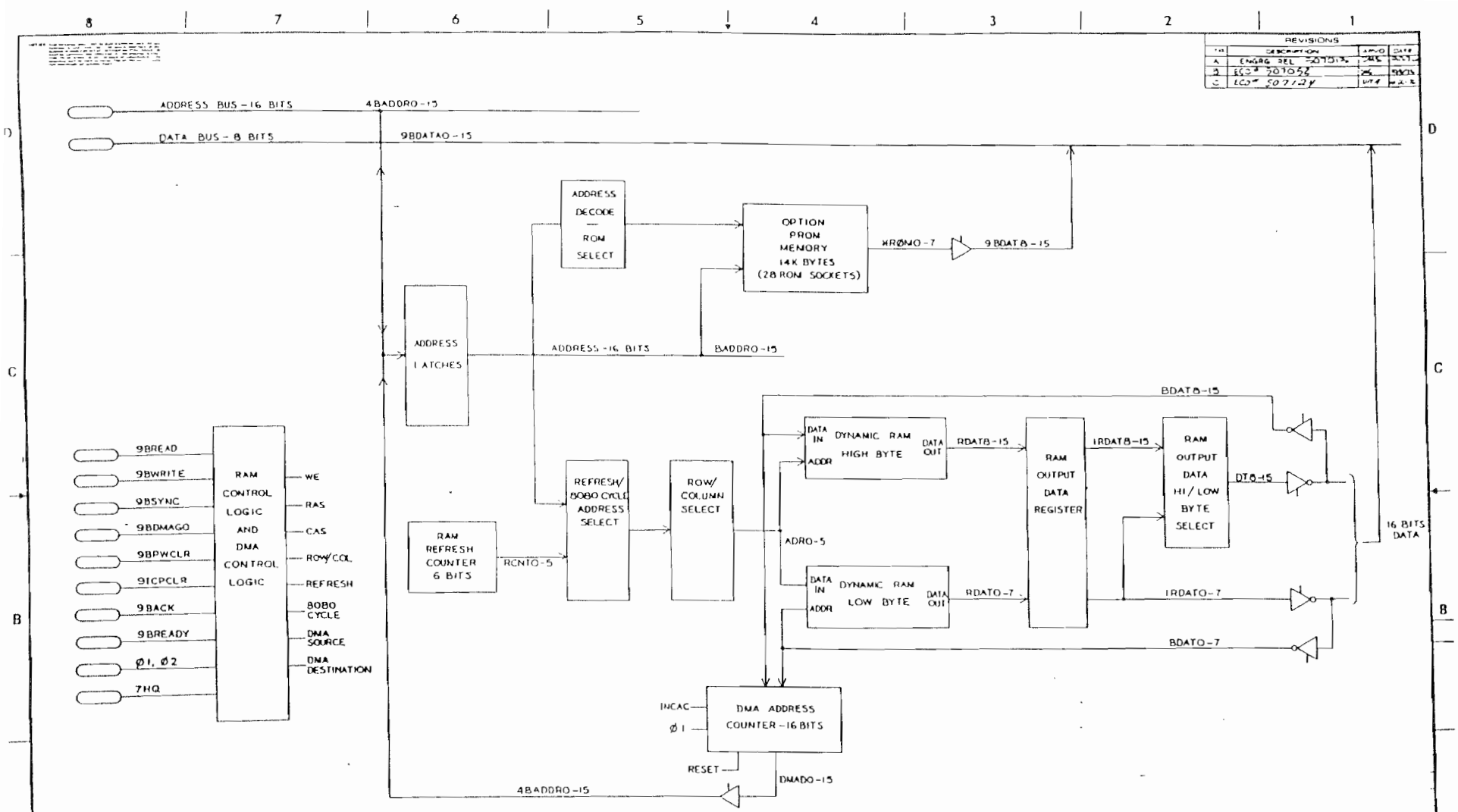
SIZE D | SCALE 2/1 | SHT 1 OF 2 | DWG NO 502440 | REV F





1. SHAVE PADS AT 3R-16 & 3P-16 TO REV'B' 80'S ONLY.

DO NOT SCALE DRAWING			RAMTEK	
SIGNATURES		DATE		
DWN			ASSEMBLY, MEMORY EXPANSION	
CHK				
ENG			SIZE	DWG NO	REV
APVD			SCALE	502440	F



REVISIONS

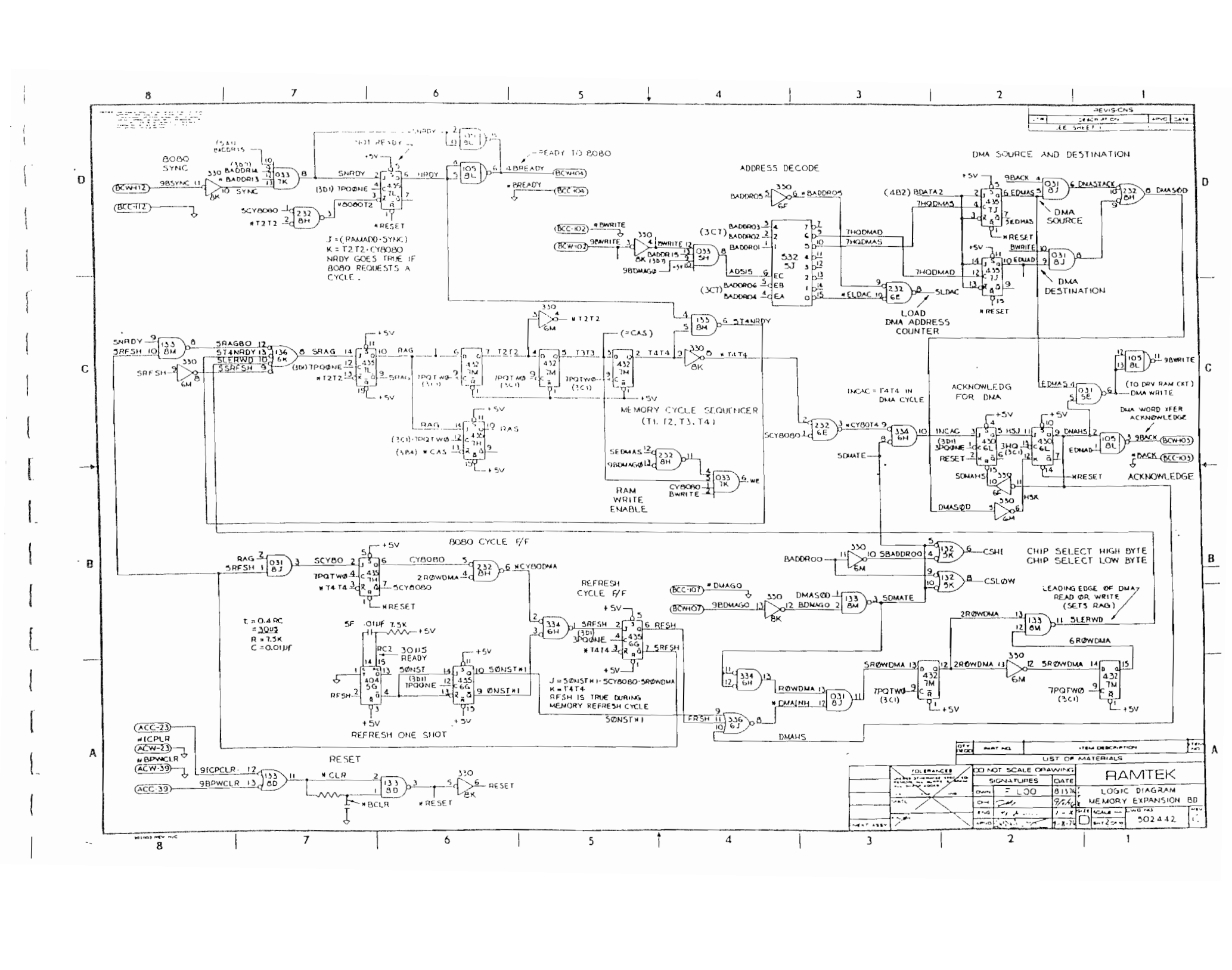
LTR	DESCRIPTION	APVD	DATE
A	ENGRG REL 207013	JRS	3/1/83
B	ECO# 207052	JRS	9/8/83
C	ECO# 507129	WTF	4-2-8

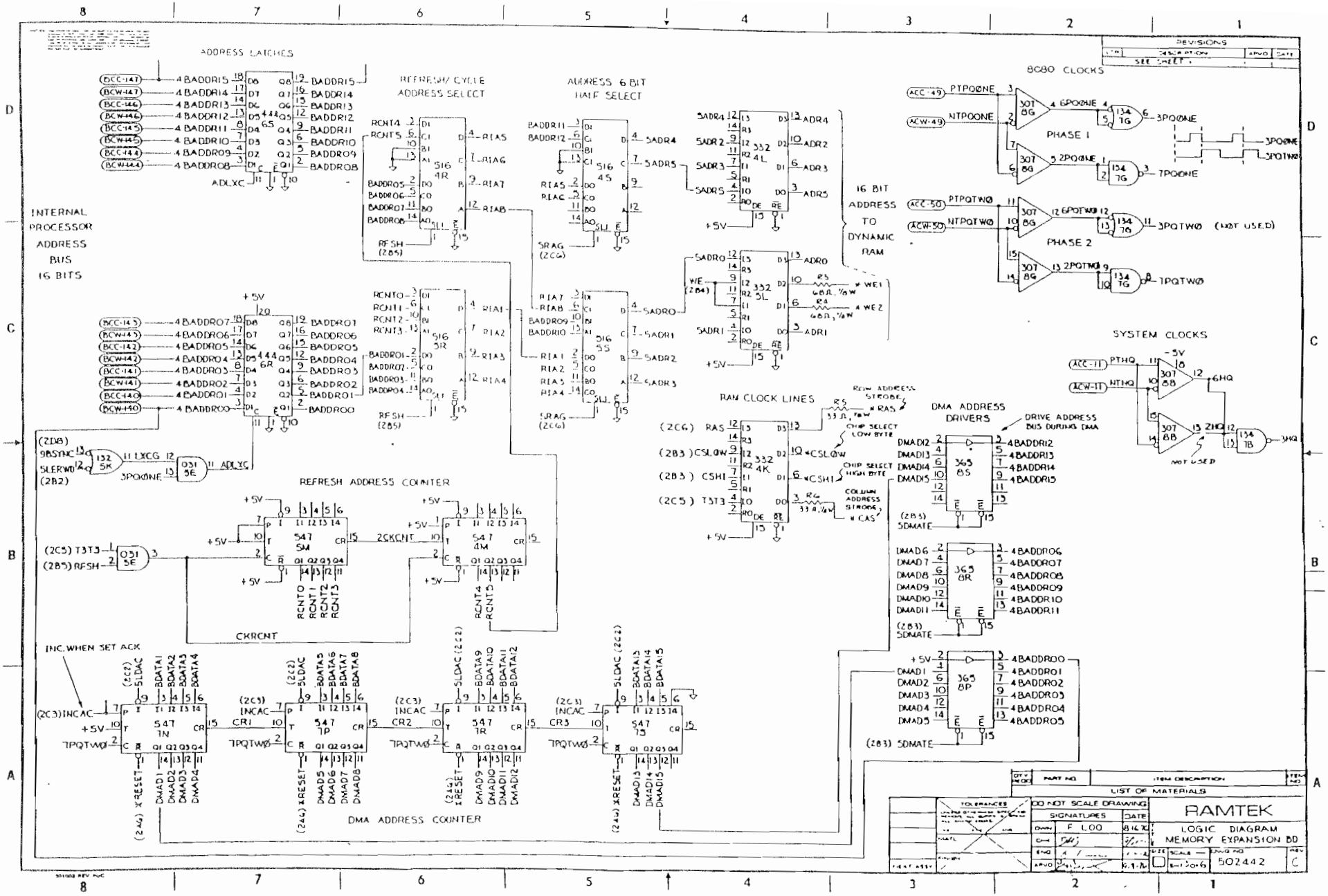
LIST OF MATERIALS

QTY PER	PART NO.	ITEM DESCRIPTION	REV LTR

TOLERANCES	DO NOT SCALE DRAWING	RAMTEK
	SIGNATURES / DATE	MEMORY EXPANSION CARD
	DWN F LOO 8/1/83	BLOCK DIAGRAM
	CHK	
	ENG	SIZE D — SCALE — — DWG NO. 502442 — REV C
	APVD 9/9/83	SHT 1 OF 6

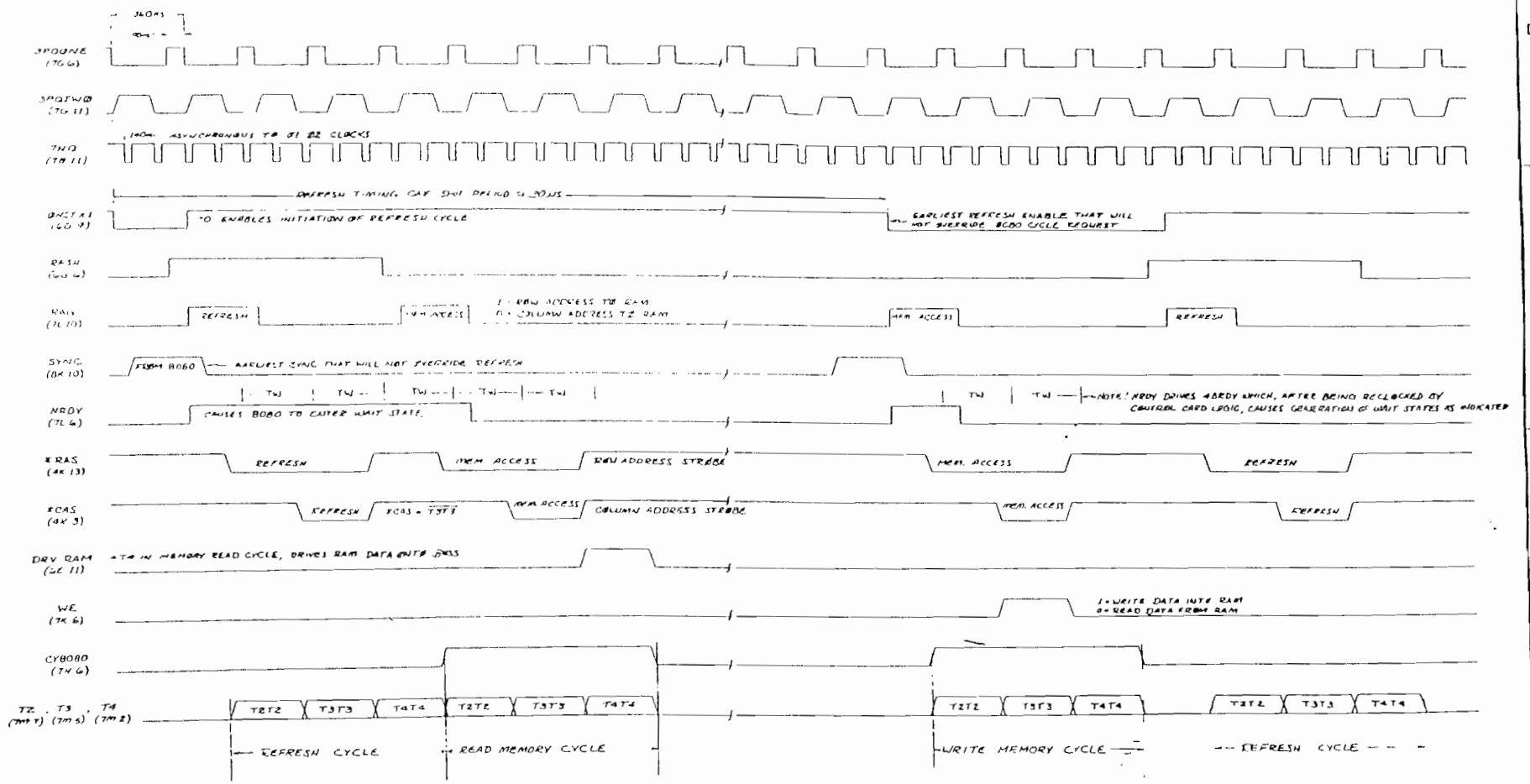
NEXT ASSY


8080 SYNC
J = (RAMADD·SYNC)
K = T2T2·CY8080
NRDY GOES TRUE IF 8080 REQUESTS A CYCLE.
READY TO 8080
ADDRESS DECODE
DMA SOURCE AND DESTINATION
DMA SOURCE
DMA DESTINATION
LOAD DMA ADDRESS COUNTER
MEMORY CYCLE SEQUENCER (T1, T2, T3, T4)
RAM WRITE ENABLE
INCAC = T4T4 IN DMA CYCLE
ACKNOWLEDG FOR DMA
ACKNOWLEDGE
(TO DRV RAM CKT) DMA WRITE
DMA WORD XFER ACKNOWLEDGE
8080 CYCLE F/F
REFRESH CYCLE F/F
REFRESH ONE SHOT
t = 0.4 RC = 30µs
R = 7.5K
C = 0.01µF
J = SØNST#1·SCY8080·SRØWDMA
K = T4T4
REFSH IS TRUE DURING MEMORY REFRESH CYCLE
SØNST#1
CHIP SELECT HIGH BYTE
CHIP SELECT LOW BYTE
LEADING EDGE OF DMA READ OR WRITE (SETS RAS)
RESET
LOGIC DIAGRAM MEMORY EXPANSION BD
RAMTEK
502442


ADDRESS LATCHES
REFRESH CYCLE ADDRESS SELECT
ADDRESS 6 BIT HALF SELECT
8080 CLOCKS
PHASE 1
PHASE 2
16 BIT ADDRESS TO DYNAMIC RAM
INTERNAL PROCESSOR ADDRESS BUS 16 BITS
SYSTEM CLOCKS
RAM CLOCK LINES
DMA ADDRESS DRIVERS
REFRESH ADDRESS COUNTER
DMA ADDRESS COUNTER
INC. WHEN SET ACK
CKRCNT
LIST OF MATERIALS
DO NOT SCALE DRAWING
RAMTEK
LOGIC DIAGRAM
MEMORY EXPANSION BD
502442

REVISIONS			
ITM	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

MEMORY ACCESS / REFRESH TIMING

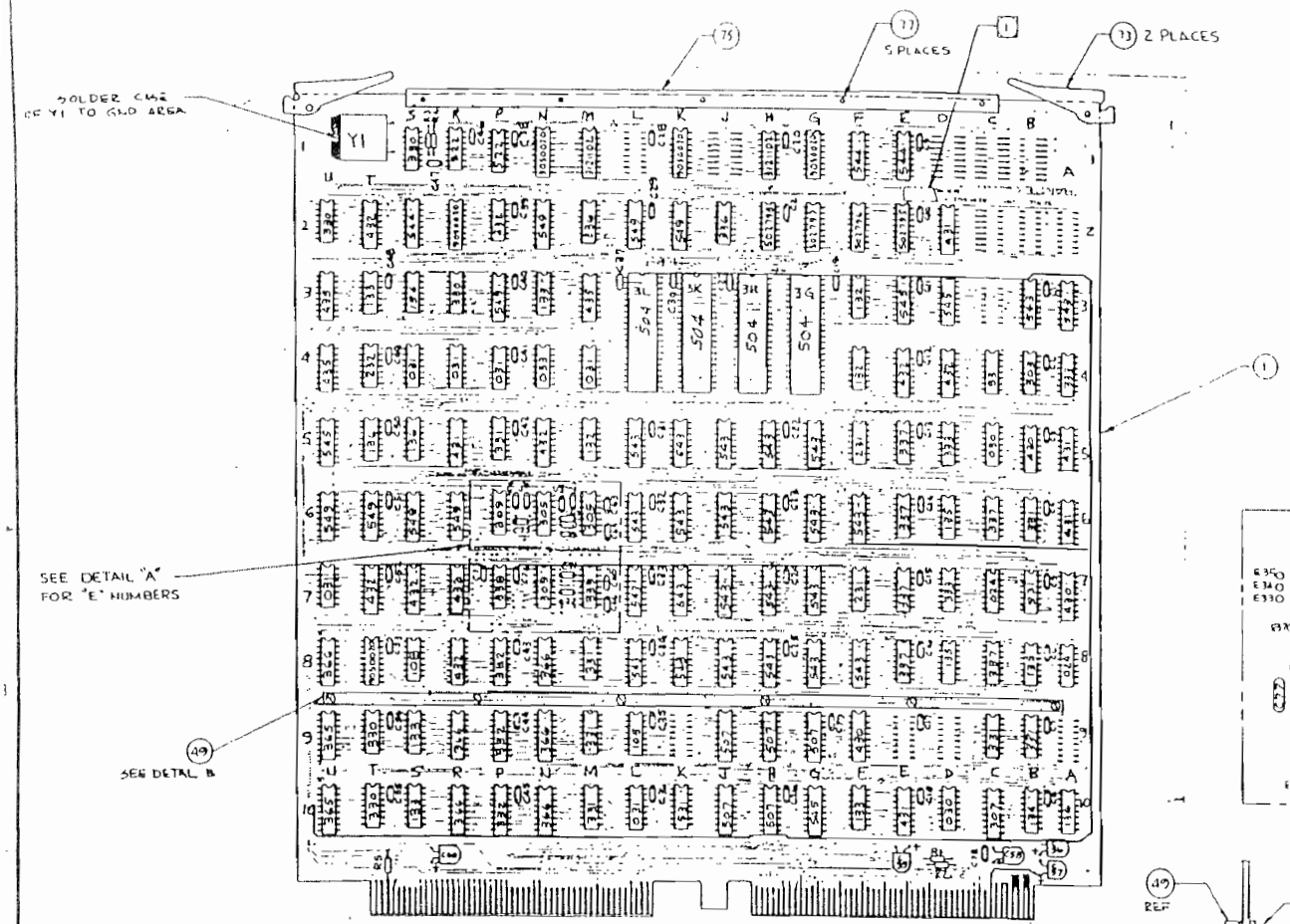


QTY PROD	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
DRAWN	[illegible]	6/24/76	MEMORY ACTION CARD
CHK	DP	9/1/76	RAM ACCESS/REFRESH TIMING
ENG	[illegible]	[illegible]	SIZE: D — SCALE: — — DWG NO: 502442 — REV: C
APVD	[illegible]	9-3-76	SHEET 1 OF 2

501003 REV 4/C

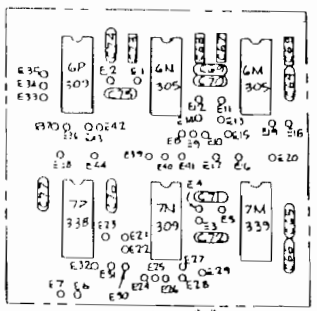
REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	RELEASED		
B	REL PER ECO 5372		



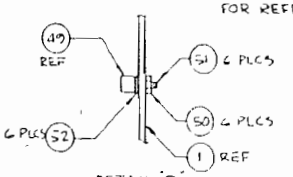
COMPONENT SIDE

NOTES: UNLESS OTHERWISE SPECIFIED

1. INK STAMP SERIAL NUMBER AND ASSY REVISION LEVEL IN AREA SHOWN.
2. REFERENCE DRAWINGS:
   LOGIC DIAGRAM — 502643
   FABRICATION DWG - 502642 Rev C
3. LOGIC DEVICE TYPE NUMBERS ARE RAMTEK STANDARD PART NO'S 1301XXX.



DETAIL "A"
REFERENCE DESIGNATIONS FOR REFERENCE ONLY



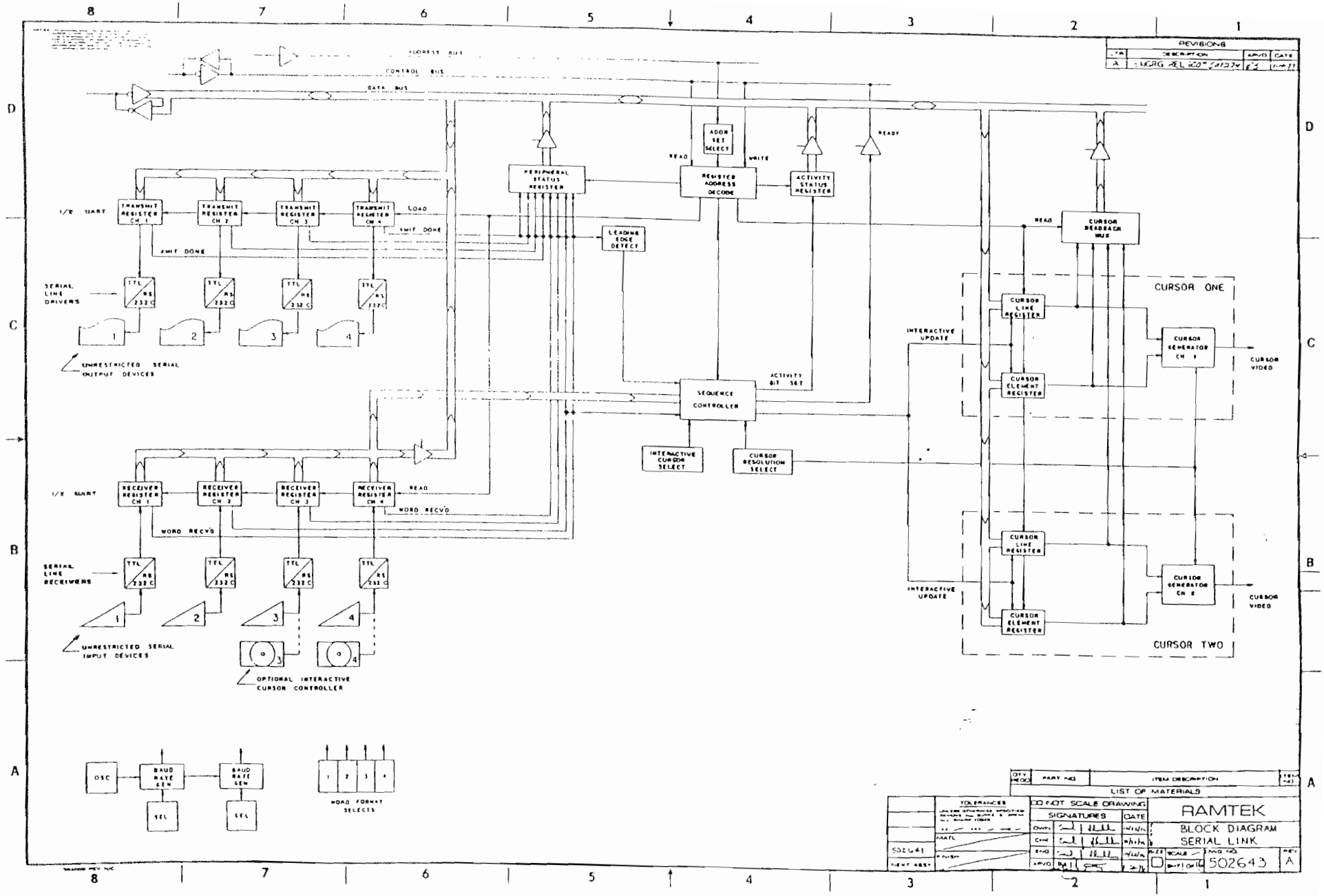
DETAIL B

SEE SEPARATE L/M

QTY PER	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		RAMTEK
	SIGNATURES	DATE	
	DWN		P.C. ASSEMBLY, SERIAL LINK
	CHK		
	ENG		
	APVD		SIZE C; SCALE 1:1; DWG NO. 502641; REV B; SHT 1 OF 1



REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	INTRO REL #20		

QTY PER UNIT	PART NO	ITEM DESCRIPTION	REF DES

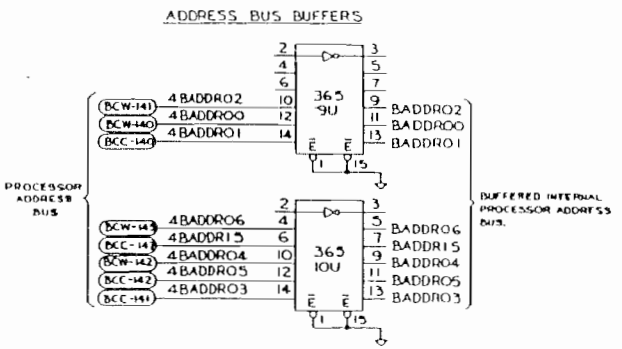
LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
MATL 502641	DWN		BLOCK DIAGRAM SERIAL LINK
FINISH	CHK		
NEXT ASSY	ENG		SIZE D SCALE DWG NO 502643 REV A
	APVD		

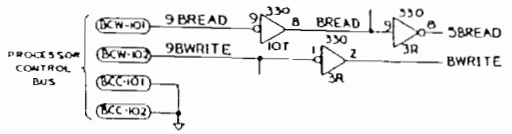
PROCESSOR BUS BUFFERS

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

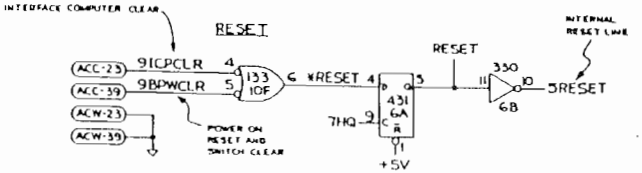
ADDRESS BUS BUFFERS



CONTROL BUS BUFFERS

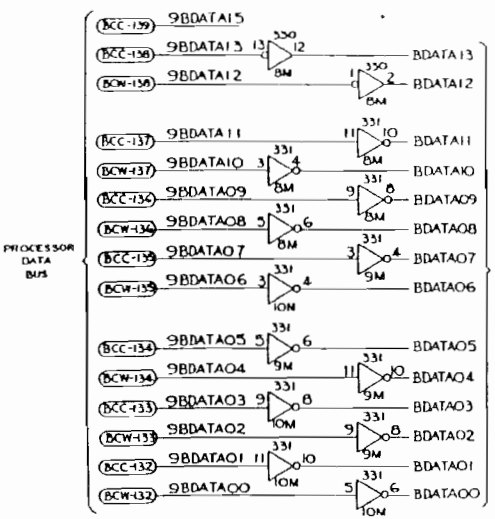


RESET

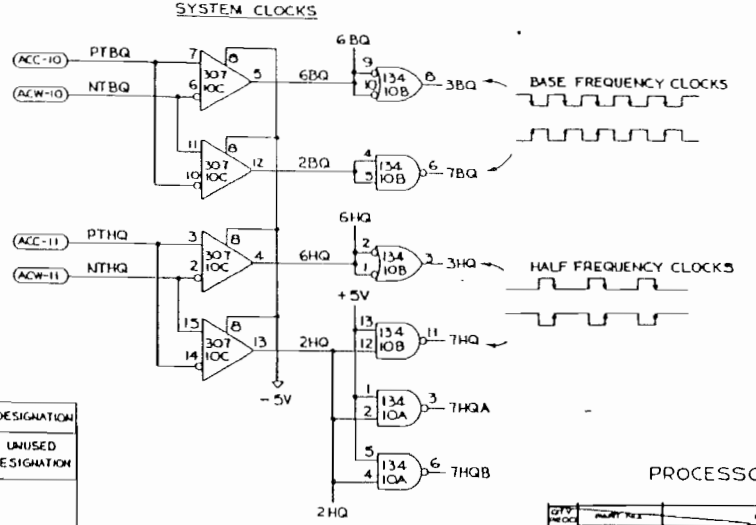


NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTANCE VALUES ARE IN OHMS.
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS.

DATA BUS BUFFERS



SYSTEM CLOCKS



REFERENCE DESIGNATION	
HIGHEST ONE USED	UNUSED DESIGNATION
R—R6 C—C0 Q—Q L—O CR—O VR—O E—E44 Y—Y1	

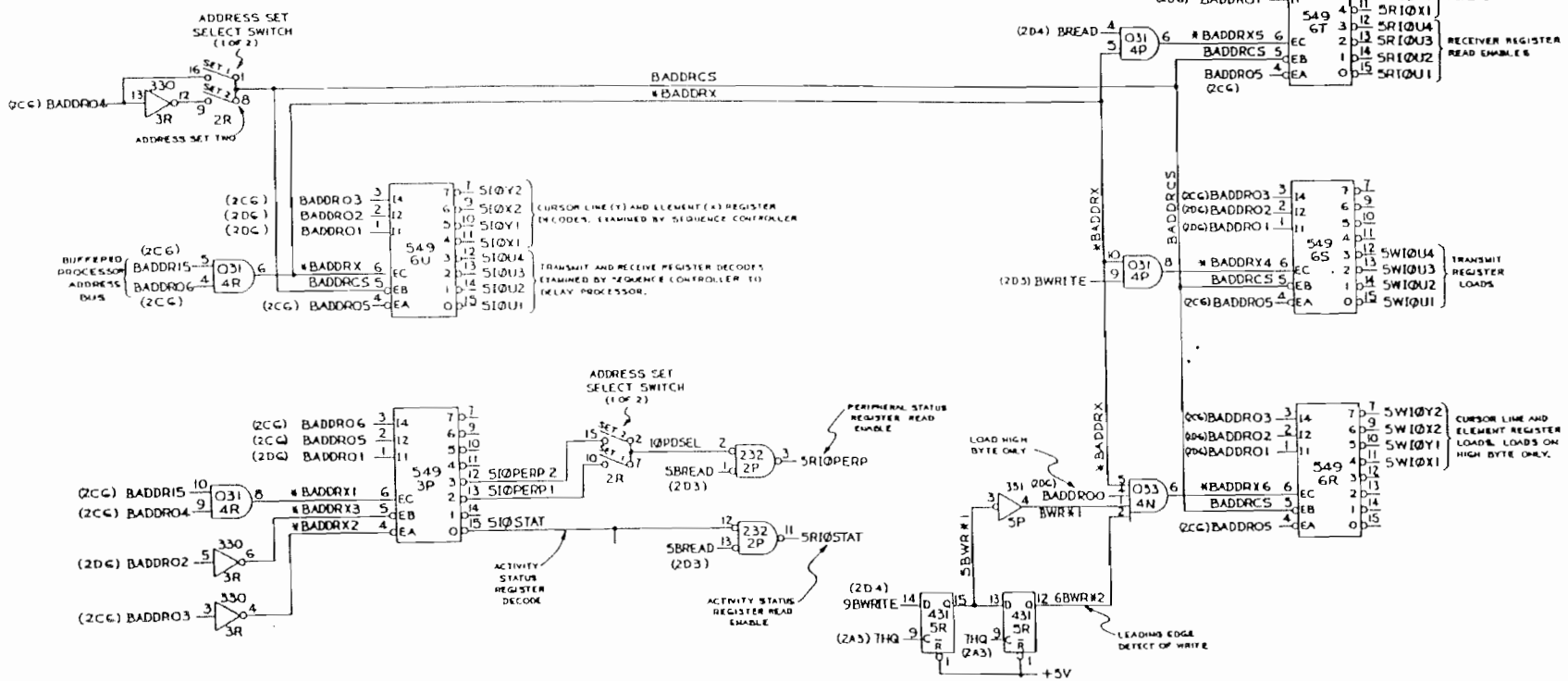
PROCESSOR BUS BUFFERS

LIST OF MATERIALS

QTY PER UNIT	PART NO	ITEM DESCRIPTION	ITEM NO

TOLERANCES	DO NOT SCALE DRAWING		RAMTEK
	SIGNATURES	DATE	
DWN	F. LOO	9/8/X	LOGIC DIAGRAM SERIAL LINK
CHK			
MATL			
ENG			
APVD			
NEXT ASSY	SIZE D	SCALE — SHT 2 OF 14	DWG NO 502643 REV A

PROCESSOR REGISTER ADDRESS DECODE



PROCESSOR REGISTER ADDRESS DECODE

LIST OF MATERIALS

QTY	PART NO.	ITEM OR DESCRIPTION	TRACK NO.
		SEE SHEET 1	

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	SEE SHEET 1		

TOLERANCES

DO NOT SCALE DRAWING

SIGNATURES		DATE
DRAWN	F. LOO	9/76
CHK		
ENG		
APVD		

RAMTEK

LOGIC DIAGRAM
SERIAL LINK

SIZE D | SCALE — | DWG NO. 302643 | REV A

NEXT ASSY

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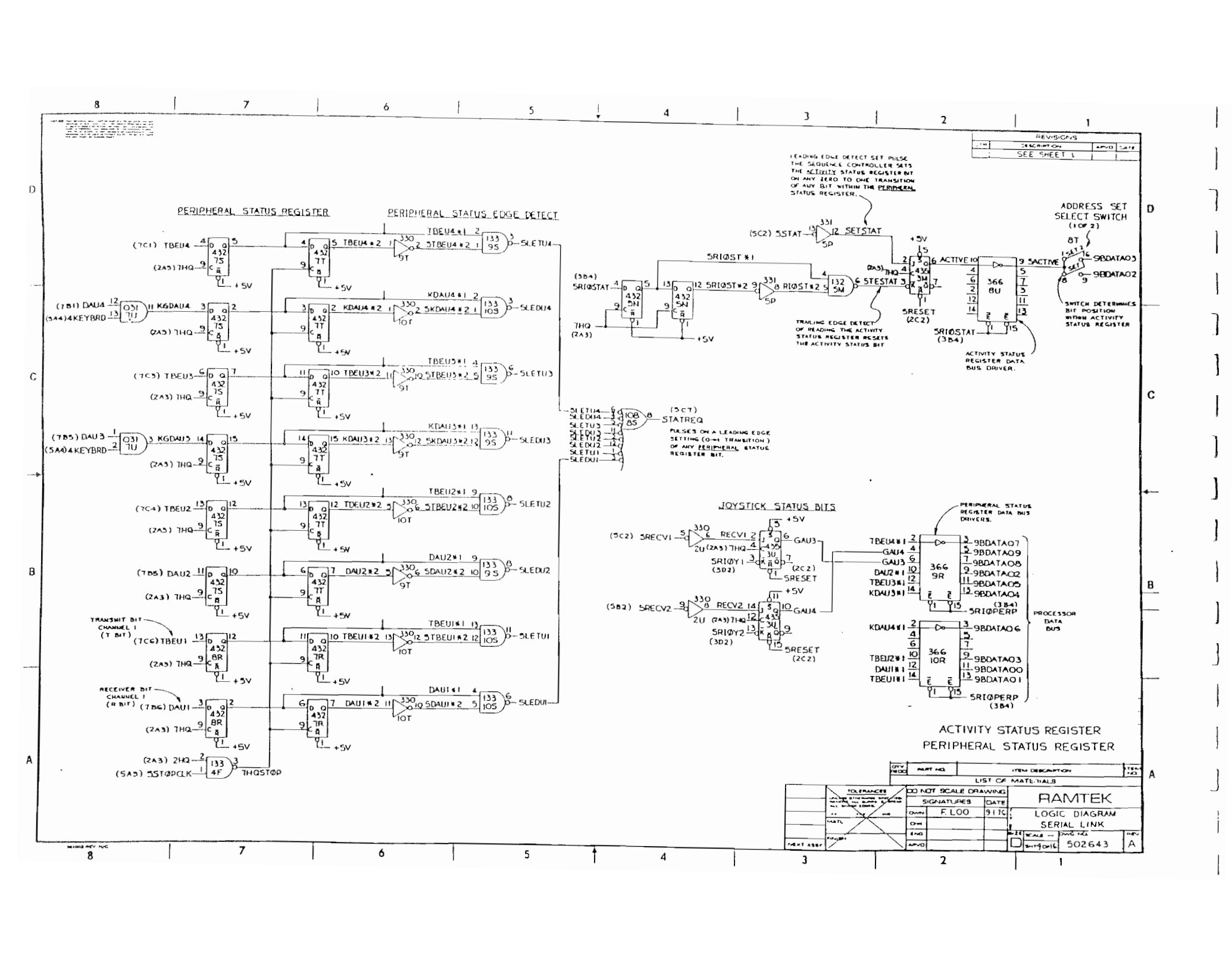
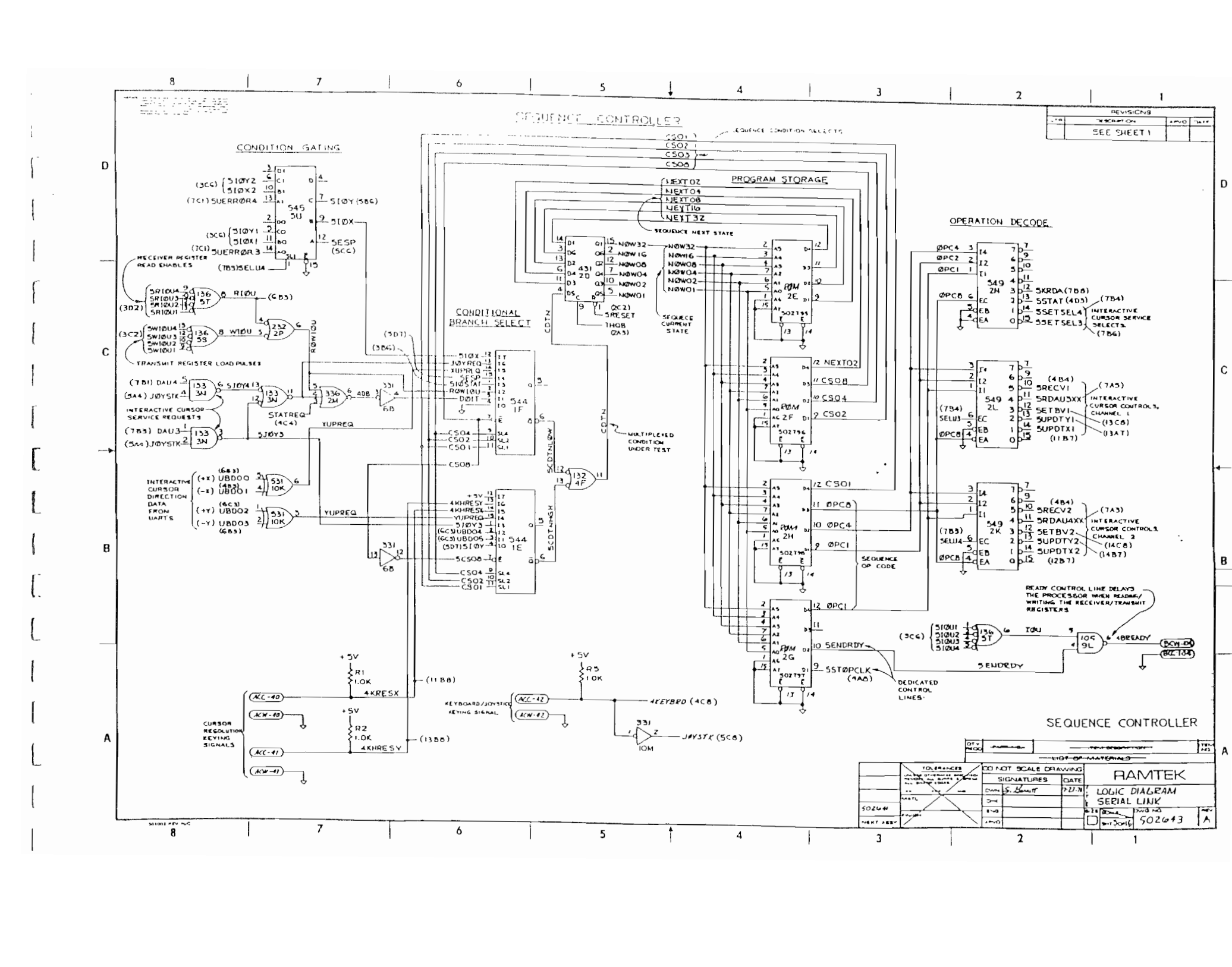
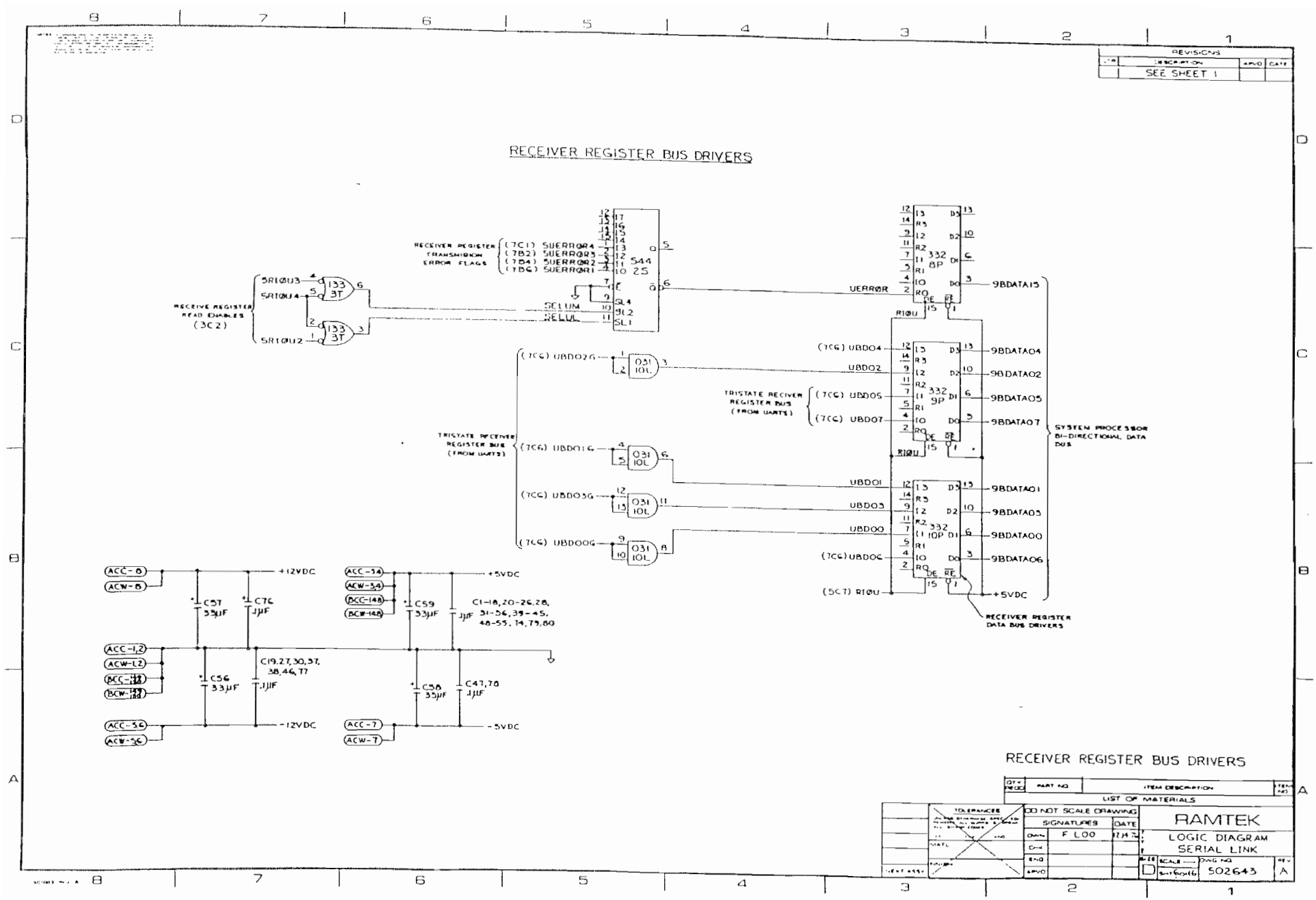
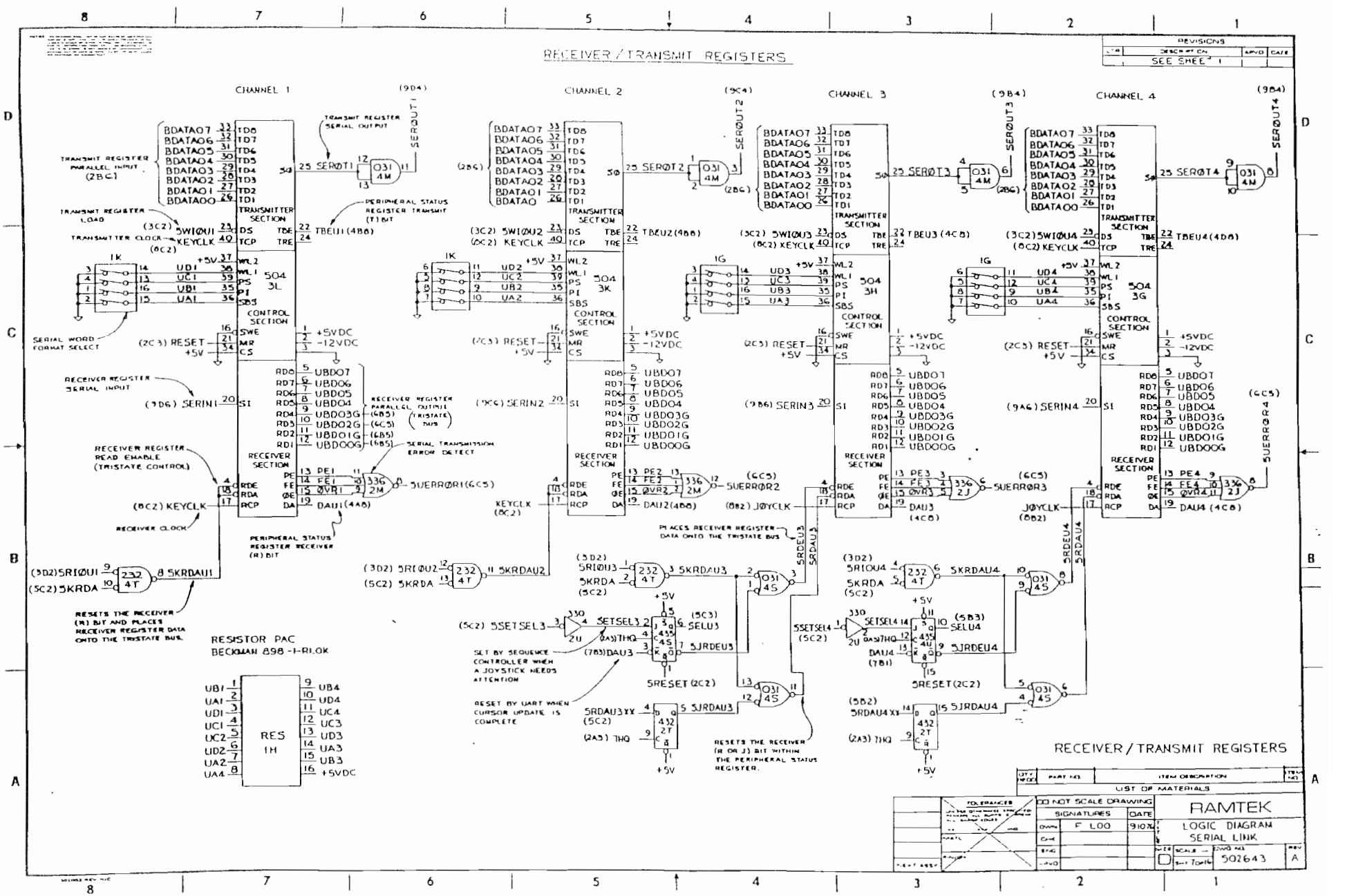

PERIPHERAL STATUS REGISTER
PERIPHERAL STATUS EDGE DETECT
ADDRESS SET SELECT SWITCH (1 OF 2)
JOYSTICK STATUS BITS
PERIPHERAL STATUS REGISTER DATA BUS DRIVERS.
PROCESSOR DATA BUS
LEADING EDGE DETECT SET PULSE THE SEQUENCE CONTROLLER SETS THE ACTIVITY STATUS REGISTER BIT ON ANY ZERO TO ONE TRANSITION OF ANY BIT WITHIN THE PERIPHERAL STATUS REGISTER.
TRAILING EDGE DETECT OF READING THE ACTIVITY STATUS REGISTER RESETS THE ACTIVITY STATUS BIT
ACTIVITY STATUS REGISTER DATA BUS DRIVER.
SWITCH DETERMINES BIT POSITION WITHIN ACTIVITY STATUS REGISTER
PULSES ON A LEADING EDGE SETTING (0→1 TRANSITION) OF ANY PERIPHERAL STATUS REGISTER BIT.
TRANSMIT BIT CHANNEL 1 (T BIT)
RECEIVER BIT CHANNEL 1 (R BIT)
ACTIVITY STATUS REGISTER
PERIPHERAL STATUS REGISTER
REVISIONS
SEE SHEET 1
LIST OF MATERIALS
DO NOT SCALE DRAWING
RAMTEK
LOGIC DIAGRAM SERIAL LINK
502643
A

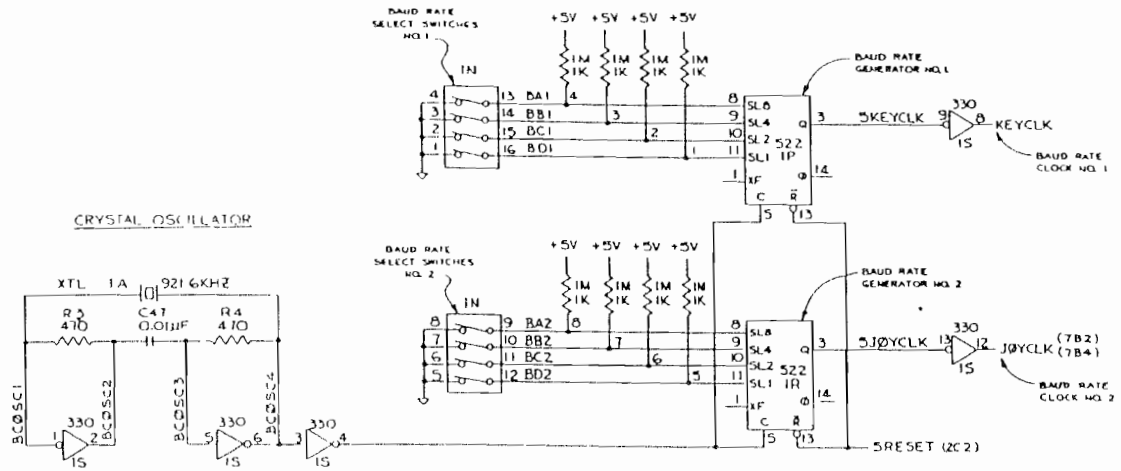

SEQUENCE CONTROLLER
CONDITION GATING
PROGRAM STORAGE
OPERATION DECODE
CONDITIONAL BRANCH SELECT
SEQUENCE CONDITION SELECTS
SEQUENCE NEXT STATE
SEQUENCE CURRENT STATE
SEQUENCE OP CODE
MULTIPLEXED CONDITION UNDER TEST
INTERACTIVE CURSOR SERVICE REQUESTS
INTERACTIVE CURSOR DIRECTION DATA FROM UARTS
CURSOR RESOLUTION KEYING SIGNALS
KEYBOARD/JOYSTICK KEYING SIGNAL
RECEIVER REGISTER READ ENABLES
TRANSMIT REGISTER LOAD PULSES
READY CONTROL LINE DELAYS THE PROCESSOR WHEN READING/WRITING THE RECEIVER/TRANSMIT REGISTERS
DEDICATED CONTROL LINES
REVISIONS
SEE SHEET 1
SEQUENCE CONTROLLER
RAMTEK
LOGIC DIAGRAM
SERIAL LINK
502643
A


REVISIONS
SEE SHEET 1
RECEIVER REGISTER BUS DRIVERS
RECEIVE REGISTER READ ENABLES (3C2)
SR1ØU3
SR1ØU4
SR1ØU2
133 3T
RECEIVER REGISTER TRANSMISSION ERROR FLAGS
(7C1) SUERRØR4
(7B2) SUERRØR3
(7B4) SUERRØR2
(7B6) SUERRØR1
544 25
SEL1M
SEL1L
UERRØR
9BDATA15
RIØU
(7C6) UBDO4
UBDO2
9BDATA04
9BDATA02
TRISTATE RECEIVER REGISTER BUS (FROM UARTS)
(7C6) UBDO5
(7C6) UBDO7
9BDATA05
9BDATA07
SYSTEM PROCESSOR BI-DIRECTIONAL DATA BUS
(7C6) UBDO1G
(7C6) UBDO3G
(7C6) UBDOOG
UBDO1
UBDO3
UBDOO
9BDATA01
9BDATA03
9BDATA00
(7C6) UBDOC
9BDATA06
(5C7) RIØU
+5VDC
RECEIVER REGISTER DATA BUS DRIVERS
ACC-8
ACW-8
+12VDC
C57 33µF
C76 .1µF
ACC-34
ACW-34
BCC-148
BCW-148
+5VDC
C59 33µF
C1-18,20-26,28, 31-36,39-45, 48-55, 74,79,80 .1µF
ACC-1,2
ACW-1,2
C19,27,30,37, 38,46,77 .1µF
C56 33µF
C58 33µF
C47,78 .1µF
ACC-56
ACW-56
-12VDC
ACC-7
ACW-7
-5VDC
RECEIVER REGISTER BUS DRIVERS
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DRWN F LOO
RAMTEK
LOGIC DIAGRAM SERIAL LINK
SCALE
DWG NO 502643
REV A


RECEIVER / TRANSMIT REGISTERS
CHANNEL 1
CHANNEL 2
CHANNEL 3
CHANNEL 4
TRANSMIT REGISTER PARALLEL INPUT (2BC)
TRANSMIT REGISTER LOAD
TRANSMIT REGISTER CLOCK (8C2)
TRANSMIT REGISTER SERIAL OUTPUT
PERIPHERAL STATUS REGISTER TRANSMIT (T) BIT
SERIAL WORD FORMAT SELECT
RECEIVER REGISTER SERIAL INPUT
RECEIVER REGISTER PARALLEL OUTPUT (TRISTATE) BUS
SERIAL TRANSMISSION ERROR DETECT
RECEIVER REGISTER READ ENABLE (TRISTATE CONTROL)
RECEIVER CLOCK
PERIPHERAL STATUS REGISTER RECEIVER (R) BIT
RESETS THE RECEIVER (R) BIT AND PLACES RECEIVER REGISTER DATA ONTO THE TRISTATE BUS.
PLACES RECEIVER REGISTER DATA ONTO THE TRISTATE BUS
SET BY SEQUENCE CONTROLLER WHEN A JOYSTICK NEEDS ATTENTION
RESET BY UART WHEN CURSOR UPDATE IS COMPLETE
RESETS THE RECEIVER (R OR J) BIT WITHIN THE PERIPHERAL STATUS REGISTER.
RESISTOR PAC
BECKMAN 898-1-R10K
RECEIVER / TRANSMIT REGISTERS
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DATE
RAMTEK
LOGIC DIAGRAM
SERIAL LINK
SIZE
SCALE
DWG NO
502643
REV
A

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET 1		

BAUD RATE GENERATORS



BAUD RATE GENERATORS

LIST OF MATERIALS

QTY PER	PART NO	ITEM DESCRIPTION	REF NO

TOLERANCES	DO NOT SCALE DRAWING	SIGNATURES	DATE
	DWN F LOO		9/15/
	CHK		
	ENG		
	APVD		

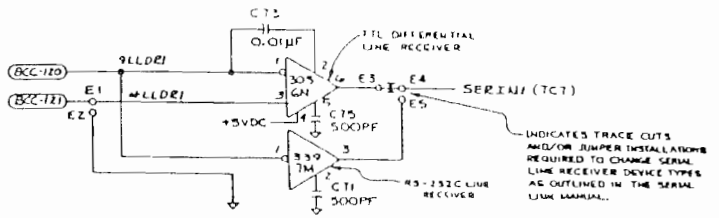
RAMTEK

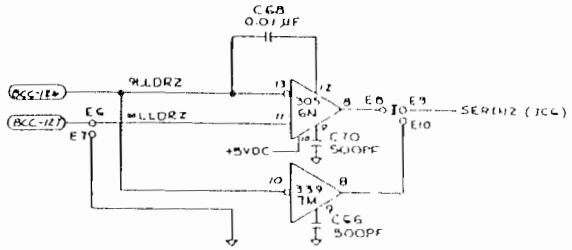
LOGIC DIAGRAM
SERIAL LINK

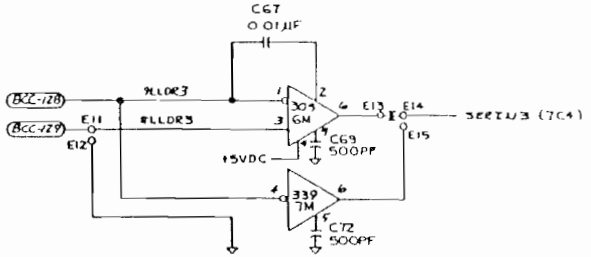
SIZE B | SCALE — | DWG NO 502643 | REV A

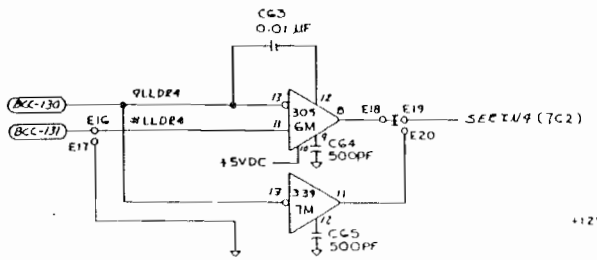
NEXT ASSY

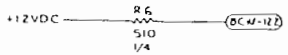
SERIAL LINE RECEIVERS



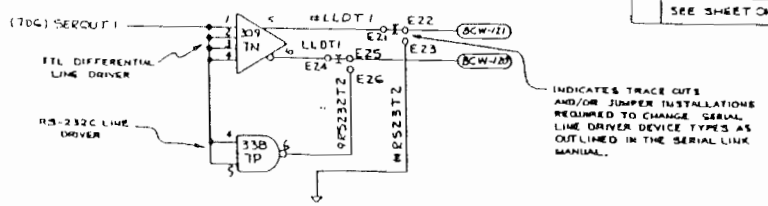


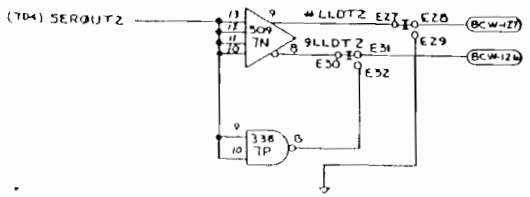


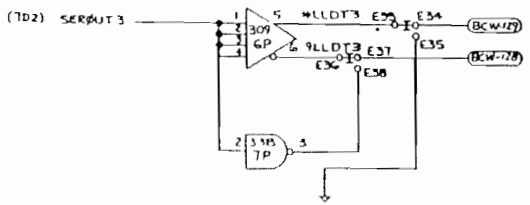


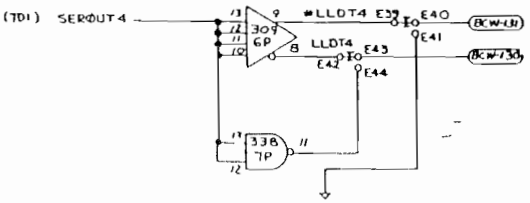


SERIAL LINE DRIVERS





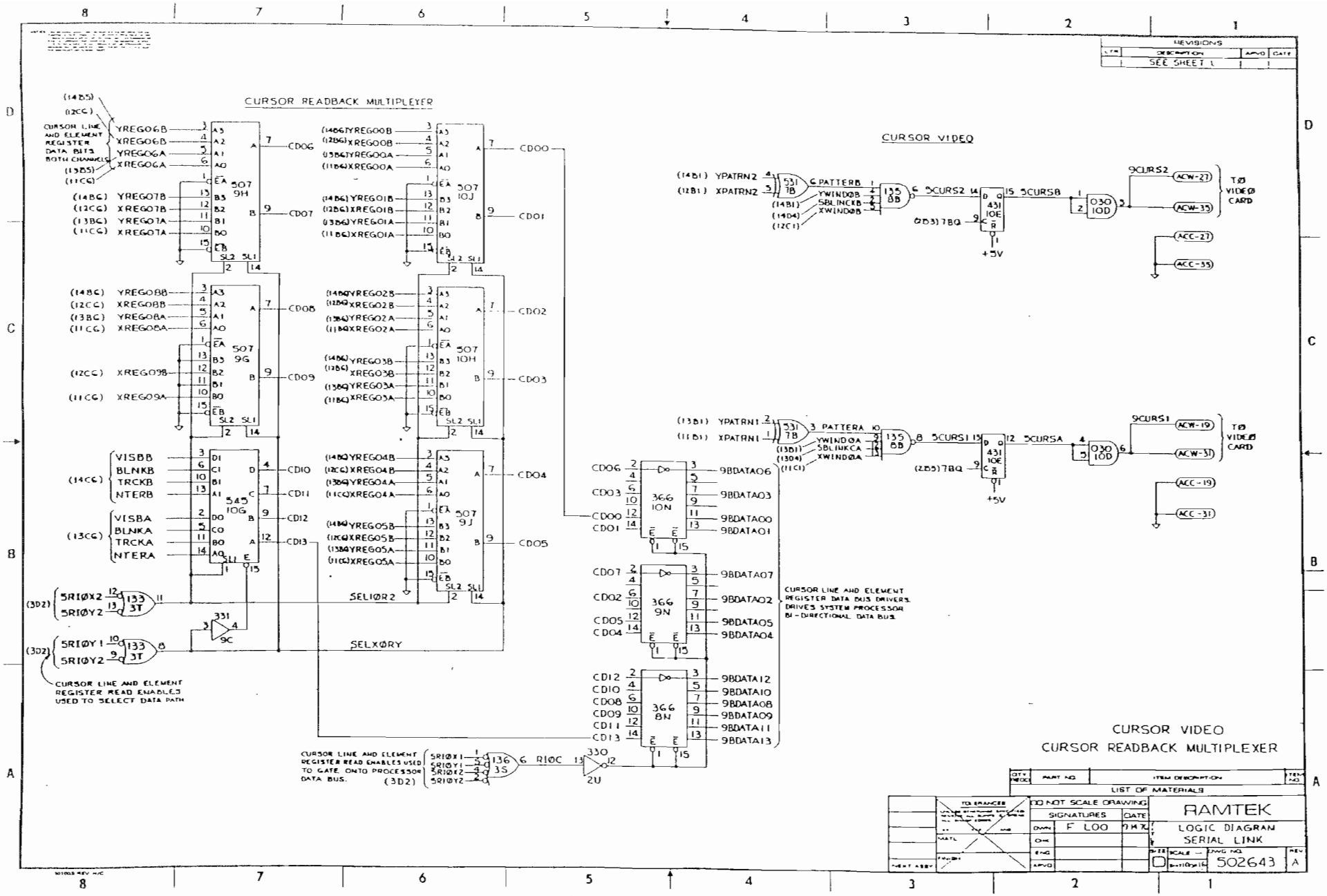




SERIAL LINE DRIVERS /RECEIVERS

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
	SEE SHEET ONE		

TOLERANCES	DO NOT SCALE DRAWING	RAMTEK	
	SIGNATURES	DATE	
	DWN S. Schmidt	8.1.76	LOGIC DIAGRAM SERIAL LINK
	CHK		
502641	ENG		
NEXT ASSY	APVD		SIZE D SHT 2 OF 6 DWG NO 502643 REV A


CURSOR READBACK MULTIPLEXER
CURSOR VIDEO
CURSOR LINE AND ELEMENT REGISTER DATA BUS DRIVERS. DRIVES SYSTEM PROCESSOR BI-DIRECTIONAL DATA BUS.
CURSOR LINE AND ELEMENT REGISTER READ ENABLES USED TO SELECT DATA PATH
CURSOR LINE AND ELEMENT REGISTER READ ENABLES USED TO GATE ONTO PROCESSOR DATA BUS.
SELIØR2
SELXØRY
CURSOR VIDEO
CURSOR READBACK MULTIPLEXER
REVISIONS
SEE SHEET 1
LIST OF MATERIALS
DO NOT SCALE DRAWING
RAMTEK
LOGIC DIAGRAN
SERIAL LINK
502643

REVISIONS			
LTR	DESCRIPTION	APVD	DATE
1	SEE SHEET 1		

CURSOR ELEMENT REGISTER — CHANNEL ONE

CURSOR ELEMENT REGISTER

ELEMENT COUNTERS

ELEMENT DECODE

ELEMENT ADDRESS FROM PROCESSOR DATA BUS.

HORIZONTAL RESOLUTION CONTROL GATE.
1=HIGH RES
0=LOW RES.

PROCESSOR ELEMENT LOAD PULSE. THIS IS A HIGH BYTE REGISTER DECODE.

INTERACTIVE CURSOR UPDATE PULSE FROM SEQUENCE CONTROLLER.
1 COUNT PER PULSE.
1 PULSE FOR HIGH RESOLUTION (9200, 9300).
2 PULSES FOR LOW RESOLUTION (9100).

INTERACTIVE CURSOR UPDATE DIRECTION DATA (+1, -1) FROM UARTS

CURSOR ELEMENT ADDRESS TO CURSOR READBACK MULTIPLEXER

HORIZONTAL MEMORY SYNCHRONIZATION

HORIZONTAL BLANKING

COUNT DIRECTION

STOPS COUNTER AT ZERO FOR ONE ELEMENT AND REVERSES COUNT DIRECTION.

CURSOR ELEMENT REGISTER
CHANNEL ONE

LIST OF MATERIALS

QTY PER	PART NO.	ITEM DESCRIPTION	ITEM NO.

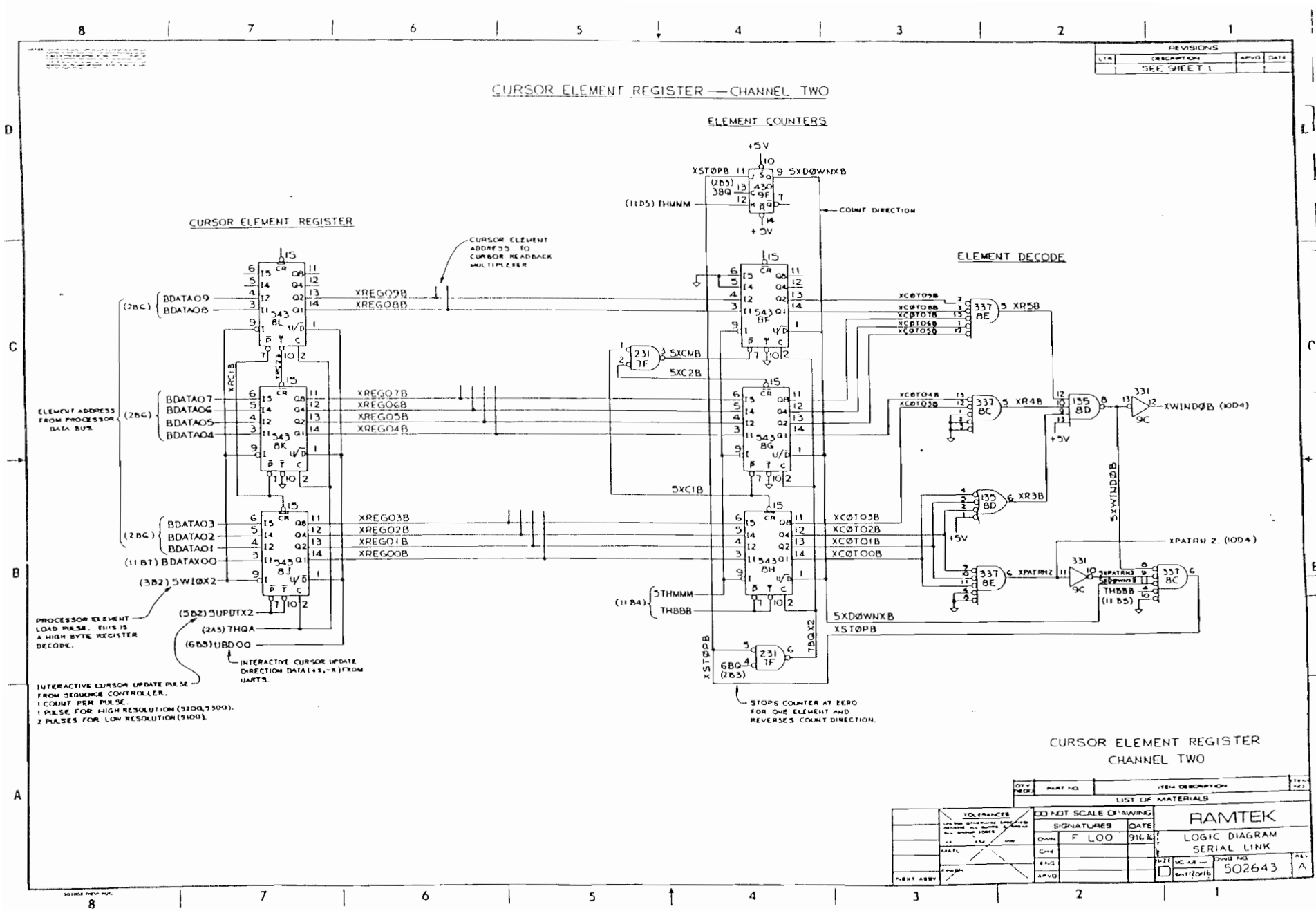
DO NOT SCALE DRAWING

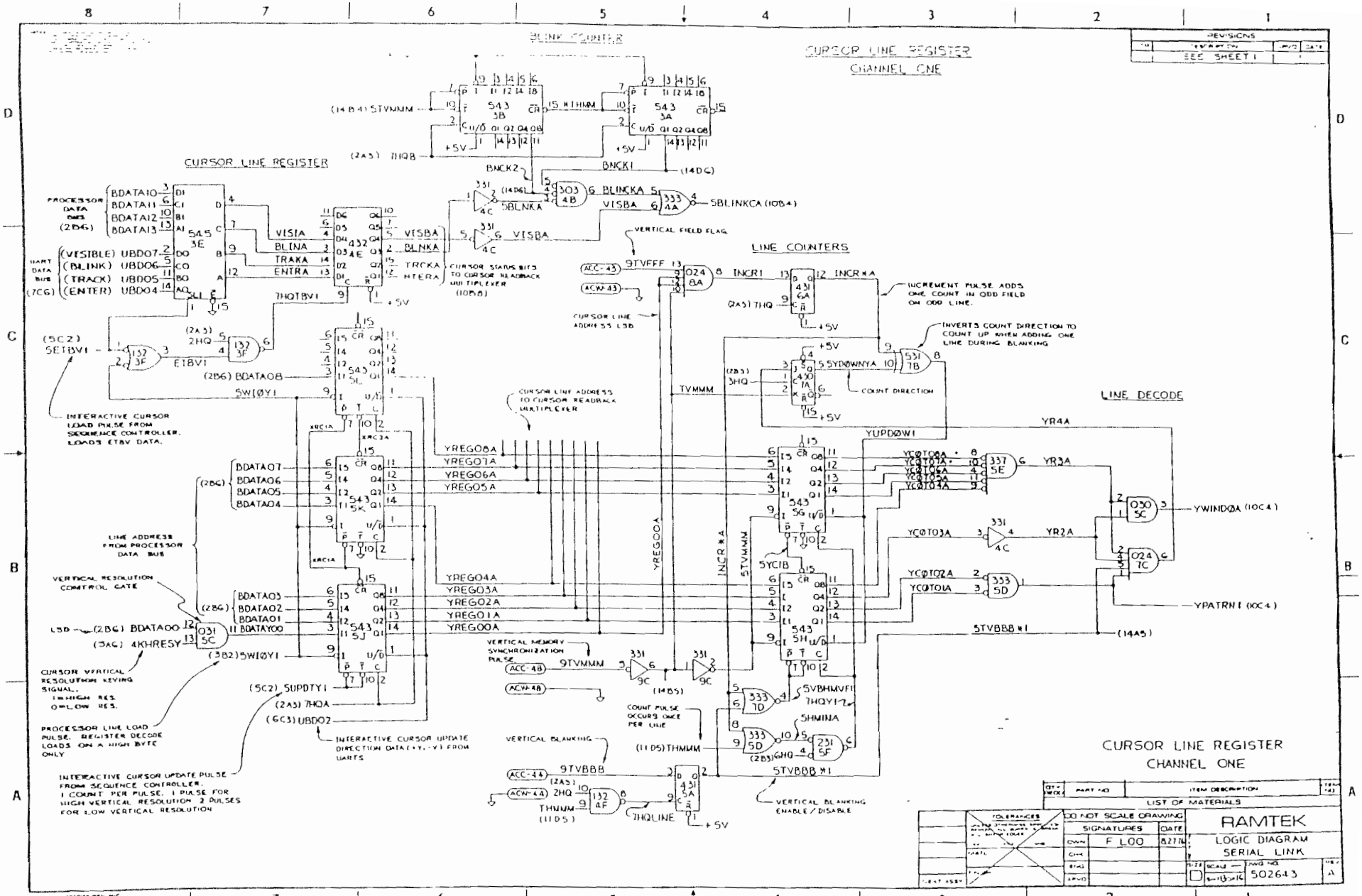
SIGNATURES		DATE
DWN	F. LOO	9/15/76
CHK		
ENG		
APVD		

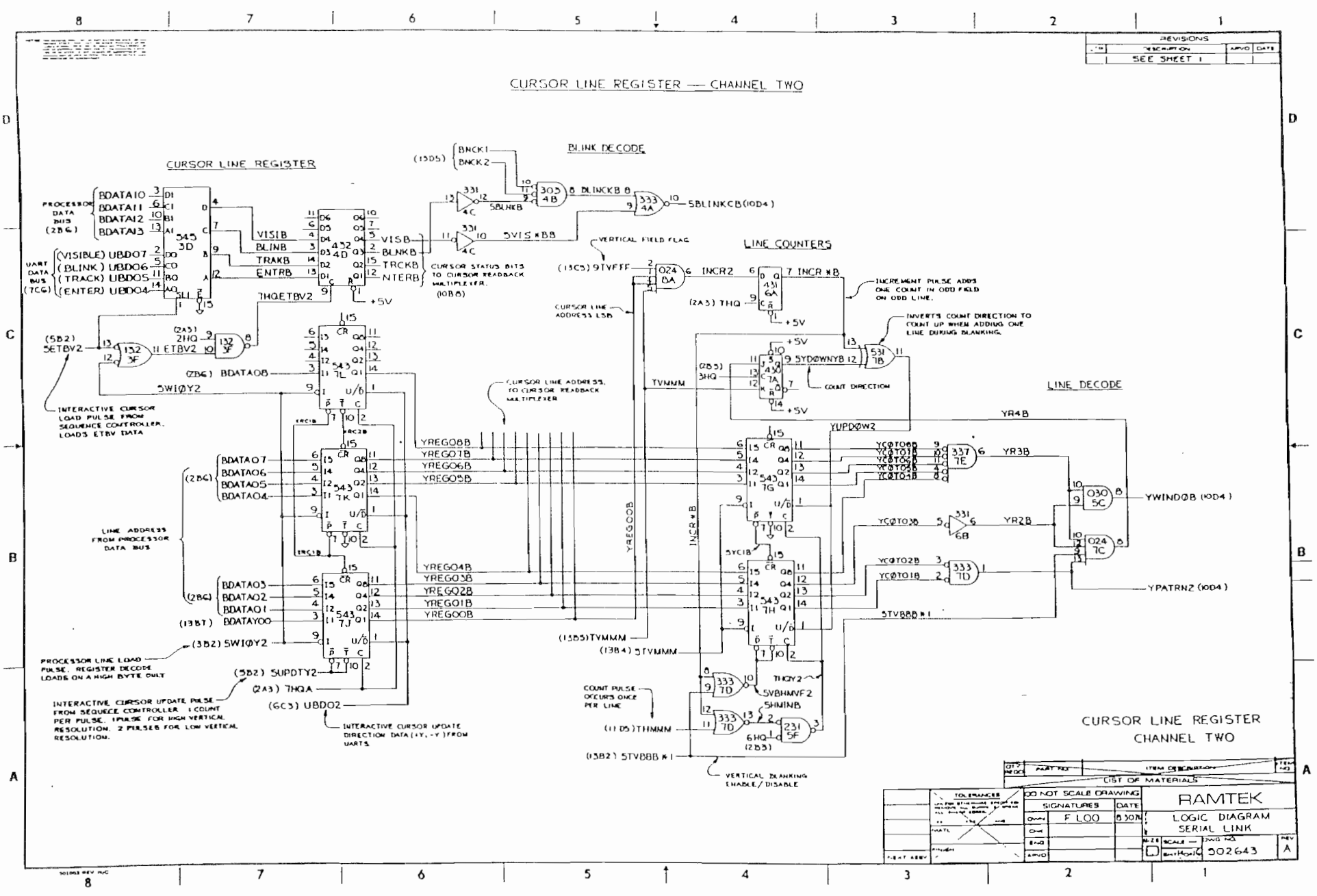
RAMTEK
LOGIC DIAGRAM
SERIAL LINK

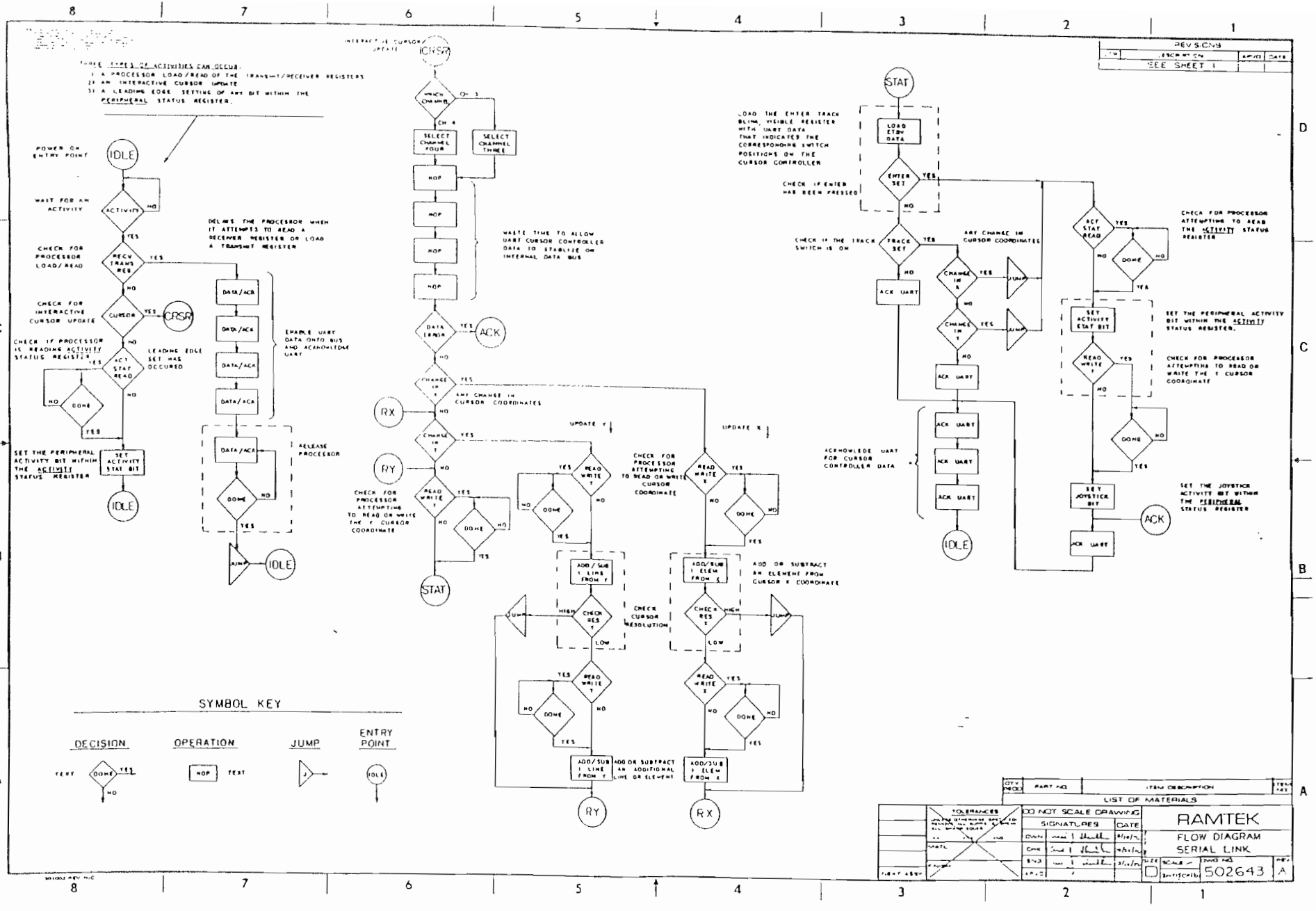
SIZE D | SCALE — | DWG NO 502643 | REV A

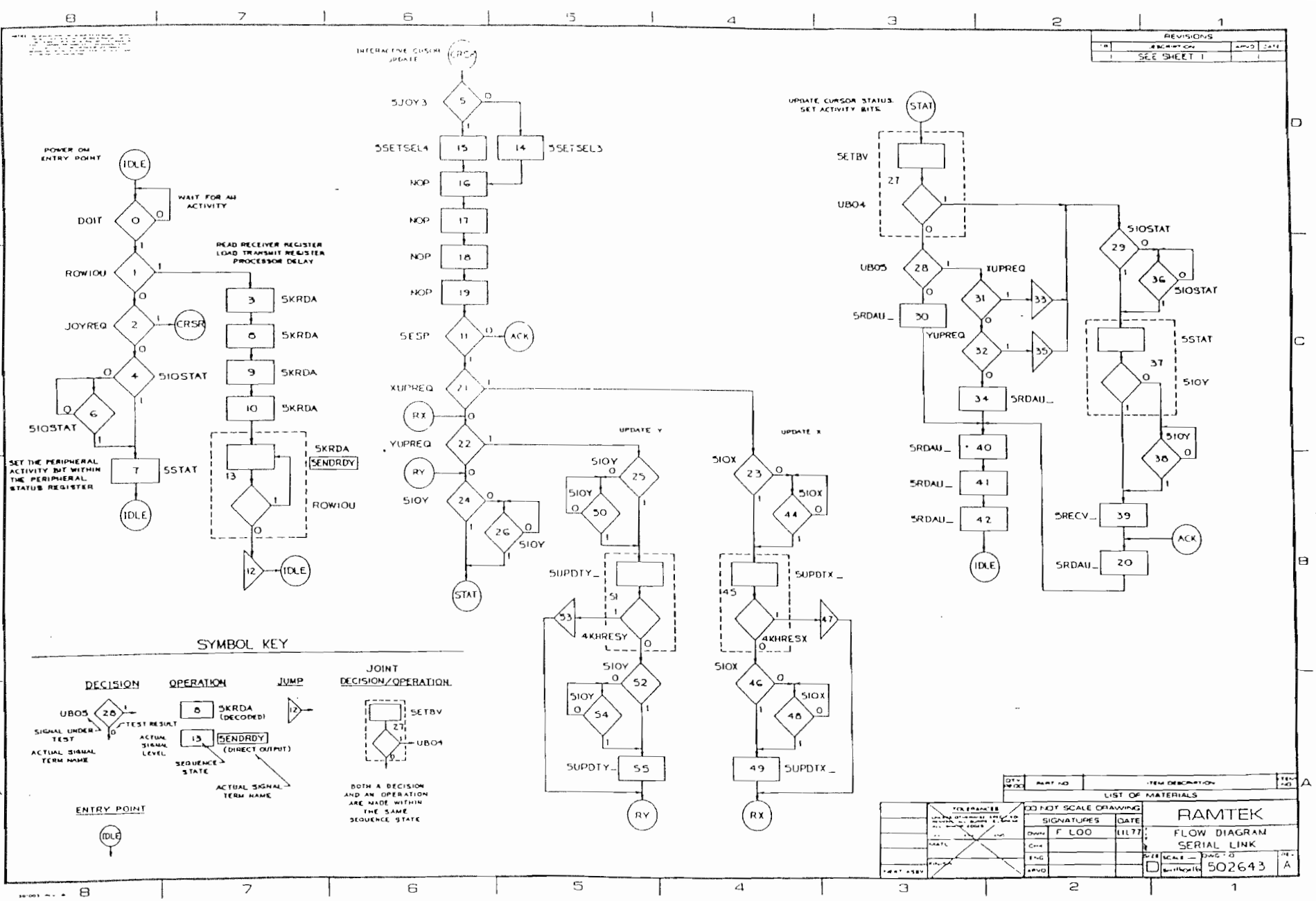
NEXT ASSY


CURSOR ELEMENT REGISTER — CHANNEL TWO
ELEMENT COUNTERS
CURSOR ELEMENT REGISTER
ELEMENT DECODE
CURSOR ELEMENT ADDRESS TO CURSOR READBACK MULTIPLEXER
ELEMENT ADDRESS FROM PROCESSOR DATA BUS
BDATAO9
BDATAO8
BDATAO7
BDATAO6
BDATAO5
BDATAO4
BDATAO3
BDATAO2
BDATAO1
BDATAXOO
XREGO9B
XREGO8B
XREGO7B
XREGO6B
XREGO5B
XREGO4B
XREGO3B
XREGO2B
XREGO1B
XREGOOB
5XC1B
5XC2B
5XCMB
5THMMM
THBBB
5XDØWNXB
XSTØPB
XC@TO3B
XC@TO2B
XC@TO1B
XC@TOOB
XR5B
XR4B
XR3B
XWINDØB (IOD4)
XPATRN Z (IOD4)
5XWINDØB
PROCESSOR ELEMENT LOAD PULSE. THIS IS A HIGH BYTE REGISTER DECODE.
INTERACTIVE CURSOR UPDATE PULSE FROM SEQUENCE CONTROLLER.
1 COUNT PER PULSE.
1 PULSE FOR HIGH RESOLUTION (9200,9300).
2 PULSES FOR LOW RESOLUTION (9100).
INTERACTIVE CURSOR UPDATE DIRECTION DATA (+X,-X) FROM UARTS.
STOPS COUNTER AT ZERO FOR ONE ELEMENT AND REVERSES COUNT DIRECTION.
COUNT DIRECTION
REVISIONS
SEE SHEET 1
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DATE
DRWN F LOO 9/16/87
CHK
ENG
APVD
TOLERANCES
NEXT ASSY
RAMTEK
LOGIC DIAGRAM
SERIAL LINK
SIZE D
SC 4.8 — 8=11/20/86
DWG NO 502643
REV A


CURSOR LINE REGISTER
CHANNEL ONE
BLINK COUNTER
CURSOR LINE REGISTER
LINE COUNTERS
LINE DECODE
543 3B
543 3A
545 3E
432 4E
543 5K
543 5G
543 5H
543 5J
PROCESSOR DATA BUS (2B4G)
BDATA10
BDATA11
BDATA12
BDATA13
UART DATA BUS (7C6)
(VISIBLE) UBD07
(BLINK) UBD06
(TRACK) UBD05
(ENTER) UBD04
VISIA
BLINA
TRAKA
ENTRA
VISBA
BLNKA
TRCKA
NTERA
CURSOR STATUS BITS TO CURSOR READBACK MULTIPLEXER (10D6)
BNCK2
BNCK1
BLINCKA
SBLNKA
SBLINKCA (10B4)
VERTICAL FIELD FLAG
9TVFFF
INCR1
INCR1A
INCREMENT PULSE ADDS ONE COUNT IN ODD FIELD ON ODD LINE.
CURSOR LINE ADDRESS LSB
INVERTS COUNT DIRECTION TO COUNT UP WHEN ADDING ONE LINE DURING BLANKING
5YDØWNYA
COUNT DIRECTION
TVMMM
YUPDØW1
YR4A
YR3A
YR2A
YC@TO9A
YC@TO8A
YC@TO7A
YC@TO6A
YC@TO5A
YC@TO4A
YC@TO3A
YC@TO2A
YC@TO1A
YWINDØA (10C4)
YPATRN1 (10C4)
5TVBBB*1
(14A5)
5SETBV1
ETBV1
5WIØY1
INTERACTIVE CURSOR LOAD PULSE FROM SEQUENCE CONTROLLER. LOADS ETBV DATA.
CURSOR LINE ADDRESS TO CURSOR READBACK MULTIPLEXER
YREGO8A
YREGO7A
YREGO6A
YREGO5A
YREGO4A
YREGO3A
YREGO2A
YREGO1A
YREGOOA
LINE ADDRESS FROM PROCESSOR DATA BUS
VERTICAL RESOLUTION CONTROL GATE
LSB
4KHRESY
CURSOR VERTICAL RESOLUTION KEYING SIGNAL. 1=HIGH RES. 0=LOW RES.
PROCESSOR LINE LOAD PULSE. REGISTER DECODE LOADS ON A HIGH BYTE ONLY
INTERACTIVE CURSOR UPDATE PULSE FROM SEQUENCE CONTROLLER. 1 COUNT PER PULSE. 1 PULSE FOR HIGH VERTICAL RESOLUTION 2 PULSES FOR LOW VERTICAL RESOLUTION
5UPDTY1
7HQA
UBD02
INTERACTIVE CURSOR UPDATE DIRECTION DATA (+Y, -Y) FROM UARTS
VERTICAL MEMORY SYNCHRONIZATION PULSE
9TVMMM
VERTICAL BLANKING
9TVBBB
THMMM (11D5)
COUNT PULSE OCCURS ONCE PER LINE
5VBHMVF1
7HQY1
5HMINA
VERTICAL BLANKING ENABLE / DISABLE
7HQLINE
DO NOT SCALE DRAWING
SIGNATURES
DATE
F LOO
8/27/76
RAMTEK
LOGIC DIAGRAM
SERIAL LINK
SCALE —
DWG NO. 502643
SIZE A
LIST OF MATERIALS
PART NO
ITEM DESCRIPTION
REVISIONS
SEE SHEET 1


CURSOR LINE REGISTER — CHANNEL TWO
CURSOR LINE REGISTER
BLINK DECODE
LINE COUNTERS
LINE DECODE
PROCESSOR DATA BUS (2B6)
BDATAI0
BDATAI1
BDATAI2
BDATAI3
UART DATA BUS (7C6)
(VISIBLE) UBDO7
(BLINK) UBDO6
(TRACK) UBDO5
(ENTER) UBDO4
VISIB
BLINB
TRAKB
ENTRB
CURSOR STATUS BITS TO CURSOR READBACK MULTIPLEXER. (10B6)
(15D5) BNCK1
BNCK2
5BLINKB
BLINKB B
5BLINKCB (10D4)
5VIS*BB
VERTICAL FIELD FLAG
(13C5) 9TVFFF
INCR2
INCR*B
INCREMENT PULSE ADDS ONE COUNT IN ODD FIELD ON ODD LINE.
INVERTS COUNT DIRECTION TO COUNT UP WHEN ADDING ONE LINE DURING BLANKING.
(2A3) THQ
+5V
CURSOR LINE ADDRESS LSB
(5B2) 5ETBV2
INTERACTIVE CURSOR LOAD PULSE FROM SEQUENCE CONTROLLER. LOADS ETBV DATA
(2A3) 2HQ
ETBV2
THQETBV2
(2B6) BDATAO8
5WIØY2
CURSOR LINE ADDRESS TO CURSOR READBACK MULTIPLEXER
(2B6) BDATAO7
BDATAO6
BDATAO5
BDATAO4
(2B6) BDATAO3
BDATAO2
BDATAO1
(13B7) BDATAYOO
LINE ADDRESS FROM PROCESSOR DATA BUS
YREGO8B
YREGO7B
YREGO6B
YREGO5B
YREGO4B
YREGO3B
YREGO2B
YREGO1B
YREGOOB
(3B2) 5WIØY2
PROCESSOR LINE LOAD PULSE. REGISTER DECODE LOADS ON A HIGH BYTE OUT
(5B2) 5UPDTY2
(2A3) THQA
INTERACTIVE CURSOR UPDATE PULSE FROM SEQUECE CONTROLLER. 1 COUNT PER PULSE. 1PULSE FOR HIGH VERTICAL RESOLUTION. 2 PULSES FOR LOW VERTICAL RESOLUTION.
(6C3) UBDO2
INTERACTIVE CURSOR UPDATE DIRECTION DATA (+Y, -Y) FROM UARTS
(13B5) TVMMM
(13B4) 5TVMMM
COUNT PULSE OCCURS ONCE PER LINE
(11D5) THMMM
(13B2) 5TVBBB*1
VERTICAL BLANKING ENABLE/DISABLE
TVMMM
YUPDØW2
YR4B
YR3B
YR2B
YCØTO3B
YCØTO2B
YCØTO1B
YCØTOØB
YWINDØB (10D4)
YPATRN2 (10D4)
5TVBBB*1
5YDØWNYB
COUNT DIRECTION
5YCIB
5VBHMVF2
5HMINB
THQY2
6HQ (2B3)
CURSOR LINE REGISTER
CHANNEL TWO
REVISIONS
SEE SHEET 1
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
F LOO
RAMTEK
LOGIC DIAGRAM
SERIAL LINK
502643
REV A


THREE TYPES OF ACTIVITIES CAN OCCUR:
1) A PROCESSOR LOAD/READ OF THE TRANSMIT/RECEIVER REGISTERS
2) AN INTERACTIVE CURSOR UPDATE
3) A LEADING EDGE SETTING OF ANY BIT WITHIN THE PERIPHERAL STATUS REGISTER.
POWER ON ENTRY POINT
IDLE
WAIT FOR AN ACTIVITY
ACTIVITY
CHECK FOR PROCESSOR LOAD/READ
RECV TRANS REG
CHECK FOR INTERACTIVE CURSOR UPDATE
CURSOR
CRSR
CHECK IF PROCESSOR IS READING ACTIVITY STATUS REGISTER
ACT STAT READ
LEADING EDGE SET HAS OCCURED
DONE
SET THE PERIPHERAL ACTIVITY BIT WITHIN THE ACTIVITY STAT REGISTER
SET ACTIVITY STAT BIT
DELAYS THE PROCESSOR WHEN IT ATTEMPTS TO READ A RECEIVER REGISTER OR LOAD A TRANSMIT REGISTER
DATA/ACK
ENABLE UART DATA ONTO BUS AND ACKNOWLEDGE UART
RELEASE PROCESSOR
JUMP
INTERACTIVE CURSOR UPDATE
CRSR
WHICH CHANNEL
CH 4
SELECT CHANNEL FOUR
SELECT CHANNEL THREE
NOP
WASTE TIME TO ALLOW UART CURSOR CONTROLLER DATA TO STABILIZE ON INTERNAL DATA BUS
DATA ERROR
ACK
CHANGE IN X
ANY CHANGE IN CURSOR COORDINATES
RX
CHANGE IN Y
RY
READ WRITE Y
CHECK FOR PROCESSOR ATTEMPTING TO READ OR WRITE THE Y CURSOR COORDINATE
STAT
UPDATE Y
UPDATE X
READ WRITE X
CHECK FOR PROCESSOR ATTEMPTING TO READ OR WRITE CURSOR COORDINATE
ADD/SUB 1 LINE FROM Y
CHECK RES Y
HIGH
LOW
CHECK CURSOR RESOLUTION
ADD/SUB 1 ELEM FROM Y
ADD OR SUBTRACT AN ADDITIONAL LINE OR ELEMENT
ADD/SUB 1 ELEM FROM X
ADD OR SUBTRACT AN ELEMENT FROM CURSOR X COORDINATE
LOAD ETBW DATA
LOAD THE ENTER TRACK BLINK VISIBLE REGISTER WITH UART DATA THAT INDICATES THE CORRESPONDING SWITCH POSITIONS ON THE CURSOR CONTROLLER
ENTER SET
CHECK IF ENTER HAS BEEN PRESSED
TRACK SET
CHECK IF THE TRACK SWITCH IS ON
ACK UART
ACKNOWLEDGE UART FOR CURSOR CONTROLLER DATA
ACT STAT READ
CHECK FOR PROCESSOR ATTEMPTING TO READ THE ACTIVITY STATUS REGISTER
SET ACTIVITY STAT BIT
SET THE PERIPHERAL ACTIVITY BIT WITHIN THE ACTIVITY STATUS REGISTER.
CHECK FOR PROCESSOR ATTEMPTING TO READ OR WRITE THE Y CURSOR COORDINATE
SET JOYSTICK BIT
SET THE JOYSTICK ACTIVITY BIT WITHIN THE PERIPHERAL STATUS REGISTER
SYMBOL KEY
DECISION
OPERATION
JUMP
ENTRY POINT
TEXT
NOP
J
IDLE
REVISIONS
SEE SHEET 1
LIST OF MATERIALS
DO NOT SCALE DRAWING
SIGNATURES
DRAWN
CHK
ENG
APVD
TOLERANCES
RAMTEK
FLOW DIAGRAM
SERIAL LINK
SCALE
DWG NO
502643
REV
A



REVISIONS			
NO	DESCRIPTION	APVD	DATE
1	SEE SHEET 1		

QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
	DWN F LOO	11/77	FLOW DIAGRAM
	CHK		SERIAL LINK
	ENG		
	APVD		SIZE D SCALE — DWG NO 502643 REV A

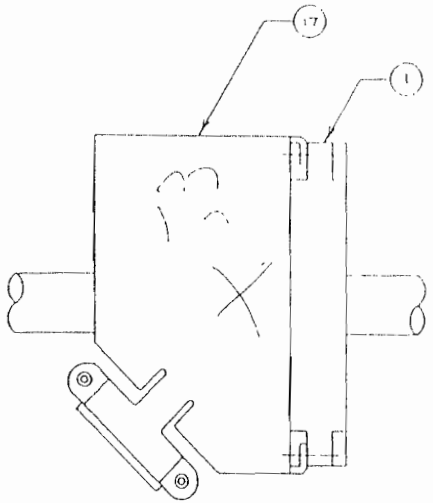
NEXT ASSY

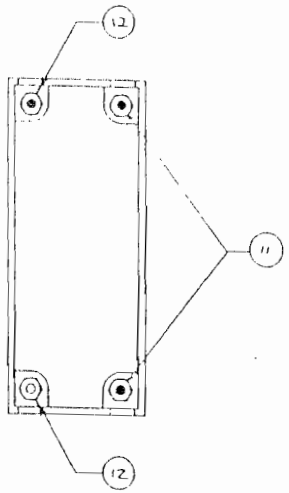
USED ON

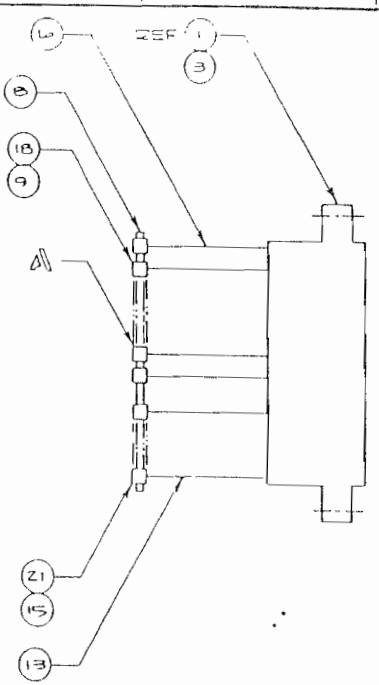
APPLICATION

DO NOT SCALE DRAWING

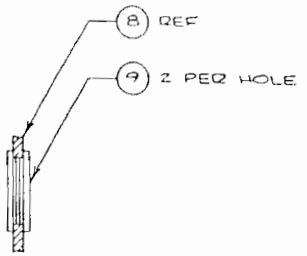
REVISIONS			
LTR	DESCRIPTION	APVD	DATE
A	RELEASED PER ECO 501878		
B	REV PER ECO# 501894		







ITEM (1)



DETAIL A

NOTES:

1. REFERENCE DRAWING 501469 FOR LOCATION OF PIN NUMBERS OF 104 PIN CONNECTORS.
2. SEE DETAIL 'A' FOR INSTALLATION OF ITEM 9 INTO BNC CONNECTOR HOLES FOR ELECTRICAL INSULATION.
3. OVERALL CABLE LENGTH TO BE 10FT ±1 INCH.
4. 104 PIN CONN PARTS ARE BURNDY. SEE 501453 FOR INTERCHANGEABILITY TO OTHER PARTS
5. THIS ASSEMBLY MAY BE CONSTRUCTED AS AN OCTOPUS CABLE BY OMITTING THE FRONT PANEL AT MARKETING'S DISCRETION ONLY.

SEE SEPERATE L/M

QTY PER	PART NO.	ITEM DESCRIPTION	ITEM NO.

LIST OF MATERIALS

TOLERANCES	DO NOT SCALE DRAWING		RAMTEK
	SIGNATURES	DATE	
MATL SEE L/M	DWN		DISTRIBUTION PANEL ASSY 9300
FINISH	CHK		
NEXT ASSY	ENG		SIZE D SCALE NONE DWG NO. 502769 REV 8
	APVD		SHT 1 OF 3

REVISIONS			
LTR	DESCRIPTION	APVD	DATE

WIRE NO	FROM	TO	CODE	CL2	TERM NAME	DESCRIPTION
18	PZ-601	J16	C		DVIDEØØG2	GREEN SLOT2
	-604	J16	S		ZGNDØ2	
17	-504	J15	C		VIDEØØR2	RED SLOT 2
	PZ-504	J15	S		ZGNDR2	
16	PZ-802	J4	C		DVIDEØBW1	GREY SCALE SLOT1
	-802	J4	S		ZGNDBW1	
15	-702	J3	C		DVIDEØB1	BLUE SLOT 1
	-702	J3	S		ZGNDB1	
14	-602	J2	C		DVIDEØG1	GREEN SLOT 1
	-602	J2	S		ZGNDG1	
13	-502	J1	C		VIDEØR1	RED SLOT 1
	-502	J1	S		ZGNDR1	
12	-402	J28	C		VIDEØ11	SUB.CHAN.11
	-402	J28	S		ZGND11	
11	-302	J27	C		VIDEØ10	SUB.CHAN.10
	-302	J27	S		ZGND10	
10	-202	J26	C		VIDEØ09	SUB.CHAN.9
	-202	J26	S		ZGND09	
9	-102	J25	C		VIDEØ08	SUB.CHAN.8
	PZ-102	J25	S		ZGND08	
8	PZ-801	J24	C		VIDEØ07	SUB.CHAN.7
	-801	J24	S		ZGND07	
7	-701	J23	C		VIDEØ06	SUB.CHAN.6
	-701	J23	S		ZGND06	
6	-601	J22	C		VIDEØ05	SUB. CHAN.5
	-601	J22	S		ZGND05	
5	-501	J21	C		VIDEØ04	SUB CHAN. 4
	-501	J21	S		ZGND04	
4	-401	J20	C		VIDEØ03	SUB. CHAN. 3
	-401	J20	S		ZGND03	
3	-301	J19	C		VIDEØ02	SUB.CHAN. 2
	-301	J19	S		ZGND02	
2	-201	J18	C		VIDEØ01	SUB. CHAN. 1
	-201	J18	S		ZGND01	
1	-101	J17	C		VIDEØ00	SUB.CHAN. 0
	PZ-101	J17	S		ZGND00	
34	PZ 504	COMP SYNC OUT	C		ØVHORZE	HORIZ DRIVE IN
	-509	COMP SYNC OUT	S		#VHORZE	HORIZ DRIVE SHIELD
33	-410	VERT DRIVE OUT	C		ØVVERTE	VERTICAL DRIVE IN
	PZ 810	VERT DRIVE OUT	S		#VVERTE	VERT DRIVE SHIELD
32	PZ-811	J16	C		VIDEØBW4	GREY SCALE SLOT 4
	-811	J16	S		ZGNDBW4	
31	-711	J15	C		VIDEØB4	BLUE SLOT 4
	-711	J15	S		ZGNDB4	
30	-609	J14	C		VIDEØG4	GREEN SLOT 4
	-609	J14	S		ZGNDG4	
29	-507	J13	C		VIDEØR4	RED SLOT 4
	PZ 507	J13	S		ZGNDR4	
28	PZ-407	J12	C		VIDEØBW3	GREY SCALE SLOT3
	-407	J12	S		ZGNDBW3	
27	-307	J11	C		VIDEØB3	BLUG SLOT 3
	-307	J11	S		ZGNDB3	
26	-211	J10	C		VIDEØG3	GREEN SLOT 3
	-211	J10	S		ZGNDG3	
25	-110	J9	C		VIDEØR3	RED SLOT 3
	PZ-110	J9	S		ZGNDR3	
24	PZ-E	COMP SYNC OUT	C		ØVCMSYE	COMP SYNC OUT
	-E	COMP SYNC OUT	S		#VCMSYE	COMP SYNC SHIELD
23	-D	VERT DRIVE OUT	C		ØVVERTE	VERTICAL DRIVE OUT
	-D	VERT DRIVE OUT	S		#VVERTE	VERTICAL DRIVE SHIELD
22	-B	COMP BLANK OUT	C		ØVCMPBLE	COMP BLANK OUT
	-B	COMP BLANK OUT	S		#VCMPBLE	COMP BLANK SHIELD
21	-A	HORIZ DRIVE OUT	C		ØVHORZE	HORIZ DRIVE OUT
	PZ-A	HORIZ DRIVE OUT	S		#VHORZE	HORIZ DRIVE SHIELD
20	PZ 804	J8	C		DVIDEØBW2	GREY SCALE SLOT2
	-804	J8	S		ZGNDBW2	
19	-704	J7	C		DVIDEØB2	BLUE SLOT 2
	PZ-704	J7	S		ZGNDB2	

WIRE NO	FROM	TO	CODE	CL2	TERM NAME	DESCRIPTION

QTY PER UNIT	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES	DO NOT SCALE DRAWING		
	SIGNATURES	DATE	RAMTEK
	DWN		DISTRIBUTION PANEL ASSY 9300
	CHK		
	ENG		
	APVD		SIZE D SCALE FULL DWG NO 502769 REV B

NEXT ASSY

WIRE NO.	FROM	TO	CODE	CL2	FROM NAME	DESCRIPTION
68	PZ-810	T6-1			#LLDQ2L	SERIAL IN (CHANNEL 2 RETURN)
67	-709	T6-2			9LLDQ2L	SERIAL IN (CHANNEL 2)
66	-710	T5-1			#LLDQ1L	SERIAL IN (CHANNEL 1 RETURN)
65	PZ-607	T5-2			9LLDQ1L	SERIAL IN (CHANNEL 1)
64	PZ-608	T8-2			#LLDT4L	SERIAL OUT (CHANNEL 4 RETURN)
63	-510	T8-3			9LLDT4L	SERIAL OUT (CHANNEL 4)
62	-210	T7-4			#LLDT3L	SERIAL OUT (CHANNEL 3 RETURN)
61	-109	T7-5			9LLDT3L	SERIAL OUT (CHANNEL 3)
60	-207	T6-4			#LLDT2L	SERIAL OUT (CHANNEL 2 RETURN)
59	-106	T6-5			9LLDT2L	SERIAL OUT (CHANNEL 2)
58	-206	T5-4			#LLDT1L	SERIAL OUT (CHANNEL 1 RETURN)
57	PZ-105	T5-5			9LLDT1L	SERIAL OUT (CHANNEL 1)
56	T9-4	T10-4			#LLDQ4S	
55	T4-1	T9-4			9LLDQ4S	
54	PZ-808	T1-1			#LLDQ2S	SERIAL IN (CHANNEL 4 RETURN)
53	T9-5	T10-5			9LLDQ4S	
52	T4-2	T9-5			9LLDQ2S	
51	PZ-707	T4-2			9LLDQ4S	SERIAL IN (CHANNEL 4)
50	T3-1	T9-1			#LLDQ3S	
49	PZ-807	T3-1			#LLDQ3S	SERIAL IN (CHANNEL 3 RETURN)
48	T3-2	T9-2			9LLDQ3S	
47	PZ-706	T8-2			9LLDQ3S	SERIAL IN (CHANNEL 3)
46	-806	T2-1			#LLDQ2S	SERIAL IN (CHANNEL 2 RETURN)
45	-805	T2-2			9LLDQ2S	SERIAL IN (CHANNEL 2)
44	-305	T1-1			#LLDQ1S	SERIAL IN (CHANNEL 1 RETURN)
43	PZ-205	T1-2			9LLDQ1S	SERIAL IN (CHANNEL 1)
42	PZ-208	T4-4			#LLDT4S	SERIAL OUT (CHANNEL 4 RETURN)
41	-107	T4-5			9LLDT4S	SERIAL OUT (CHANNEL 4)
40	-809	T3-4			#LLDT3S	SERIAL OUT (CHANNEL 3 RETURN)
39	-108	T3-5			9LLDT3S	SERIAL OUT (CHANNEL 3)
38	-209	T2-4			#LLDT2S	SERIAL OUT (CHANNEL 2 RETURN)
37	-108	T2-5			9LLDT2S	SERIAL OUT (CHANNEL 2)
36	-404	T1-4			#LLDT1S	SERIAL OUT (CHANNEL 1 RETURN)
35	PZ-304	T1-5			9LLDT1S	SERIAL OUT (CHANNEL 1)

WIRE NO.	FROM	TO	CODE	CL2	TERM NAME	DESCRIPTION
98	T11-9	T12-12			SHLD GND	SHLD GND
97	T7-3	T11-9				
96	T7-6	T7-3				
95	T8-3	T7-6				
94	T8-6	T8-3				
93	T4-6	T8-6				
92	T4-3	T4-6				
91	T3-6	T4-3				
90	T3-9	T3-6				
89	PZ-K	T3-3			SHLD GND.	SHLD GND
88	T7-10	T8-10			SLZ+12	+12VDC
87	T6-10	T7-10				
86	T5-10	T6-10				
85	PZ-611	T5-10			SLZ+12	+12VDC
84	T3-10	T4-10			SL1+12	+12VDC
83	T2-10	T3-10				
82	T1-10	T2-10				
81	PZ-409	T1-10			SL1+12	+12VDC
80	T9-10	T12-10			#LLDQ4G	
79	T8-1	T9-10			9LLDQ4G	
78	PZ-705	T8-1			#LLDQ4G	SERIAL IN (CHANNEL 4 RETURN)
77	T9-11	T12-11			9LLDQ4G	
76	T8-2	T9-11			9LLDQ4G	
75	PZ-609	T8-2			9LLDQ4G	SERIAL IN (CHANNEL 4)
74	T9-7	T11-7			#LLDQ3G	
73	T7-1	T9-7			9LLDQ3G	
72	PZ-604	T7-1			#LLDQ3G	SERIAL IN (CHANNEL 3 RETURN)
71	T9-8	T11-8			9LLDQ3G	
70	T7-2	T9-8			9LLDQ3G	
69	PZ-504	T7-2			9LLDQ3G	SERIAL IN (CHANNEL 3)

WIRE NO.	FROM	TO	CODE	CL2	TERM NAME	DESCRIPTION
111	T9-12	T10-12			SHIELD GROUND	SHIELD GROUND
110	T9-9	T9-12				
109	T9-6	T9-9				
108	T9-3	T9-6				
107	T5-3	T9-3				
106	T5-6	T5-3				
105	T6-3	T5-6				
104	T6-6	T6-3				
103	T2-6	T6-6				
102	T2-3	T2-6				
101	T1-6	T2-3				
100	T1-3	T1-6				
99	PZ-G	T1-3			SHIELD GROUND	SHIELD GROUND

REVISIONS			
LTR	DESCRIPTION	APVD	DATE

QTY PER	PART NO	ITEM DESCRIPTION	ITEM NO

LIST OF MATERIALS

DO NOT SCALE DRAWING

SIGNATURES	DATE
DWN	3/27/10
CHK	3/31/10
ENG	4/1/10
APVD	4/1/10

TOLERANCES

NEXT ASSY

RAMTEK

DISTRIBUTION PANEL ASSY 9300

SIZE: D | SCALE: NTS | DWG NO: 502769 | REV: B

UNLESS OTHERWISE SPECIFIED

1. REFERENCE DRAWING 50169 FOR LOCATION OF PIN NUMBERS OF 104 PIN CONNECTOR.

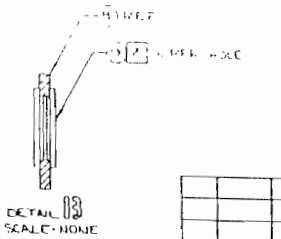
2. SEE DETAIL B FOR INSTALLATION OF ITEM 9 INTO BNC CONNECTOR HOLES FOR ELECTRICAL INSULATION.

3. OVERALL CABLE LENGTH TO BE 120" ± 1".

4. 104 PIN CONN PARTS ARE BURNDY. SEE 50145 FOR INTERCHANGEABILITY TO OTHER PARTS.

5. THIS ASSEMBLY MAY BE CONSTRUCTED AS AN OCTOPUS CABLE BY OMITTING THE FRONT PANEL AT MARKETINGS DISCRETION ONLY.

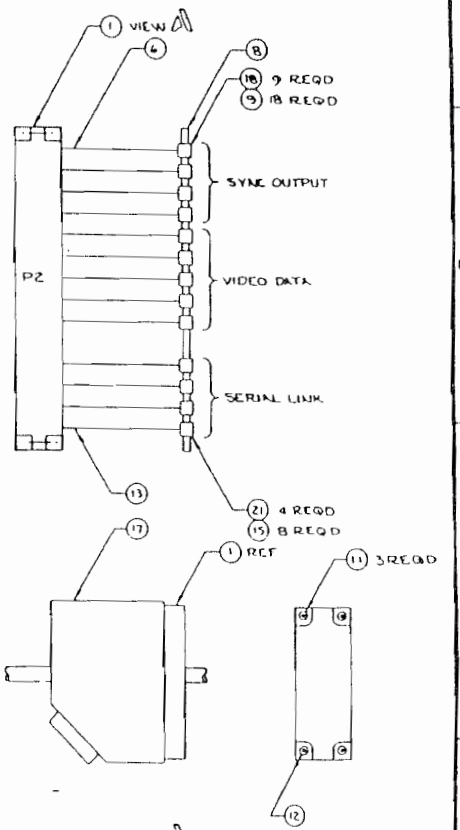
6. WHEN CONNECTING JOYSTICKS TO THIS PANEL USE CABLE NUMBER 502648 ONLY.



REVISIONS			
LTR	DESCRIPTION	APVD	DATE
E	RELEASE PER ECO 507060		

24	T3-8	T4-8				
23	T3-2	T3-8				
22	P2-706	T3-2			9LLDR35	
21	-806	T2-1			*LLDR25	
20	-805	T2-2			9LLDR25	
19	-305	T1-1			*LLDR15	
18	-205	T1-2			9LLDR15	
17	-208	T4-4	GRN		*LLDT45	
16	-107	T4-5	YEL		9LLDT45	
15	-809	T3-4	ORN		*LLDT35	
14	-708	T3-5	RED		9LLDT35	
13	-209	T2-4	BRN		*LLDT25	
12	-108	T2-5	BLK		9LLDT25	
11	-406	T1-4	ORN		*LLDT15	
10	P2-306	T1-5	YEL		9LLDT15	
9	P2-C	J5	C		VIDEØ	DIAGNOSTIC VIDEO
	-C	J5	S		2GND	
8	-E	COMP SYNC	C		9VCMSYE	COMPOSITE SYNC
	-E	COMP SYNC	S		*VCMSYE	
7	-D	VERT DRIVE	C		9VVERTE	VERTICAL DRIVE
	-D	VERT DRIVE	S		*VVERTE	
6	-B	COMP BLANK	C		9VCMPBLE	COMPOSITE BLANKING
	-B	COMP BLANK	S		*VCMPBLE	
5	-A	HORIZ DRIVE	C		9VHORZE	HORIZONTAL DRIVE
	-A	HORIZ DRIVE	S		*VHORZE	
4	-802	J4	C		VIDEØ BW	GREY SCALE
	-802	J4	S		2GND BW	
3	-702	J3	C		VIDEØ B	BLUE
	-702	J3	S		2GND B	
2	-602	J2	C		VIDEØ G	GREEN
	-602	J2	S		2GND G	
1	-502	J1	C		VIDEØ R	RED
	P2-502	J1	S		2GNDR	

PART NO	FROM	TO	C.R	GA	TERM NAME	DESCRIPTION
47	P2-K	T1-*			SHIELD	
46	T1-13	T2-13				
45	T2-13	T3-13				
44	T3-13	T3-13				
43	T3-9	T4-13				
42	T4-13	T4-9				
41	P2-G	T1-6			SHIELD	
40	T1-6	T2-6				
39	T2-6	T3-6				
38	T3-6	T3-12				
37	T3-12	T4-6				
36	T4-6	T4-12				
35	T1-10	T2-10			SL1+12	
34	P2-105	T1-10			SL1+12	
33	T4-10	T3-10				
32	T4-1	T4-10				
31	P2-808	T4-1			*LLDR45	
30	T4-11	T3-11				
29	T4-2	T4-11				
28	P2-707	T4-2			9LLDR45	
27	T3-7	T4-7				
26	T3-1	T3-7				
25	P2-501	T3-1			*LLDR35	



QTY REQD	PART NO	ITEM DESCRIPTION	ITEM NO
		LIST OF MATERIALS	

TOLERANCES UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES ALL SURFACE FINISHES	DO NOT SCALE DRAWING		RAMTEK
	SIGNATURES	DATE	
	DWN		DISTRIBUTION PANEL
MATL	CHK		SMALL
FINISH	ENG		SIZE A SCALE — DWG NO 502635 REV A
NEXT ASSY	APVD		SHT 1 OF 1

LIST OF MATERIALS

PRODUCTION ORDER

JOB NO.

PREPARED BY

PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS -01	-02	STD COST EA	TOTAL
1	502030	PC BOARD, FAB.	1	1		
2	0301101	LEVER EXTRACTOR Southco 90-0-650311	—	2		
3	0301100	RIVET Southco 90-0-503024	—	2		
4	501596-01	BUSS BAR	14	14		
5	1301 031	IC SN 74LS08	2	2		
6	133	74LS00	2	2		
7	134	74S37	1	1		
8	136	74LS20	2	2		
9	232	74LS32	1	1		
10	307	10125	1	1		
11	330	74LS04	5	5		
12	332	8T26	10	10		
13	334	74LS02	1	1		
14	336	74LS27N	4	4		
15	337	74S260N	1	1		
16	432	74LS174N	14	14		
17	500	74191	2	2		
18	532	74S138	1	1		
19	535	74S157	5	5		
20	540	74S64	1	1		
21	541	74LS51	1	1		
22	1301 435	IC SN74S109	9	9		
23	3121332	RESISTOR PAK 898-1-R33K	1	1		
24	3121471	" " 898-1-R470	2	2		
25	3126000	" " 898-5-220/330	2	2		
26	3109332	" COMP 33K 1/4W 5%	1	1		
27	6706336	CAPACITOR TDC 336M020G1	3	3		
28	6701104-04	" .1mf AXIAL LEAD	32	32		
29	6701104-02	" .1mf	1	1		
30	8602004	CONNECTOR 65275-004	2	2		
31	8602001	" 65275-001	2	2		
32	8606124	TERMINAL 1350-8	2	2		
33	502328-2	STIFFENER	1	1		
34	0799435	SCREW, 4-40 x 1/2", NYLON	4	4		
35	0799456	WASHER, FLAT, #4 NYLON	8	8		
36	0799482	NUT, HEX, 4-40 NYLON	4	4		
37	0301106	CARD EJECTOR, INSERTER	2	—		

		SIGNATURES	DATE
PARTS ISSUD BY		DWN O Lanquin	6 2 78
PARTS RCVD BY		CHK	7-17-78
TO INVTY CPOS		ENG	7/17/78
TO ACCOUNT		APVD	7-17-78

RAMTEK

TITLE PC.B.,ASSY, UTILITY GENERAL PURPOSE INTERFACE

REV E | SHEET 1 OF 1 | DWG NO 502028-

LIST OF MATERIALS

BC1030

PRODUCTION ORDER

JOB NO.

PREPARED BY

PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502316	REAR PANEL - FAB	1				
2	502274	POWER SUPPLY	1				
3	502329	COVER P/S	1				
4	502336	ASSY, CPU CABLE	1				
5	50233701	ASSY, MUX CABLE	1				
6							
7	501662-03	POWER CONTROL PC.B. ASSY.	1				
8	0302006	BUSHING, INSULATED	8				
9							
10	502346 REV C	PWR DIST. DIAGRAM	REF				
11							
12	6903102	FILTER EMI-2081	1				
13	0705102	SPACER, 1/4 LG NYLON 4006	4				
14	8603100	STRAIN RELIEF HAYCO SR-TP-2	1				
15	3852104	POWER CORD BELDEN 17407	1				
16							
17							
18	8604018	GUIDE PIN, MALE BURNDY M3104PM-401-PC	3				
19	8604019	GUIDE PIN, FEMALE M3104PM 424-05	5				
20	8601190	CONN, 12 PIN FEMALE	1				
21							
22							
23	0799701	SCREW MACH PAN HD, 6-32 x 3/8 LG SS	4				
24	1703116	GROMMET STRIP ELECTRICRAFT 6034	AR				
25							
26							
27	3110221	RESISTOR 220Ω 1/2W	1				
28	6702103	CAP., .01uF 1000V	1				
29	8606114	TERMINAL STRIP HR Smith 861	1				
30	0799203	WASHER, FLAT #8	4				
31			2				
32	0799201	WASHER, FLAT #4	4				
33							
34	0799406	NUT, KEP #6-32	2				
35	0799402	NUT, KEP 4-40	4				
36	0799504	NUT, #4-40	8				
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		DWN K Tinsley	7/31/78
PARTS RCVD BY		CHK	8-1-78
TO INVTY CPOS		ENG	8-1-78
TO ACCOUNT		APVD	8/1/78

RAMTEK

TITLE: ASSY REAR PANEL - 9100

REV D | SHEET 1 OF 1 | DWG NO 502312

LIST OF MATERIALS

BC1030 Rev. 3/26

PRODUCTION ORDER

JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS -01	-02	TOT		ISS	STD COST EA	TOTAL
1	50231701	FRONT PANEL - FAB	1	—					
2	502317-02	FRONT PANEL - FAB	—	1					
3	9050056	SWITCH, MINI-PADDLE w/8 CKT SOCK & XX1101-20	1	1					
4	9050057	SWITCH MINI-PADDLE w/8 LUG SOCK & SC3GX1B1-96	1	1					
5	3203302	LED USE MTG CLIP TT TIL220	2	2					
6	0302007	MTG CLIP FOR LED	2	2					
7	8601090	CONN, PLUG 12 PIN BURNDY SM312P-1	1	1					
8									
9									
10	8604002	CONTACT, PIN 20-22GA BURNDY SM20M-101T	7	7					
11	1902100	METAL NAME PLATE	1	1					
12									
13	9550550	TIE WRAP BASE	2	2					
14	9550560	TIE WRAP	2	2					
15									
16		WIRE T.P #22GA BLU & WHT	30"	30"					
17		WIRE, #22 GA BLU	30"	30"					
18		WIRE, #22 GA GRN	15"	15"					
19									
20									
21									
22									
23									
24									
25									
		TOTAL							

		SIGNATURES	DATE
PARTS ISSUD BY		OWN	2/27/76
PARTS RCVD BY		CHK	5/3/76
TC INVTY CRDS		ENG	5/3/76
TC ACCOUNT		APVD	5/17/76

RAMTEK

TITLE: ASSY, FRONT PANEL - 9100/9200

REV: D | SHEET: 1 OF 1 | DWG NO: 502318

LIST OF MATERIALS

BC1030

PRODUCTION ORDER

JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS -01	-02	-03	-04	-05	-06	TOTAL
1	502330	PC BOARD	1	1	1	1	1	1	
2	502331	LOGIC DIAGRAM	REF						
3									
4	50159601	BUS BAR	4	4	4	4	4	4	
5									
6	6701104-3	CAPACITOR .1mF	70	80	90	100	110	120	
7	6701105	CAPACITOR 1mF MEPCO 4MCG-1-B5	20	30	40	50	60	70	
8	6706336	CAPACITOR 33mF	16	16	16	16	16	16	
9									
10									
11	0301106	EJECTOR CALMARC SERIES 107	2	2	2	2	2	2	
12									
13	1301-030	IC SN7408	1	1	1	1	1	1	
14	1301-091	IC SN74LS08	1	1	1	1	1	1	
15	033	SN74LS21	3	3	3	3	3	3	
16	132	SN7400	1	1	1	1	1	1	
17	134	SN7437	1	1	1	1	1	1	
18	140	SN74H00	5	5	5	5	5	5	
19	232	SN74LS32	2	2	2	2	2	2	
20	307	SN10125	1	1	1	1	1	1	
21	330	SN74LS04	4	4	4	4	4	4	
22	331	SN7404	1	1	1	1	1	1	
23	332	8T26	12	12	12	12	12	12	
24	409	SN74166	1	2	3	4	5	6	
25	431	IC SN74S174	1	1	1	1	1	1	
26	450	4K DYNAMIC RAM	20	40	60	80	100	120	
27	516	SN74157	5	5	5	5	5	5	
28	531	SN74S86	1	1	1	1	1	1	
29	543	SN74S169	1	1	1	1	1	1	
30	544	SN74LS151	6	6	6	6	6	6	
31	545	SN74LS157	5	5	5	5	5	5	
32	1301-546	IC SN74LS158	2	2	2	2	2	2	
33									
34	3122220	RESISTOR Pac 222	10	10	10	10	10	10	
35	3109102	RESISTOR 1K, 1/4W, 5%	6	6	6	6	6	6	
36									
		TOTAL							

		SIGNATURES	DATE
PARTS ISSUD BY		OWN	7/14/75
PARTS RCVD BY		CHK	7/14/76
TC INVTY CRDS		ENG	8/2/76
TC ACCOUNT		APVD	8/2/76

RAMTEK

TITLE: PC ASSY 320 x 256 MEMORY BD

REV: B | SHEET: 1 OF 2 | DWG NO: 502332

LIST OF MATERIALS

BC1030

PRODUCTION ORDER — JOB NO.

PREPARED BY: — PRODUCTION MGR.

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS -01	-02	-03	-04	-05	-06	TOTAL
37	0301200	ROLL PIN (.062)	5	5	5	5	5	5	
38	F02432	STIFFENER, EDGE-	1	1	1	1	1	1	
39	502328	STIFFENER	1	1	1	1	1	1	
40									
41									
42		SCREW NYLON (SOC) 4-40 x 1/4 LG	6	6	6	6	6	6	
43		NUT, NYLON HEX #4-40	6	6	6	6	6	6	
44		WASHER, NYLON #4	6	6	6	6	6	6	
45									
46	502022	I.C. PROM MMI6331 (AT BD)	1	1	1	1	1	1	
47	502623	" " " (AT BC)	1	1	1	1	1	1	
48	502624	" " " (AT BV)	1	1	1	1	1	1	
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									
69									
70									
71									
72		TOTAL							

		SIGNATURES	DATE
PARTS ISSUD BY		OWN Dave Howard	11/11/85
PARTS RCVD BY		CHK	11/11/85
TO INVTY CROS		ENG	11/11/85
TO ACCOUNT		APVD	9/7/86

RAMTEK

TITLE: PC ASSY 320x256 MEMORY BD

REV: 5 — SHEET: 2 OF 2 — OWG NO: 502332

LIST OF MATERIALS

BC 1030

PRODUCTION ORDER — JOB NO.

PREPARED BY: — PRODUCTION MGR.

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	199	GTO COST EA	TOTAL
1	502333C	PC BOARD	1				
2	502334	LOGIC DIAGRAM	Ref				
3							
4							
5	6706336	CAPACITOR 33mF, 20V (C3, C4)	2				
6	6701104-3	CAPACITOR .1mF, (C5-C15)	11				
7	6702103-1	CAPACITOR .01mF (C1,C2)	2				
8	6706685	CAPACITOR 6.8μF, 16V, 20% (C16)	1				
9	8602012	CONNECTOR (J1, J2) BERG STRT HEADER	1				
10	8602006	HEADER POST	1				
11	9101129	CRYSTAL 12.273 MHz (Y1,Y2)	2				
12							
13							
14	3202201	DIODE 1N4454 (CR1)	1				
15							
16							
17							
18	1301132	IC. SN 74800	2				
19	134	SN 74S37	2				
20	135	SN 74S20	1				
21	306	SN 10124	1				
22	307	SN 10125	1				
23	517	SN 74161	1				
24	330	SN 74LS04	1				
25	331	SN 74S04	3				
26	333	SN 74S02	1				
27	365	SN 74365	2				
28	430	SN 74S112	4				
29	431	SN 74S174	4				
30	532	SN 74S138	1				
31	534	SN 74S153	1				
32	1301543	IC. SN 74S169	6				
33							
34							
35							
36							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		OWN DAVE	9/7/86
PARTS RCVD BY		CHK	5-21-86
TO INVTY CROS		ENG	5-21-86
TO ACCOUNT		APVD	5-21-86

RAMTEK

TITLE: P.C. ASSY - (-01)

MULTI-RESOLUTION SYNC TIMING

REV: E — SHEET: 1 OF 2 — OWG NO: 502335-01

LIST OF MATERIALS

BC 1030

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
37							
38	502504	IC, SN74S287 PROM	1				
39	502505	" " "	1				
40	502506	" " "	1				
41	502507	" SN74S287	1				
42	502510	IC, MM6331 PROM	1				
43							
44							
45							
46	3121102	RESISTOR PAC (R12)	1				
47	3124511	RESISTOR PAC (R11)	1				
48							
49							
50	3109471	RESISTOR 470Ω, 1/4W 5% (R1, R2, R3, R4)	4				
51	3109102	RESISTOR 1K, 1/4W, 5% (R5)	1				
52	3109221	RESISTOR 220Ω, 1/4W 5% (R6)	1				
53	3109103	RESISTOR 10K, 1/4W 5% (R7)	1				
54							
55							
56	9050004	SWITCH DIP S1	1				
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY / RCVD BY		DWN Dave	9/1/x
TO INVTY CROS		CHK	
TO ACCOUNT		ENG	
LIST OF MATERIALS		APVD	

RAMTEK

TITLE: P.C. ASSY-(-01) MULTI-RESOLUTION SYNC TIMING

REV E | SHEET 2 OF 2 | DWG NO: 502335-01

BC1030

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502333	PC BOARD	1				
2	502334	LOGIC DIAGRAM	Ref				
3							
4							
5	6706336	CAPACITOR 33μF, 20V (C3, C4)	2				
6	6701104-3	CAPACITOR .1μF, (C5-C15)	11				
7	6702103-1	CAPACITOR .01μF, (C1, C2)	2				
8	6706685	CAPACITOR 6.8μF, 15V, 20% (C16)	1				
9	8603512	CONNECTOR (J1, J2) BERG STEP HEADER	1				
10	8602006	HEADER POST	1				
11	9101129	CRYSTAL 12.273 MHz (Y1)	1				
12	9101130	CRYSTAL 13.068 MHz (Y2)	1				
13							
14	3202201	DIODE 1N4454 (CR1)	1				
15							
16							
17							
18	1301132	IC, SN 74S00	2				
19	134	" SN 74S37	2				
20	135	" SN 74S20	1				
21	306	" SN 10124	1				
22	307	" SN 10125	1				
23	517	" SN 74161	1				
24	330	" SN 74LS04	1				
25	331	" SN 74S04	3				
26	333	" SN 74S02	1				
27	365	" SN 74S15	2				
28	430	" SN 74S112	4				
29	431	" SN 74S174	4				
30	532	" SN 74S138	1				
31	534	" SN 74S153	1				
32	1301543	IC, SN 74S169	6				
33							
34							
35							
36							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY / RCVD BY		DWN Dave	9/1/x
TO INVTY CROS		CHK	
TO ACCOUNT		ENG	
LIST OF MATERIALS		APVD	

RAMTEK

TITLE: P.C. ASSY, (-02) MULTIRESOLUTION SYNC TIMING

REV E | SHEET 1 OF 2 | DWG NO: 502335-02

BC1030

PRODUCTION ORDER — JOB NO:

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
37							
38	502504	IC, SN74S287 PROM	1				
39	502505	"	1				
40	502506	"	1				
41	502508	" SN 74S287	1				
42	502511	IC, MM6331 PROM	1				
43							
44							
45							
46	3121102	RESISTOR PAC (R12)	1				
47	3124511	RESISTOR PAC (R11)	1				
48							
49							
50	3109471	RESISTOR 470Ω 1/4W 5% (R1, R2, R3, R4)	4				
51	3109102	RESISTOR, 1KΩ 1/4W 5% (R5)	1				
52	3109221	RESISTOR, 220Ω 1/4W 5% (R6)	1				
53	3109103	RESISTOR, 10K Ω, 1/4W 5% (R7)	1				
54							
55							
56	9050004	SWITCH DIP (S1)	1				
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		OWN Dave	9/1/4
PARTS RCVD BY		CHK	
TO INVTY CROS		ENG	
TO ACCOUNT		APVD	

LIST OF MATERIALS

RAMTEK

TITLE: P.C. ASSY, (-02)
MULTI-RESOLUTION SYNC TIMING

REV E | SHEET 1 OF 2 | DWG NO: 502335-02

BS1020

PRODUCTION ORDER — JOB NO:

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502333	PC BOARD	1				
2	502334	LOGIC DIAGRAM	REF				
3							
4							
5	6706336	CAPACITOR 33μF, 20V (C3, C4)	2				
6	6701104-3	CAPACITOR .1μF, (C5-C15)	11				
7	6702103-1	CAPACITOR .01μF, (C1, C2)	2				
8	6706685	CAPACITOR 6.8μF, 15V, 20% (C16)	1				
9	8602012	CONNECTOR 11 BERG STRIP HEADER	1				
10	8602006	HEADER POST	1				
11	9101129	CRYSTAL 12.273 MHz (Y1)	1				
12	9101128	" 12.188 MHz (Y2)	1				
13							
14	3202201	DIODE 1N4454 (CR1)	1				
15							
16							
17							
18	1301132	IC, SN 74S00	2				
19	134	" SN 74S37	2				
20	135	SN 74S20	1				
21	306	SN 10124	1				
22	307	SN 10125	1				
23	517	SN 74161	1				
24	330	SN 74LS04	1				
25	331	SN 74S04	3				
26	333	SN 74S02	1				
27	365	SN 74365	2				
28	430	SN 74S112	4				
29	431	SN 74S174	4				
30	532	SN 74S138	1				
31	554	" SN 74S153	1				
32	1301543	IC, SN 74S169	6				
33							
34							
35							
36							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		OWN Dave	9/1/4
PARTS RCVD BY		CHK	9/1/4
TO INVTY CROS		ENG	9/1/4
TO ACCOUNT		APVD	9/1/4

LIST OF MATERIALS

RAMTEK

TITLE: P.C. ASSY - (-03)
MULTI-RESOLUTION SYNC TIMING

REV E | SHEET 1 OF 2 | DWG NO. 502335-03

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR.

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
37							
38	502504	IC, SN74S287 PROM	1				
39	502505	" " "	1				
40	502506	" " "	1				
41	502509	" SN74S287 "	1				
42	502512	IC, MM6331 PROM	1				
43							
44							
45							
46	3121102	RESISTOR PAC (R12)	1				
47	3124511	RESISTOR PAC (R11)	1				
48							
49							
50	3109471	RESISTOR, 470Ω, 1/4W, 5% (R1, R2, R3, R4)	4				
51	3109102	RESISTOR, 1K Ω, 1/4W, 5% (R5)	1				
52	3109221	RESISTOR, 220Ω, 1/4W, 5% (R6)	1				
53	3109103	RESISTOR, 10K Ω, 1/4W, 5% (R7)	1				
54							
55							
56	9050004	SWITCH DIP (S1)	1				
		TOTAL					

		SIGNATURES		DATE
PARTS ISSUD BY		OWN	DAVE	9/7/84
PARTS RCVD BY		CHK		
TO INVTY CROS		ENG		
TO ACCOUNT		APVD		

RAMTEK

TITLE: P.C. ASSY - (-03) MULTI-RESOLUTION SYNC TIMING

REV	SHEET	OWG NO:
E	2 OF 2	502335-03

LIST OF MATERIALS

RC 1030

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR.

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502333	PC BOARD	1				
2	502334	LOGIC DIAGRAM	Ref				
3							
4							
5	6706336	CAPACITOR 33μF, 20V (C3, C4)	2				
6	6701104-3	CAPACITOR .1μF, (C5-C15)	11				
7	6702103-1	CAPACITOR .01μF, (C1, C2)	2				
8	6706685	CAPACITOR 6.8μF, 15V, 20% (C16)	1				
9	8602012	CONNECTOR 71 PIN BERG STEP HEADER	1				
10	8602006	HEADER POST	1				
11	9101129	CRYSTAL 12.273 MHz (Y1)	1				
12	9101119	CRYSTAL 10.910 MHz (Y2)	1				
13							
14	3202201	DIODE 1N4454 (CR1)	1				
15							
16							
17							
18	1301132	IC, SN 74S00	2				
19	134	" SN 74S37	2				
20	135	" SN 74S20	1				
21	306	" SN 10124	1				
22	307	" SN 10125	1				
23	517	" SN 74161	1				
24	330	" SN 74LS04	1				
25	331	" SN 74S04	3				
26	333	" SN 74S02	1				
27	365	" SN 74365	2				
28	430	" SN 74S112	4				
29	431	" SN 74S174	4				
30	532	" SN 74S138	1				
31	534	" SN 74S153	1				
32	1301543	IC, SN 74S169	6				
33							
34							
35							
36							
		TOTAL					

		SIGNATURES		DATE
PARTS ISSUD BY		OWN	DAVE	9/7/84
PARTS RCVD BY		CHK		9-11-84
TO INVTY CROS		ENG		9-11-84
TO ACCOUNT		APVD		9-11-84

RAMTEK

TITLE: P.C. ASSY, (-04) MULTI-RESOLUTION SYNC TIMING

REV	SHEET	OWG NO:
E	1 OF 2	502335-04

LIST OF MATERIALS

RC 1030

PRODUCTION ORDER

PREPARED BY: PRODUCTION MGR.

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

JOB NO:

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
37							
38	502504	IC, SN74S287 PROM	1				
39	502505	"	1				
40	502506	"	1				
41	502508	" SN 745287 "	1				
42	502511	IC, MM6331 PROM	1				
43							
44							
45							
46	3121102	RESISTOR PAC (R12)	1				
47	3124511	RESISTOR PAC (R11)	1				
48							
49							
50	3109471	RESISTOR, 470Ω, 1/4W, 5% (R1, R2, R3, R4)	4				
51	3109102	RESISTOR, 1KΩ 1/4W 5% (R5)	1				
52	3109221	RESISTOR, 220Ω, 1/4W, 5% (R6)	1				
53	3109103	RESISTOR, 10KΩ, 1/4W, 5% (R7)	1				
54							
55							
56	9050004	SWITCH DIP (S1)	1				
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY / RCVD BY		DWN Dave	9/1/76
TO INVTY CROS		CHK	
TO ACCOUNT		ENG	
		APVD	

LIST OF MATERIALS

RAMTEK

TITLE: P.C. ASSY, (-02) MULTI-RESOLUTION SYNC TIMING

REV: E | SHEET: 2 OF 2 | DWG NO: 502335-04

RC 1030

PRODUCTION ORDER

PREPARED BY: PRODUCTION MGR.

	ORIG REQUEST	PARTS AVAIL	BACK ORDERS
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

JOB NO:

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS -01	-02	TOT	ISS	STD COST EA	TOTAL
1	502341	P.C. BOARD, BACKPLANE 320X256	1	X				
2	502322	CONNECTOR MTG PLATE	1	1				
3	8602006	CONNECTOR, BERG	2	2				
4		(BERG 111TO THE FOLLOWING						
5		2-25 PIN, 1-3 PIN, 1-12 PIN)						
6	8601034	CONNECTOR, BERG 3 PIN	1	1				
7	3202215	DIODE, MBR1520 OR 1N5826	3	3				
8	8601090	CONNECTOR, BURNDY 12 PIN	1	1				
9	502323	BOARD ALIGNMENT CKT	1	1				
10	502346	POWER DIST. DIAG.	REF	REF				
11	3109221	RES, 220Ω, 1/4W, ±5%	1	1				
12	502785	P.C. BOARD, BACKPLANE 640X256	X	1				
13	8604023	SOCKET, BERG	2	2				
14	8604002	PIN BURNDY	6	6				
15								
16	3851187	3/16" FLAT BRAID	51"	51"				
17	3851250	3/4" FLAT BRAID	68"	68"				
18								
19	0299604	SCREW, PAN HD, 4-40, 3/8	16	16				
20	0299602	SCREW, PAN HD 4-40 X 1/4	3	3				
21	0299436	FLAT WASHER, NYLON, #4	2	2				
22	0299201	FLAT WASHER, #4	19	19				
23								
24	8606.04	RING LUG AMP RACO55, 5373	3	3				
25								
26	3913096	TWISTED PAIR WIRE, WHT-BLU	1/2	1/2				
27		#30 GW						
28	3854000	3/16" SHRINK TUBING YEL, BLU, BLK	1/2					
29	3854008	1/4" SHRINK TUBING RED, BLK, WHT	1/2					
		TOTAL						

		SIGNATURES	DATE
PARTS ISSUED BY / RCVD BY		CHK.	6/10/76
TO INVTY CROS		CHK	
TO ACCOUNT		ENG	6-7-76
		APVD	6-7-76

LIST OF MATERIALS

RAMTEK

TITLE: 320 x 256 BACKPLANE ASSY

SIZE: D | ASSEMBLY NO: 502340-__

-01 3100
-02 3200

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR

	JOB REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	BTO COST EA	TOTAL
1	502320	MAIN CHASSIS FAB	1				
2	502327	COVER, BOTTOM	1				
3							
4	502321	CARD GUIDE BRKT	6				
5	502324	INJECTOR-EJECTOR BRKT	2				
6	502312	ASSY, REAR PANEL	1				
7	502318-01	ASSY, FRONT PANEL	1				
8	502340-01	ASSY, MOTHER BOARD	1				
9	502335-01	ASSY, SYNC TIMING BD	*1				
10		WIRE, STRD, 14GA, WHT, 8" LONG	2				
11	8606104	TERMINAL LUG NO 6 #22-16 AWG #332	4				
12	502315	PC BD LOADING CONFIG.	REF				
13	502346-02	PWR DISTRIBUTION SCHEMATIC	REF				
14	502640	ASSY SYNC TIMING INTERCOM CABLE	1				
15	502339-02	ASSY, INTERNAL CABLE	1				
16	0100102	FAN	6				
17	8609101	TERMINAL BLOCK ZIERICK 334-11-04-001	1				
18							
19	07006003	CARD GUIDES BAR 1110 F	26				
20	0300107	LATCH, PUSHBUTTON PAULOC 6004	2				
21	0302001	BUSHING NYLON	2				
22	0705102	SPACER 1/4 LG #4 SOUTH 4006	5				
23	9550550	TIE BASE PANDUIT ABM 5-M	A/R				
24	0499482	NUT, NYLON 4-40	5				
25	0799652	SCREW 6-32 x 3/8 PAN HD, X RECESS SS	8				
26	0799602	SCREW #4-40 x 1/2	5				
27	0799902	SCREW MACH FLAT HD. X RECESS #6-32 x 1/2 LG 82°	26				
28	0799851	SCREW MACH FLAT HD X RECESS #4-40 x 1/4 LG 82°	14				
29	0799900	SCREW MACH FLAT HD. X RECESS #6-32 x 1/4 LG 82°	12				
30	0799600	SCREW MACH PAN HD. X RECESS #4-40 x 1/4 LG	20				
31	502335-02	ASSY, SYNC TIMING BOARD	*1				
32	502335-03	ASSY, SYNC TIMING BOARD	*1				
33	0799202	WASHER, FLAT #6	43				
34	0799201	WASHER, FLAT #4	25				
35	0799406	NUT, KEP #6	28				
36	0799402	NUT, KEP #4	16				
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY / RCVD BY		DWN	3/29/76
		CHK	
TO INVTY CROS		ENG	
TO ACCOUNT		APVD	7-8-76

RAMTEK

TITLE: FINAL ASSY MAIN CHASSIS -9100

REV	SHEET	DWG NO:
H	1 OF 2	502344-01

LIST OF MATERIALS

DCN 275

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR

	JOB REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	BTO COST EA	TOTAL
37	502669	IDENTIFICATION PLATE	1				
38	501578	MARKER STRIP CARD LOCATION	1				
39	0799805	SCREW, PAN HD #10-32 X .50	2				
40	0799801	SCREW, FLT HD, 6-32 x 3/8	2				
41	0799703	SCREW MACH PAN HD X RECESS 8-32 x 1/2 SS	2				
42	0799203	WASHER #8 SM	2				
43	0799410	NUT, KEP #8-32 SS	2				
44							
45							
46							
47							
48							
		NOTE:					
		* MARKETING TO SPECIFY					
		DASH NUMBER.					
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY / RCVD BY		DWN	
		CHK	
TO INVTY CROS		ENG	
TO ACCOUNT		APVD	

RAMTEK

TITLE: FINAL ASSY. MAIN CHASSIS-9100

REV	SHEET	DWG NO:
H	2 OF 2	502344-01

LIST OF MATERIALS

PRODUCTION ORDER

JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM I.D	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502449	FRONT PANEL ASSY	1				
2	0300110	PWB SCR - SPRING EJECT (SOURCE 63-16-910-24)	4				
3	9050056	SWITCH-N.W. PADDLE (SOURCE 63-16-910-24)	1				
4	9050057	SWITCH-N.W. PUSH (SOURCE 63-16-910-24)	1				
5	3203302	LED T1 3/4	2				
6	0302007	CLIP FOR LED	2				
7							
8	3600198	CONN, 12 PIN (SOURCE 3M #3412-)	1				
9							
10	8604002	CONTACT, PIN 28-22GA (SOURCE 3M #3421)	7				
11							
12							
13	3350550	8 WIRE BASE	2				
14	3350560	TIE WRAP	2				
15							
16	3912069	WIRE 22 AWG TP BLUE/WHT	A/R				
17	3913096	WIRE 20 AWG WHITE/BLU	A/R				
18	3859004	WIRE 22 AWG YELLOW	A/R				
19	3359003	WIRE 22 AWG ORANGE	A/R				
		TOTAL					

	ISSUED BY / RCVD BY	SIGNATURES	DATE
PARTS		OWN	9-23-76
		CHK	9-25-76
TO INVTY CROS		ENG	
TO ACCOUNT		APVD	9-25-76

RAMTEK

TITLE: FRONT PANEL ASSY 9300

REV: D | SHEET: 1 OF 1 | DWG NO: 502422

LIST OF MATERIALS

PRODUCTION ORDER

JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM I.D	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502434	CONNECTOR PLATE	1				
2							
3	502790	CABLE ASSY, CPU	1				
4	502789	CABLE ASSY, SERIAL LINK W/ISOLATOR	1				
5	5016814	COUPLE PLATE	2				
6	8604018	GUIDE PIN, MALE (SOURCE 3M #3434-1121-06)	3				
7	8604019	GUIDE PIN, FEMALE (SOURCE 3M #3434-1121-06)	5				
8	0703101	FASTENER 1/4 TURN (SOURCE 3M #5-32-1202-16)	4				
9	0302008	WIRE BRACING (SOURCE 3M #5-32-1101-32)	4				
10	0704101	EJECTOR SPRING (SOURCE 3M #5-32-1502-32)	4				
11	0703116	SPLIT RETAINER (SOURCE 3M #5-32-1101-00)	4				
12	9607006	HOLE PLUG (SOURCE 3M #3463)	2				
13		SCREW P.H.H. 4-40 X 3/8	8				
14	1703116	GROMMET STRIP (SOURCE 3M #5220)	A/R				
15		WASHER FLAT, #4	8				
16	0302006	INSULATING BUSHING	8				
17		NUT, KEP 4-40	8				
		TOTAL					

	ISSUED BY / RCVD BY	SIGNATURES	DATE
PARTS		OWN	9-23-76
		CHK	9-25-76
TO INVTY CROS		ENG	
TO ACCOUNT		APVD	9-25-76

RAMTEK

TITLE: CONNECTOR PLATE ASSY 9300

REV: A | SHEET: 1 OF 1 | DWG NO: 502423

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQ'D	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS -01	-02	TOT	ISS	STD COST EA	TOTAL
1	502441-C	PC BOARD	1	1				
2	502442	LOGIC DIAGRAM	REF	REF				
3								
4								
5	6706335G	CAPACITOR 33 UF, 25V	11	11				
6		C1,2,3,6,41,46,47,59,61,71,72						
7	6706685-1	CAPACITOR 6.8UF (C27)	1	1				
8	6701105-1	" 1UF, 50V	8	8				
9		C26,30,33,36 (4R THRU 45)						
10	6701104-3	CAPACITOR .1UF	53	53				
11		C4,5,(7 THRU 25),28,29,31,32,34,35						
12		(37 THRU 40),(43 THRU 58),(60 & 62 THRU 70),73						
13	6701472	CAPACITOR .0047UF (C74)	1	1				
14	6701103	" .01UF (C75)	1	1				
15								
16								
17	1301031	IC 74LS08 (5E, BJ)	2	2				
18	033	74LS21 (5H, 7K)	2	2				
19	105	7438 (8L)	1	1				
20	132	74S00 (8M, 5K)	2	2				
21	133	74LS00 (8D)	1	1				
22	134	74S37 (7G, 7B)	2	2				
23	136	74LS20 (6K)	1	1				
24	232	74LS32 (6E, BH)	2	2				
25	307	10125 (8B, 8G)	2	2				
26	330	74LS04 (6F, 8K, 6M)	3	3				
27	332	8T26 (4L, 4P, 5N, 5L, 6N)	7	7				
28	334	74LS02 (6H)	1	1				
29	336	74LS27 (6J)	1	1				
30	365	74365 (8S, 8R, 8P, 6P, 5P)	5	5				
31	401	74123 (5G)	1	1				
32	430	74S112 (6L)	1	1				
33	432	74LS174 (7M, 3L, 3K, 4N)	4	4				
34	435	74LS109 (7H, 7J, 7L, 6G)	4	4				
35	444	74S374 (6R, 6S)	2	2				
36	1301450	IC M66004 (3A TO 3H, 4A TO 4H)	16	16				
		TOTAL						

		SIGNATURES		DATE
PARTS ISSUD BY / RCVD BY		OWN	DMS	7-1-76
		CHK	DMS	9/8/76
TO INVTY CROS		ENG	[signature]	9-8-76
TO ACCOUNT		APVD	[signature]	9-8-76

RAMTEK

TITLE: PC ASSEMBLY MEMORY EXPANSION

LIST OF MATERIALS — REV: F — SHEET: 1 OF 2 — DWG NO: 502440

PRICE: 200 32T

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQ'D	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS -01	-02	TOT	ISS	STD COST EA	TOTAL
37	1301516	IC 74157 (2R, 5S, 4R, 4S, 3J, 3M)	6	6				
38	1301532	IC 74S138 (8J)	1	1				
39	1301536	IC 74S1601 (7N, 7P, 7R, 7S, 6M, 6N)	6	6				
40								
41								
42								
43								
44	3108680	RESISTOR 68Ω ±5%, ½W - (R3, R4)	2	2				
45	3108330	" 33Ω ±5%, ½W (R5, R6)	2	2				
46	3092072	" 2K ±5%, ¼W (R2)	1	1				
47	3109752	" 7.5K ±5%, ¼W (R1)	1	1				
48	3109102	" 1K ±5%, ¼W (R7)	8	8				
49		R8, 9, 10, 11, 12, 13, 14						
50	8608002	SOCKET 16 PIN IC	4	4				
51	8608008	SOCKET 24 PIN IC	28	28				
52	5015960-01	BUS BAR	18	18				
53	502432	STIFFENER	1	1				
54	0301106	CARD EJECTOR/INSERTER	2	2				
55	0301200	ROLL PIN (IP-062-0250)	5	5				
56								
57	502804	PROM 5610 (3P)	1	-				
58	502805	" " (3R)	1	-				
59	502806	" " (3N)	1	-				
60	502807	" " (3S)	1	-				
61	502728	PROM 512 X 8 (1A)	1	-				
62	* REF ONLY	I C PROM 512 x 8 (ROW 1 & 2)	27	-				
63		*NOTE: THE PROGRAM						
64		IS TO BE SPECIFIED BY						
65		MARKETING AND LOADED						
66		BY FINAL TEST.						
67	* REF. ONLY	PROM 1K X 8 (2708)	-	14				
68	503025	PROM 5610 (3P)	-	1				
69	503026	PROM 5610 (3R)	-	1				
70								
71								
72								
		TOTAL						

		SIGNATURES		DATE
PARTS ISSUD BY / RCVD BY		OWN	DMS	7-1-76
		CHK	DMS	9/8/76
TO INVTY CROS		ENG	[signature]	9-8-76
TO ACCOUNT		APVD	[signature]	9-8-76

RAMTEK

TITLE: PC ASSEMBLY MEMORY EXPANSION

LIST OF MATERIALS — REV: F — SHEET: 2 OF 2 — DWG NO: 502440

PRODUCTION ORDER

PREPARED BY: PRODUCTION MGR.

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

JOB NO.

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502447	VIDEO TYPE 1 PWB	1				
2	502498	LOGIC DIAGRAM	REF				
3	0301106	CARD EJECTOR, CALMARK	2				
4	502432	CARD EDGE STIFFENER	1				
5	0301200	ROLL PIN, 12-062-0250, GROOV-PIN	5				
6	502432	BOARD STIFFENER	1				
7		NUT, HEX 4/40, NYLON	6				
8		SCREW, CSK, 4/40 X 1/2"	6				
9		WASHER, 4/40, NYLON	6				
10	501596	BUS BAR, FS2000 BD	19				
11	502338	DAC COVER	3				
12		SLEEVING FOR #24 WIRE SIZE	A/R				
13	8608002	I.C. SOCKET, 16 PIN	4				
14		5J, 5H, 6F, 6E					
15		BUSS WIRE #24 AWG SOLID TINNED	A/R				
16							
17							
18							
19							
20	1301031	I.C. SN74LS08 (5F)	1				
21	134	SN74S37 (4C, 4D, 4A 3F)	4				
22	138	SN74S140 (3A)	1				
23	231	SN74S32 (3G)	1				
24	304	IM5003 (3E)	1				
25	307	10125 (8B)	1				
26	330	SN74LS04 (4F)	1				
27	331	SN74S04 (1G, 2G)	2				
28	430	SN74S112 (1D, 1C, 1B, 1A, 1F, 1E, 4B)	7				
29	431	SN74S174 (5A, 4F, 5G, 5A, 6D, 6K, 2A)	7				
30	432	SN74LS174 (3C, 3B, 3A, 5E, 5D, 7F, 7G, 7N, 7J, 7A, 7B, 7C, 7D)	13				
31	526	NE556A (2D)	1				
32	1301561	I.C. SN74S253 (6A, 6B, 6C, 6D, 6H, 6J)	6				
33							
34							
35							
36							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY		OWN:	7-19-76
PARTS RCVD BY		CHK	8/2/76
TO INVTY CROS		ENG	8/11/76
TO ACCOUNT		APVD	8/11/76

RAMTEK

TITLE: PC ASSEMBLY VIDEO TYPE I

REV	SHEET	DWG NO.
J	1 OF 5	502446

LIST OF MATERIALS

PRODUCTION ORDER

PREPARED BY: PRODUCTION MGR.

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

JOB NO.

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
37	1301318	OP AMP LH0002	18				
38		5P5R, 5N, 5L, 6R, 6P, 6N, 6L, 8R,					
39		8P, 8N, 8L, 3P, 3L, 3N, 1N, 1L, 1P					
40	REF ONLY *	PROM 93446-DC 5J, 5H, 6F, 6E	4				
41		NOTE: THE PROGRAM IS TO BE					
42		SUPPLIED BY MARKETING &					
43		THE PROMS LOADED BY FINAL TEST					
44	6701103	CAPACITOR .01UF C45, 46, 179	3				
45	6701104-2	CAPACITOR .1UF (.2 SPACING)	166				
46		C85-C30 90 91 93 95 96 97 99 101					
47		102 103 105 107 108 110 112 113 114 116 118					
48		119 120 122 124 125 126 128 130 131 132					
49		133 135 137 138 139 141 143 144 145 147 149					
50		150 151 153 155 156 158 160 161 162 164					
51		166 167 168 170 172 173 174 176 178 179					
52							
53	6701104-1	CAPACITOR .1UF (.1 SPACE)	21				
54		C66-C70, 72-79, 81-87, 89					
55							
56							
57	6701104-3	CAPACITOR .1UF (.25 SPACING)	17				
58		C1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 41, 44, 51, 58,					
59		62, 64, 65					
60							
61	6701105	CAPACITOR 1UF 50V	35				
62		C16 THRU 24, 32 THRU 40,					
63		42, 43, 47, 48, 49, 50, 52, 53, 54, 55, 56,					
64		57, 59, 60, 61, 63, 180					
65							
66	6706685	CAPACITOR 6.8UF 15V 20%	30				
67		C94, 92, 98, 100, 104, 106, 109, 111, 115,					
68		117, 121, 123, 127, 129, 134, 136, 140, 142,					
69		146, 148, 152, 154, 157, 159, 163, 165					
70		169, 171, 175, 177					
71							
72							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY		OWN	7-19-76
PARTS RCVD BY		CHK	8/2/76
TO INVTY CROS		ENG	8/2/76
TO ACCOUNT		APVD	8/11/76

RAMTEK

TITLE: PC ASSEMBLY VIDEO TYPE I

REV	SHEET	DWG NO.
J	2 OF 5	502446

LIST OF MATERIALS

PRODUCTION ORDER

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
73	6703336	CAPACITOR, 33 μF, 20V, 20%	5				
74		C3, 6, 9, 12, 15					
75							
76	6707470	CAPACITOR, 47PF 5%	3				
77		C80, 71, 88					
78							
79							
80							
81							
82	6901103	INDUCTOR, 100 μH	5				
83							
84	3109100	RESISTOR, 10Ω, ¼W, 5%	18				
85		R9, 16, 63, 181, 82, 90, 99, 109, 125,					
86		133, 139, 147, 155, 163, 175,					
87		189, 197, 117					
88							
89	3109680	RESISTOR, 68Ω, ¼W, 5%,	15				
90		R210 THRU R224					
91							
92	3109271	RESISTOR, 270Ω, ¼W, 5%,	24				
93		R2, 4, 6, 8, 12, 14, 16, 18, 29, 31, 33,					
94		35, 39, 41, 43, 45, 56, 58, 60, 62,					
95		66, 68, 70, 72					
96							
97	3109301	RESISTOR, 300Ω, ¼W, 5%	15				
98		R83, 91, 100, 108, 124, 132, 140,					
99		148, 156, 164, 172, 180, 188, 196					
100		116					
101	3109471	RESISTOR, 470Ω, ¼W, 5%	1				
102		R237					
103							
104	3109221	RESISTOR, 220Ω, ¼W, 5%	12				
105		R225 THRU R236					
106							
107	3109334	RESISTOR 330K ¼W 5%	2				
108		R203, 204					
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		DWN	7.19.76
PARTS RCVD BY		CHK	8/3/76
TO INVTY CROS		ENG	9/1/76
TO ACCOUNT		APVD	9/3/76

RAMTEK

TITLE: PC ASSEMBLY VIDEO TYPE 1

REV J | SHEET 3 OF 5 | DWG NO 502446

LIST OF MATERIALS

85 1078

PRODUCTION ORDER

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
109	3109511	RESISTOR, 510Ω, ¼W, 5%	24				
110		R1, 3, 5, 7, 11, 13, 15, 17, 28, 30, 32, 34,					
111		38, 40, 42, 44, 55, 57, 59, 61, 65, 67,					
112		69, 71					
113							
114							
115							
116	3109681	RESISTOR, 680Ω ¼W, 5%	15				
117		R85, 94, 102, 110, 118, 126, 134,					
118		142, 150, 158, 166, 174, 182, 190					
119		198					
120							
121	3109102	RESISTOR, 1K, ¼W, 5%, R205	1				
122							
123	3103102	RESISTOR, 1K, .3W, .1% (VISHAY)	9				
124		R20, 22, 24, 47, 49, 51, 74, 76, 78					
125							
126	3103202	RESISTOR, 2K, .3W, .1% (VISHAY)	16				
127		R19, 21, 23, 25, , 27, 46, 48, 50,					
128		52, , 54, 73, 75, 77, 79, 80, 81					
129							
130							
131							
132	3109332	RESISTOR, 3.3K, ¼W, 5%, R10	3				
133		R37, R64					
134	3109272	RESISTOR, 2.7K, ¼W, 5%	30				
135		87, 88, 96, 97, , 104,					
136		105, 112, 113, 120, 121,					
137		128, 129, 136, 137, 144,					
138		145, 152, 153, 160, 161,					
139		168, 169, 176, 177,					
140		184, 185, 192, 193, 200					
141		201					
142							
143							
144							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		DWN	7.19.76
PARTS RCVD BY		CHK	8/3/76
TO INVTY CROS		ENG	9/1/76
TO ACCOUNT		APVD	9/3/76

RAMTEK

TITLE: PC ASSEMBLY VIDEO TYPE 1

REV J | SHEET 4 OF 5 | DWG NO 502446

LIST OF MATERIALS

PRODUCTION ORDER

JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
145	3109103	RESISTOR, 10K, ¼W, 5%,	4				
146		R206 THRU R209					
147							
148	3109104	RESISTOR, 100K, ¼W, 5%	15				
149		R84, 92, 101, 107, 123, 131, 141,					
150		149, 157, 165, 171, 179, 187, 195, 115					
151							
152	3121102	RESISTOR PACK, 898-1-R1K	5				
153		8A, 8E, 8H, 8J, 7E					
154							
155	3122471	RESISTOR PACK, 898-3-R470, 3Ω	1				
156							
157							
158							
159	3202216	DIODE, IN4448, CR1 THRU CR12	12				
160							
161	3201119 *	TRANSISTOR, 2N3646	12				
162		Q1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23					
163							
164	3201107	TRANSISTOR, 2N4258	19				
165		Q25 THRU Q43					
166							
167	3201107-01	TRANSISTOR (FAIRCHILD) 2N4250	12				
168		Q2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24					
169							
170							
171	*	NOTE: ALL 2N3646 TRANSISTORS					
172		USED MUST BE FAIRCHILD					
173							
174	3109621	RESISTOR, 620Ω, ¼W, 5%	15				
175		R89, 98, 106, 114, 122, 130, 138					
176		146, 154, 162, 170, 178, 186, 194, 202					
177							
178	3109302	RESISTOR, 3K, ¼W, 5%	15				
179		R86, 95, 103, 111, 119, 127, 135, 143,					
180		151, 159, 167, 175, 183, 191, 199					
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY		DWN	7-19-72
PARTS RCVD BY		CHK	8/3/72
TO INVTY CROS		ENG	7/26/72
TO ACCOUNT		APVD	9/1/72

RAMTEK

TITLE PC ASSEMBLY VIDEO TYPE 1

REV J | SHEET 2 OF 2 | DWG NO 502416

LIST OF MATERIALS

PRODUCTION ORDER

JOB NO:

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502451-C	P.C. BOARD	1				
2	502548	LOGIC DIAGRAM	REF				
3	1301030	I.C. 74S08 (4D, 8D)	2				
4	031	74LS08 (4C, 4R, 5E)	3				
5	033	74LS21 (7E, 4G)	2				
6	105	7438 (4B, 5B, 9L, 9M)	4				
7	132	74S00 (2D, 4F, 4J, 4M)	4				
8	133	74LS00 (3S, 9K)	2				
9	134	74S37 (9C)	1				
10	135	74S20 (2L, 4P, 7L)	3				
11	140	74H00 (8J)	1				
12	231	74S32 (7F, 9E)	2				
13	232	74LS32 (2C, 4N, 7G)	3				
14	307	10125 (9B, 9J)	2				
15	330	74LS04 (4S, 9H)	2				
16	331	74S04 (1V, 4E, 4K, 8L)	4				
17	332	8T26 (1P, 1R, 6L, 6P, 6R,	13				
		6S, 6T, 7N, 7P, 7S, 8N, 8P, 8S)					
18	333	74S02 (4L)	1				
19	334	74LS02 (7D 7T)	2				
20	350	DS0026CN (8T)	1				
21	365	74365 (5P, 5R, 5S, 5T,	14				
		7H, 7K, 8F, 8G, 8H, 9F, 9G, 9U, 9V, 9W)					
22	366	74366 (9D, 9N, 9P)	3				
23	431	74S174 (3B, 6F,	6				
		8B, 8C, 9R, 9S)					
24	432	74LS174 (1G, 1H, 2E,	9				
		2F, 6K, 7R, 8K, 8M, 8R)					
25	433	74LS194 (3M, 3N)	2				
26	435	74LS109 (1C, 3L, 3P,	7				
		4H, 6J, 7J, 8E)					
27	445	74170 (6N, 6U, 7M)	3				
28	531	74S86 (3R, 5J)	2				
29	1301532	I.C. 74S138 (2N, 2R)	2				
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY		DWN	
PARTS RCVD BY		CHK	
TO INVTY CROS		ENG	
TO ACCOUNT		APVD	8-1-72

RAMTEK

TITLE PC ASSEMBLY MULTI-RESOLUTION CONTROL QD

REV M | SHEET 1 OF 4 | DWG NO 502450-01

LIST OF MATERIALS

PRODUCTION ORDER

PREPARED BY		ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION MGR	PRODUCTION UNITS (ASSY)			
	SCHEDULED BEGIN			
	SCHEDULED COMPLETION			

JOB NO.

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
30	1301535	IC. 74S157 (5F,5G,5H)	3				
31	539	74S158 (6G,6H)	2				
32	541	74LS51 (3K)	1				
33	543	74S169 (1D.1F.2G,	15				
		2J,2H,3D,3E,3F,3G,3H,3J,					
		5A,5L,5M,5N)					
34	544	74LS151 (2A,2B,5C,5D	4				
35	545	74LS157 (1L,1M,1N,5K)	4				
36	552	74S168 (1E,2K)	2				
37	538	AY52513 (2R)	1				
	436	74S194 (7C)	1				
38	426	9ILI2C (4U,4V,5U,5V)	4				
39	1301600	IC 8080A-1 (7V)	1				
40	1301517	IC 7416/ (9A)	1				
41		CONT. ON SHT. 3					
42							
43	3121102	RES, DIP, 1K Ω, 898-1-R1.0K,	5				
		(6V,6M,9T,1S,4W)					
44	9050020	SWITCH, DIP, (S2) (1U)	1				
45	9050077	SWITCH, TOGGLE (S1)	1				
46	3202200	DIODE, IN914 (CR1)	1				
47	3203302	LED TIL 220	1				
48	3109220	RES, 22 Ω, 1/4W 5% (R2,R3)	2				
49	3109510	51 Ω, 1/4W 5% (R7-R16)	10				
50	3109101	100 Ω, 1/4W 5% (R1)	1				
51	3109471	470 Ω, 1/4W 5% (R6)	1				
52	3109102	1K, 1/4W 5% (R17-R25, R27-R35)	18				
	3109221	220 Ω, 1/4W, 5% (R26)	1				
	3109103	RES 10K, 1/4W, 5% (R24 R25)	2				
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY		OWN	
PARTS RCVD BY		CHK	
TO INVTY CROS		ENG	
TO ACCOUNT		APVD	

RAMTEK

TITLE P.C. ASSEMBLY MULTI-RESOLUTION CONTROL BD

REV M | SHEET 2 OF 4 | DWG NO: 502450-01

LIST OF MATERIALS

PRODUCTION ORDER

PREPARED BY		ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION MGR	PRODUCTION UNITS (ASSY)			
	SCHEDULED BEGIN			
	SCHEDULED COMPLETION			

JOB NO.

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
53	6701104-3	CAP 0.1 UF C5 THRU C8, C50, 51, 58, 69, 79, 81	10				
54	6104085	6.8 UF C3, C4, C9, C10	4				
55	6101104-2	0.1 UF C13 THRU C49, C52 THRU C57 C59 THRU C68, 70, 71, 73, 74, 75, 78, 79	61				
56	6706336	33 UF C11, C12	2				
57	6702251	250 PF C2	1				
58	6702501	CAP 500 PF C1	1				
59	8608008	LOW PRO 24 PIN IC SOCKET	4				
60	8608009	LOW PRO. 40 PIN IC SOCKET	1				
61	502432	STIFFENER, EDGE	1				
62	03012200	ROLL PIN (.062)	7				
63							
64	0301106	CARD EJECTOR/INSERTER	2				
65							
66	502571	IC PROM 6E	1				
67	572	6C	1				
68	573	6D	1				
69	574	6A	1				
70	575	6B	1				
71	619	7B	1				
72	620	7A	1				
73	621	8A	1				
74	589	3A	1				
75	590	3C	1				
76	633	3W	1				
77	592	3V	1				
78	593	4T	1				
79	594	3U	1				
80	595	3T	1				
81	605	1J	1				
82	606	1K	1				
83	607	2W	1				
84	608	2V	1				
85	609	2T	1				
86	502610	IC PROM 2S	1				
87	6702101	CAPACITOR 100 PF (C76)	1				
88	8608002	SOCKET	17				
89	6702302	CAPACITOR 3000 PF (C80)	1				

		SIGNATURES	DATE
PARTS ISSUED BY		OWN	6-11-76
PARTS RCVD BY		CHK	
TO INVTY CROS		ENG	
TO ACCOUNT		APVD	

RAMTEK

TITLE P.C. ASSEMBLY MULTI-RESOLUTION CONTROL BD

REVISION: M | SHEET 2 OF 4 | DWG NO: 502450-01

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO.

PREPARED BY: | PRODUCTION MGR: | PRODUCTION UNITS (ASSY) | SCHEDULED BEGIN / COMPLETION | ORIG REQUEST | PARTS AVAIL | BACK ORDER

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
90		MACHINE SCREW, NYLON 4-40 x 1/4	6				
91		HEX NUT, NYLON, 4-40	6				
92		FLAT WASHER, NYLON 4-40	12				
93	502450	STIFFENER	1				
		TOTAL					

		SIGNATURES		DATE
PARTS ISSUD BY / RCVD BY		DWN	RON	4/4/77
TO INVTY CROS		CHK		
TO ACCOUNT		ENG		
LIST OF MATERIALS		APVD		

RAMTEK

TITLE: PC ASSY MULTI-RESOLUTION CONTROL BOARD

REV: M | SHEET: 4 OF 4 | DWG NO: 502450-01

PRODUCTION ORDER — JOB NO.

PREPARED BY: | PRODUCTION MGR: | PRODUCTION UNITS (ASSY) | SCHEDULED BEGIN / COMPLETION | ORIG REQUEST | PARTS AVAIL | BACK ORDER

REV NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502451-01	P.C. BOARD	1				
2	502548	LOGIC DIAGRAM	REF				
3	1301030	I.C. 74S03 (9D, 8J)	2				
4	031	74LS08 (4C, 4R 5E)	3				
5	033	74LS21 (7E, 4G)	2				
6	105	7433 (4B, 5B, 9L, 3M)	4				
7	132	74S00 (2D, 4F, 4J, 4K)	4				
8	133	74LS00 (3S, 9K)	2				
9	134	74S37 (9C)	1				
10	135	74S20 (2L, 4P, 7L)	3				
11	140	74H00 (8J)	1				
12	231	74S32 (7F, 9E)	2				
13	232	74LS32 (2C, 4H, 7G)	3				
14	307	10125 (9B, 9J)	2				
15	330	74LS04 (4S, 9H)	2				
16	331	74S04 (1V, 4E 4K, 8L)	4				
17	332	8T26 (1P, 1R, 6L, 6P, 6R, 6S, 6T, 7N, 7P, 7S, 8N, 3P, 6S)	13				
18	333	74S02 (4L)	1				
19	334	74LS02 (7D 7T)	2				
20	350	DS0026CN (8T)	1				
21	365	74365 (5F, 5R, 5S, 5T, 7H, 7K, 8F, 3G, 8H, 9F, 9G, 3D, 7V, 9W)	14				
22	366	74366 (9D, 9N, 3P)	3				
23	431	745174 (3B, 6F, 8B, 8C, 9R, 9S)	6				
24	432	74LS174 (1G, 1H, 2E, 2F, 6K, 7R, 8K, 9N, 5R)	9				
25	433	74LS194 (3N, 3R)	2				
26	435	74LS164 (1C, 3L, 3P, 4H, 6J, 7J, 3E)	7				
27	445	74170 (6N, 6U, 7N)	3				
28	531	7485 (3R, 5J)	2				
29	1301532	I.C. 74S133 (2N, 2P)	2				

RAMTEK

TITLE: PC ASSEMBLY MULTI-RESOLUTION CONTROL BD.

REV: M | SHEET: 1 OF 4 | DWG NO: 502450-02

PRODUCTION ORDER — JOB NO:

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	PART REQMNTS TOT	PART REQMNTS ISS	STD COST EA	STD COST TOTAL
30	1301535	I.C. 74S157 (5F,5G,5H)	3				
31	539	74S158 (6G,6H)	2				
32	541	74LS51 (3K)	1				
33	543	74S169 (1D,1F,2G,	15				
		2J,2H,3D,3E,3F,3G,3H,3J,					
		5A,5L,5M,5N)					
34	544	74LS151 (2A,2B,5C,5D	4				
35	545	74LS157 (1L,1M,1N,5K)	4				
36	552	74S168 (1E,2K)	2				
37	538	AY52513 (2R)	1				
	436	74S194 (7C)	1				
38	426	91L12C (4U,4V,5U,5V)	4				
39	1301600	I.C. 8080A-1 (7V)	1				
40	1301517	I.C. 7416 1 (9A)	1				
41		CONT ON SHT 3					
42							
43	3121102	RES,DIP, 1K Ω, 8R3-1-R1.0K,	5				
		(6V,6M,9T,1S,9N)					
44	9050020	SWITCH,DIP,(S2)(1U)	1				
45	9050077	SWITCH, TOGGLE (S1)	1				
46	3202200	DIODE, IN914 (CR1)	1				
47	3203302	LED TIL 220	1				
48	3109220	RES, 22 Ω, 1/4W ±5% (R2,R3)	2				
49	3109510	51 Ω, 1/4W ±5% (R7-R16)	10				
50	3109101	100 Ω, 1/4W ±5% (R1)	1				
51	3109471	470 Ω, 1/4W ±5% (R6)	1				
52	3109102	1K, 1/4W ±5% (R17-R25, R27-R36)	18				
-							
-	3109103	RES 10K, 1/4W, 5% (R4,R5)	2				
-	3109221	RES 220 Ω, 1/4W, 5% (R24)	1				
		TOTAL					

	SIGNATURES	DATE
PARTS ISSUED BY	DWN	
PARTS REVD BY	CHK	
TO INVENTORY	ENG	
TO ACCOUNT	REVD	

RAMTEK

TITLE: P.C. ASSEMBLY MULTI-RESOLUTION CONTROL BD

REVISION LETTER: M | SHEET 1 OF 4 | DWG NO: 502450-02

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO:

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	PART REQMNTS TOT	PART REQMNTS ISS	STD COST EA	STD COST TOTAL
53	6701104-3	CAP 0.1 UF C5 THRU C8, C50, 51, 58, 68, 72	9				
54	6706085	6.8 UF C3, C4, C9, C10	4				
55	6701104-2	0.1 UF C13 THRU C49, C52 THRU C57 C59 THRU C67, 69, 70, 73, 74, 75	59				
56	6706336	33 UF C11, C12	2				
57	6702251	250 PF C2	1				
58	6702501	CAP 500 PF C1	1				
59	8608085	LOW PRO 24 PIN IC SOCKET	4				
60	8608009	LOW PRO. 40 PIN IC SOCKET	1				
61	502432	STIFFENER, EDGE	1				
62	0301200	ROLL PIN (.062)	7				
63							
64	0301106	CARD EJECTOR/INSERTER	2				
65	6707470	CAPACITOR, 47 PF (C71)	1				
66	502571	I.C. PROM 6E	1				
67	572	6C	1				
68	573	6D	1				
69	574	6A	1				
70	575	6B	1				
71	619	7B	1				
72	620	7A	1				
73	621	8A	1				
74	589	3A	1				
75	590	3C	1				
76	633	3W	1				
77	592	3V	1				
78	593	4T	1				
79	594	3U	1				
80	595	3T	1				
81	605	1J	1				
82	606	1K	1				
83	611	2W	1				
84	502612	I.C. PROM 2V	1				
85							
86							
87	6702101	CAPACITOR 100 PF (C76)	1				
88	8602002	SOCKET	17				
89	6702302	CAPACITOR 3000PF (C80)	1				

	SIGNATURES	DATE
PARTS ISSUED BY	DWN	6-17-81
PARTS REVD BY	CHK	
TO INVENTORY	ENG	
TO ACCOUNT	REVD	

RAMTEK

TITLE: P.C. ASSEMBLY MULTI-RESOLUTION CONTROL BD

REVISION LETTER: M | SHEET 2 OF 4 | DWG NO: 502450-02

LIST OF MATERIALS

PRODUCTION ORDER

PREPARED BY		ORIG REQUEST	PARTS AVAIL	BACK-ORDER	JOB NO.
PRODUCTION MGR	PRODUCTION UNITS (ASSY)				
	SCHEDULED BEGIN				
	SCHEDULED COMPLETION				

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT		199	STD COST EA	TOTAL
90		MACHINE SCREW, NYLON 4-40x1/4	6					
91	0799482	HEX NUT NYLON 4-40	6					
92	0799456	FLAT WASHER	12					
93	502450	STIFFENER	1					
		TOTAL						

		SIGNATURES		DATE	RAMTEK
PARTS ISSUD BY		DWN	RON	4-4-7	TITLE: PC. ASSY MULTI-RESOLUTION CONTROL BOARD
PARTS RCVD BY		CHK			
TO INVTY CRDS		ENG			
TO ACCOUNT		APVD			REV M · SHEET 4 OF 4 · DWG NO 502450-02

LIST OF MATERIALS

PRODUCTION ORDER

PREPARED BY		ORIG REQUEST	PARTS AVAIL	BACK-ORDER	JOB NO.
PRODUCTION MGR	PRODUCTION UNITS (ASSY)				
	SCHEDULED BEGIN				
	SCHEDULED COMPLETION				

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT		199	STD COST EA	TOTAL
1	8601200	CONN, 104 PIN	1					
2								
3	8604030	PIN, COAX	9					
4								
5								
6	3899120	CABLE, COAX (RG174\U)	A/R					
7								
8	502634	PANEL, DISTRIBUTION	1					
9	302006	INSULATED BUSHING	18					
10								
11	8604018	GUIDE PIN, MALE	3					
12	8604019	GUIDE PIN, FEMALE	1					
13	3850099	10 COND RIBBON CABLE	A/R					
14								
15	8604002	PIN, 22 AWG (SM20M-1027)	8					
16								
17	8605501	HOOD, CONNECTOR	1					
18	8611109	CONN, BNC	9					
19								
20								
21	8601190	CONN, PLUG	4					
22								
		TOTAL						

		SIGNATURES		DATE	RAMTEK
PARTS ISSUD BY		DWN	[signature]	7-31-76	TITLE: ASSEMBLY DISTRIBUTION PANEL
PARTS RCVD BY		CHK			
TO INVTY CRDS		ENG	[signature]	7/31/76	
TO ACCOUNT		APVD	[signature]	8-3-76	REV A · SHEET 1 OF 1 · DWG NO 502635

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO.

PREPARED BY — ORIG REQUEST — PARTS AVAIL — BACK-ORDER

PRODUCTION MGR — PRODUCTION UNITS (ASSY) — SCHEDULED BEGIN / COMPLETION

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502642	P.C.B. FABRICATION	1				
2	502643 Rev B	LOGIC DIAGRAM	REF				
3							
4							
5	1301024	I.C., SN74H21 - 7C, 8A	2				
6	030	SN74S08 - 5C, 10D	2				
7	031	SN74LS08 - 4M, 4P,	6				
		4R, 4S, 7U, 10L					
8	033	SN74LS21 4N	1				
9	105	SN7438 - 9L	1				
10	108	SN7430 - 8S	1				
11	132	SN74S00 - 3S, 5M, 4F	3				
12	133	SN74LS00 - 3T, 3N,	5				
		9S, 10F, 10S					
13	134	SN74S37 - 10A, 10B	2				
14	135	SN74S20 - 6D, 8D, 8B	3				
15	136	SN74LS20 - 3S, 5S, 5T	3				
16	231	SN74S32 - 5F, 7F	2				
17	232	SN74LS32 - 2P, 4T	2				
18	303	SN7427 - 4B	1				
19	305	SN75182 - 6N, 6M	2				
20	307	10125 - 10C	1				
21	309	SN75183 - 6P, 7N	2				
22	330	SN74LS04 - 1S, 2U,	5				
		3R, 9T, 10T					
23	331	SN74S04 - 4C, 5P, 6B,	8				
		8M, 9M, 9C, 9B, 10M					
24	332	8T26 - 8P, 9P, 10P	3				
25	333	SN74S02 - 4A, 5D, 7D	3				
26	336	SN74LS27 - 2J, 2M	2				
27	337	SN74S260 - 5E, 6E, 6C,	6				
		7E, 8E, 8C					
28	338	SN75188 - 7P	1				
29	339	SN75189 - 7M	1				
30	1301365	I.C., SN74365 - 9U, 10U	2				
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		DWN N. P. Fagan	8/24/70
PARTS RCVD BY		CHK Carl / R. L.	10/22/70
TO INVTY CRDS		ENG Carl / R. L.	10/22/70
TO ACCOUNT		APVD	10/22/70

RAMTEK

TITLE: P.C.B. ASSEMBLY, SERIAL LINK

REV: B — SHEET: 1 OF 3 — DWG NO: 502641

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO.

PREPARED BY — ORIG REQUEST — PARTS AVAIL — BACK-ORDER

PRODUCTION MGR — PRODUCTION UNITS (ASSY) — SCHEDULED BEGIN / COMPLETION

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
31	1301366	I.C., SN74366 - 8U, 8N,	6				
		9N, 9R, 10R, 10N					
32	430	SN74S112 - 5B, 7A, 9F	3				
33	431	SN74S174 - 2D, 5R	5				
		5A, 6A, 10E					
34	432	SN74LS174 - 2T, 4D, 4E,	8				
		5N, 7R, 7S, 7T, 8R					
35	435	SN74LS109 - 3U, 3M, 4U	3				
36	504	TR1602 - 3G, 3H, 3K, 3L	4				
37	507	SN74LS153 - 9H, 10H	5				
		9G, 9J, 10J					
38	522	MM5307 - 1P, 1R	2				
39	531	SN74S86 - 7B, 10K	2				
40	543	SN74S169 - 3A, 3B, 5L,	24				
		5G, 5H, 5J, 5K, 6F, 6G, 6H,					
		6J, 6K, 6L, 7G, 7H, 7J, 7K,					
		7L, 8F, 8G, 8H, 8J, 8K, 8L					
41	544	SN74LS151 - 1E, 1F, 2F	3				
42	545	SN74LS157 - 3D, 3E,	4				
		5U, 10G					
43	1301549	I.C., SN74LS138 - 2K, 2L, 2M	8				
		3P, 6R, 6S, 6T, 6U					
44	502795	PROM, PROGRAMMED - 2E	1				
45	502796	- 2F	1				
46	502797	- 2G	1				
47	502798	PROM - PROGRAMMED - 2H	1				
48							
49	502328	STIFFENER, BOARD	1				
50	0799482	NUT, HEX 4/40, NYLON	6				
51	0799433	SCREW, CSK, 4/40 x ½", NYLON	6				
52	0799456	WASHER, 4/40, NYLON	6				
53							
54							
55	9050020	SWITCH - 1N, 1K, 1G, 2R, 8T	5				
56							
57							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		DWN N. P. Fagan	8/24/70
PARTS RCVD BY		CHK Carl / R. L.	10/22/70
TO INVTY CRDS		ENG Carl / R. L.	10/22/70
TO ACCOUNT		APVD	

RAMTEK

TITLE: P.C.B. ASSEMBLY, SERIAL LINK

REV: B — SHEET: 2 OF 3 — DWG NO: 502641

LIST OF MATERIALS

PRODUCTION ORDER

JOB NO.

PREPARED BY

PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
58	3109471	RES, 470Ω, 1/4W, ±5% –	2				
		R3, R4					
59	3121102	RES PACK, 1K, 898-1-1K, -	2				
		1M, 1H					
60	3109102	RES, 1K, 1/4W, ± 5% –	3				
		R1, R2, R5					
61	6701104-3	CAP, 0.1 MF (.250 SPACING)	4				
		C19, 27, 30, 37					
63							
64	6701104-2	CAP, 0.1MF (.200 SPACING)	56				
		C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16,					
		17, 18, 20, 21, 22, 23, 24, 25, 26, 28					
		29, 31, 32, 33, 34, 35, 36, 38, 39,					
		40, 41, 42, 43, 44, 45, 46, 47, 48, 49,					
		50, 51, 52, 53, 54, 55,					
		74, 76, 77, 78, 79					
65	6702501	CAP, 500 PF (.250 SPACING)	8				
		C64, 65, 66, 69, 70, 71, 72, 75					
66	6706336	CAP, 33 MF – C56, 57, 58,	5				
67		59, 60					
68	6701103	CAP, .01MF (.150 SPACING)	4				
		C63, 67, 68, 73					
70	9101123	CRYSTAL 0.9216 MHZ – Y1	1				
71							
72							
73	0301106	CARD EJECTOR/INSERTOR	2				
74							
75	502432	CARD EDGE STIFFNER	1				
76							
77	0301200	ROLL PIN, 12-062-0250,	5				
		GROOVE PIN					
78							
79	8608002	I.C. SOCKET, 16 PIN –	4				
		2E, 2F, 2G, 2H					
		TOTAL					

		SIGNATURES		DATE
PARTS ISSUD BY		OWN	WP Fagan	8/24/76
PARTS RCVD BY		CHK	[illegible]	9/21/76
TO INVTY CROS		ENG	[illegible]	9/21/76
TO ACCOUNT		APVD		

RAMTEK

TITLE PC. B. ASSEMBLY, SERIAL LINK

REV	SHEET	DWG NO.
B	3 OF 2	502641

LIST OF MATERIALS

PRODUCTION ORDER

JOB NO:

PREPARED BY

PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
1	502425	FAN Housing	1				
2							
3							
4	0100100	FAN Ramtek 4600C	6				
5	501973	FINGER GUARD	6				
6	8609101	TERMINAL BLOCK Cinch 141-11-04-001	1				
7	502438	POWER DISTRIBUTION DIAGRAM	REF				
8							
9	0799655	SCREW, PAN HD, 6-32 x 3/4	24				
10	0799656	SCREW, PAN HD, 6-32 x 5/8	2				
11	0707110	TERM. STRIP JUMPERS Cinch 141-9-W-01-3	2				
12	3859009	WIRE, 22 AWG, WHITE	A/R				
13	3859006	WIRE, 22 AWG, BLUE	A/R				
14	8631101	TERM NUT, SPACE Keystone 2340x5	8				
15		WASHER, FLAT NO. 6	26				
16	9550350	TIE WRAP BASE Panduit SST-1-C	3				
17	9550360	TIE WRAP Panduit SST-M	9				
18	8606106	TERMINAL LUG Amp 34152-2	2				
19	0799406	NUT, KEP 6-32	26				
		TOTAL					

		SIGNATURES		DATE
PARTS ISSUD BY		OWN	[illegible]	8-25-76
PARTS RCVD BY		CHK	[illegible]	8-25-76
TO INVTY CROS		ENG		
TO ACCOUNT		APVD	[illegible]	8-25-76

RAMTEK

TITLE FAN HOUSING ASSY 7300

REV	SHEET	DWG NO.
B	1 OF 1	502, 51

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO

PREPARED BY		ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION MGR	PRODUCTION UNITS (ASSY)			
	SCHEDULED BEGIN			
	SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT		ISS	STD COST EA	TOTAL
1	8601200	CONN, 104 PIN (BURNDY M5104PM-410)	1					
2								
3	8604046	PIN, COAX, MALE	34					
4								
5								
6	3899120	CABLE, COAX (RG174/U)	A/R					
7								
8	502768	PANEL, DISTRIBUTION	1					
9	0302006	BUSHING, INSULATED	68					
10								
11	8604018	PIN, MALE GUIDE (BURNDY M2104PM-401R)	2					
12	8604019	PIN, FEMALE GUIDE (BURNDY M2104PF-01RS)	2					
13		CABLE, 20 COND RIBBON	A/R					
14								
15	8604002	PIN, 22 AWG (SM20M-1027)	24					
16								
17	8605501	HOOD, CONN. (BURNDY M5H104-1)	1					
18	8611109	CONN, BNC (AMP 1-331693-2)	34					
19								
20								
21	8601190	CONN, PLUG (BURNDY SMSZP-1)	12					
		TOTAL						

		SIGNATURES	DATE
PARTS ISSUD BY / RCVD BY		DWN	5-20-76
TO INVTY CRDS		CHK	8-23-76
TO ACCOUNT		ENG	9/6/76
		APVD	9/7/76

RAMTEK

TITLE: DISTRIBUTION PANEL ASSY 9300

REV	SHEET	DWG NO
B	1 OF 1	502769

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO:

PREPARED BY		ORIG REQUEST	PARTS AVAIL	BACK-ORDER
PRODUCTION MGR	PRODUCTION UNITS (ASSY)			
	SCHEDULED BEGIN			
	SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT		ISS	STD COST EA	TOTAL
1	503047	P.C.B FABRICATION	1					
2	503046	LOGIC DIAGRAM	REF					
3								
4								
5								
6								
7	1301030	I.C., SN74S08 6N	1					
8	"	"						
9	031	SN74LS08 4S, 8S	2					
10	"	"						
11	035	SN7409 6K	1					
12	"	"						
13	105	7438 4C	1					
14	132	74S00 6L, 7A	2					
15	231	SN74S32 7B, 8L	2					
16	134	74S37 9J, 8A, 7K	3					
17	232	SN74LS32 6P, 7L, 7N	3					
18	138	74S140* 8J	1					
19	304	IM5003 9L	1					
20								
21	307	10125 9A	1					
22								
23	308	75107 3A, 3B, 3E, 3F	4					
24								
25	318	LH0002 1E, 1F, 1H,	8					
26		1J, 1L, 1M, 1R, 1S						
27								
28	331	SN74S04 3D, 3H, 3P,	9					
29		4A, 4K, 6A, 6B, 6J, 7S						
30								
31	332	8T26 9M, 9N, 9P	2					
32								
33	333	6N74S02 5D, 7M, 9S	3					
34	"	"						
35	1301 334	I.C., SN74LS02 6M	1					
36								
		TOTAL						

		SIGNATURES	DATE
PARTS ISSUD BY / RCVD BY		DWN	5-9-77
TO INVTY CRDS		CHK	5-9-77
TO ACCOUNT		ENG	5/31/77
		APVD	5-26-77

RAMTEK

TITLE: P.C.B. ASSEMBLY - VIDEO TYPE 2A

REV	SHEET	DWG NO:
B	1 OF 8	503045

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM I.D	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
37	1301430	I.C., 74S112 2A, 2B, 2D	12				
38		2E, 2G, 2J, 2L, 2M, 2R, 2P					
39		4J, 7G					
40							
41	431	SN74S174 4B, 4F, 4P,	10				
42		4R, 6C, 6F, 6H, 7H, 7J, 8K					
43							
44	432	SN74LS174 6G, 6R,	12				
45		8C, 8D, 8E, 8F, 8H, 9C,					
46		9D, 9E, 9F, 9H					
47							
48	434	SN74S74 6S	1				
49							
50	443	N82S11 5E, 5F,	12				
51		5G, 5H, 5J, 5K, 5L, 5M,					
52		5N, 5P, 5R, 5S					
53							
54	444	SN74S374 9R	1				
55							
56	532	SN74S138 7R, 8R	2				
57							
58	534	SN74S153 6D, 6E	6				
59		7C, 7D, 7E, 7F					
60							
61	535	SN74S157 5A, 5B, 5C	3				
62							
63	1301536	I.C., SN74S161 8M, 8N, 8P	3				
64							
65	1302107*	PROM, 93446 FAIRCHILD, 4G	1				
66		PROM, 4H	1				
67		PROM, 4L	1				
68		PROM, 4M	1				
69	1302107*	PROM, 93446 FAIRCHILD, 4N	1				
70		*NOTE: PART NO. IS FOR					
71		BLANK PROM					
72							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY / RCVD BY		DWN	3/7/77
TO INVTY CRDS		CHK	3/8/77
TO ACCOUNT		ENG	3/15/77
		APVD	

RAMTEK

TITLE: P.C.B. ASSEMBLY- VIDEO TYPE 2A

REV: B | SHEET: 2 OF 8 | DWG NO: 503045

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM I.D	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
73	3109360	RES., 36Ω 1/4W±5%	4				
74		R26, 61, 96, 131					
75							
76	3109680	RES, 68Ω 1/4W±5%	4				
77		R27, 62, 97, 132					
78							
79	3109101	RES, 100Ω 1/4W±5%	16				
80		R34, 35, 69, 70, 104,					
81		105, 139, 140, 176, 189, 194,					
82		199, 204, 209, 214, 219					
83							
84	3109131	RES, 130Ω 1/4W±5%	1				
85		R22					
86							
87	3109151	RES, 150Ω 1/4W±5%	9				
88		R106, 111, 116, 121, 141,					
89		146, 151, 156, 220					
90							
91	3109181	RES., 180Ω 1/4W±5%	12				
92		R5, 10, 15, 20, 40, 45,					
93		50, 55, 75, 80, 85, 90					
94							
95	3109221	RES., 220Ω 1/4W±5%	11				
96		R21, 28, 30, 56, 63,					
97		65, 91, 98, 100, 133, 135					
98							
99	3109271	RES., 270Ω 1/4W±5%	12				
100		R1, 6, 11, 16, 36, 41,					
101		46, 51, 71, 76, 81, 86					
102							
103	3109301	RES., 300Ω 1/4W±5%	12				
104		R109, 114, 119, 124,					
105		144, 149, 154, 159, 223, 225,					
106		227, 229					
107							
108							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY / RCVD BY		DWN	3/7/77
TO INVTY CRDS		CHK	3/8/77
TO ACCOUNT		ENG	3/15/77
		APVD	

RAMTEK

TITLE: P.C.B. ASSEMBLY- VIDEO TYPE 2A

REV: B | SHEET: 3 OF 3 | DWG NO: 503045

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	PART REQMNTS TOT	PART REQMNTS ISS	STD COST EA	STD COST TOTAL
109	3109471	RES., 470Ω 1/4W±5%	1				
110		R165					
111							
112	3109511	RES., 510Ω 1/4W±5%	4				
113		R32,67,102,137					
114							
115	3109681	RES., 680Ω 1/4W±5%	24				
116		R4,9,14,19,29,31,					
117		39,44,49,54,64,66,74,79,					
118		84,89,99,101,134,136,167,					
119		168,169,170					
120							
121	3109751	RES., 750Ω 1/4W±5%	8				
122		R108,113,118,					
123		123,143,148,153,158					
124							
125	3109102	RES., 1K Ω 1/4W±5%	5				
126		R33,68,103,138,166					
127							
128	3109152	RES., 1.5K 1/4W±5%	12				
129		R3,8,13,18,38,43,					
130		48,53,73,78,83,88					
131							
132	3109472	RES., 4.7K Ω 1/4W±5%	1				
133		R171					
134							
135	3109103	RES., 10K Ω 1/4W±5%	8				
136		R172,177,190,195,					
137		200,205,210,215					
138							
139							
140							
141							
142	3108101	RES., 100Ω 1/8W±5%	4				
143		R222,224,226,228					
144							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		DWN	5-2-77
PARTS RCVD BY		CHK	5/7/77
TO INVTY CRDS		ENG	5/7/77
TO ACCOUNT		ARVD	

RAMTEK

TITLE: P.C.B. ASSEMBLY— VIDEO TYPE 2A

REV	SHEET	DWG NO.
B	1 OF 8	503045

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO.

PREPARED BY: PRODUCTION MGR

	ORIG REQUEST	PARTS AVAIL	BACK ORDER
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM NO	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	PART REQMNTS TOT	PART REQMNTS ISS	STD COST EA	STD COST TOTAL
145	3108221	RES., 220Ω 1/8W±5%	8				
146		R175,180,193,198,					
147		203,208,213,218					
148							
149	3108681	RES., 680Ω 1/8W±5%	8				
150		R173,178,191,196					
151		201,206,211,216					
152							
153							
154							
155	3103750	RES., 75Ω 0.3W±0.1%	16				
156		R22,23,24,57,58,					
157		59,92,93,94,127,128,129,					
158		130,161,162,163					
159							
160	3103151	RES., 150Ω 0.3W±0.1%	25				
161		R2,7,12,17,25,37,					
162		42,47,52,60,72,77,82,87,					
163		95,107,112,117,122,126,142,					
164		147,152,157,164					
165							
166							
167							
168	3101121	RES.,POT., 500Ω, .5W±20%	8				
169		R110,115,120,125,					
170		145,150,155,160					
171							
172	3101120	RES.,POT., 2KΩ, .5W±20%	8				
173		R174,179,192,					
174		197,202,207,212,217					
175							
176	3122471	RES.PACK, 470Ω,898-3-470	1				
177		-9K					
178							
179	3121102	RES. PACK, 1KΩ, 898-1-R1K	4				
180		8B,8G,9B,9G					
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUD BY		DWN	5-2-77
PARTS RCVD BY		CHK	5/7/77
TO INVTY CRDS		ENG	
TO ACCOUNT		ARVD	

RAMTEK

TITLE: P.C.B. ASSEMBLY— VIDEO TYPE 2A

REV	SHEET	DWG NO.
B	2 OF 8	503045

LIST OF MATERIALS

PRODUCTION ORDER — JOB NO:

PREPARED BY: PRODUCTION MGR

	QTY REQUEST	PARTS AVAIL	BALA TO ISSUE
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM I.D	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
181	3201107	TRANSISTOR, 2N4258	4				
182	-	Q21, 22, 23, 24					
183							
184	3201119	TRANSISTOR, 2N3646 *	20				
185		Q1, 2, 3, 4, 5, 6, 7, 8,					
186		9, 10, 11, 12, 13, 14, 15, 16, 17,					
187		18, 19, 20,					
188		* MFR MUST BE FAIRCHILD					
189							
190	3202201	DIODE, IN4454	42				
191		CR1, 2, 3, 4, 5, 6, 7,					
192		8, 9, 10, 11, 12, 13, 14, 15, 16, 17,					
193		18, 19, 20, 21, 22, 23, 24, 25,					
194		26, 27, 28, 29, 30, 31, 32, 33,					
195		34, 35, 36, 37, 38, 39, 40, 41, 42					
196							
197							
198							
199	6701103	CAP., 0.01UF, 100V ±10%	1				
200		C1					
201							
202	6701104-1	CAP., 0.1UF (.100") 50V±20%	68				
203		C32, 33, 34, 35, 36,					
204		37, 38, 39, 42, 43, 50, 51, 53, 54,					
205		55, 56, 57, 58, 59, 60, 63, 64, 71,					
206		72, 74, 75, 76, 77, 78, 79, 80, 81,					
207		84, 85, 92, 93, 95, 96, 97, 98, 99					
208		100, 101, 102, 105, 106, 113, 114, 116,					
209		117, 118, 119, 120, 121, 122, 123, 124,					
210		125, 126, 127, 128 129, 130, 131,					
211		132, 133, 134, 135					
212							
213							
214							
215							
216							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY		OWN	3-2-77
PARTS RCVD BY		CHK	3/6/77
TO INVTY CRDS		ENG	3/5/77
TO ACCOUNT		SRVC	

RAMTEK

TITLE P.C.B. ASSEMBLY-VIDEO TYPE 2A

LIST OF MATERIALS

REV B | SHEET 1 OF 8 | DWG NO 503045

PRODUCTION ORDER — JOB NO:

PREPARED BY: PRODUCTION MGR

	QTY REQUEST	PARTS AVAIL	BALA TO ISSUE
PRODUCTION UNITS (ASSY)			
SCHEDULED BEGIN			
SCHEDULED COMPLETION			

ITEM I.D	PART NUMBER	PART DESCRIPTION	PART REQMNTS EA	TOT	ISS	STD COST EA	TOTAL
217	6701104-2	CAP., 0.1UF (.200"), 50V±20%	61				
218		C6, 7, 8, 9, 10, 11, 12, 13,					
219		14, 15, 16, 17, 18, 19, 20, 21, 22, 23,					
220		24, 25, 26, 27, 28, 29, 30, 31,					
221		139, 141, 142, 143, 144, 145,					
222		148, 151, 153, 154, 157, 158, 159,					
223		161, 162, 163, 165, 166, 167, 168					
224		169, 164, 170, 171, 172, 173, 174,					
225		175, 176, 177, 179, 180, 178					
226		182, 183					
227	6701105-1	CAP., 1.0UF (.200"), 50V±10%	8				
228		C146, 147, 149, 150,					
229		152, 155, 156, 160					
230							
231	6706685	CAP., 6.8UF, 35V±20%	16				
232		C41, 44, 49, 52, 62, 65, 70, 73, 83,					
233		86, 91, 94, 104, 107, 112, 115					
234							
235	6703336	CAP., 33UF, 25V, -10%+50%	5				
236		C3, 4, 5, 140, 189					
237							
238	6706227	CAP., 220UF, 10V±10%	3				
239		C136, 137, 138					
240							
241	6707470	CAP., 47PF, 500V±10%	9				
242		C45, 46, 66, 67,					
243		87, 88, 108, 109, 181					
244							
245	6701221	CAP., 220PF, 200V±10%	8				
246		C47, 48, 68, 69,					
247		89, 90, 110, 111					
248							
249							
250							
251							
252							
		TOTAL					

		SIGNATURES	DATE
PARTS ISSUED BY		OWN	3-2-77
PARTS RCVD BY		CHK	3/6/77
TO INVTY CRDS		ENG	3/5/77
TO ACCOUNT		SRVC	

RAMTEK

TITLE P.C.B. ASSEMBLY-VIDEO TYPE 2A

LIST OF MATERIALS

REV B | SHEET 2 OF 8 | DWG NO 503045