

digital

RH70

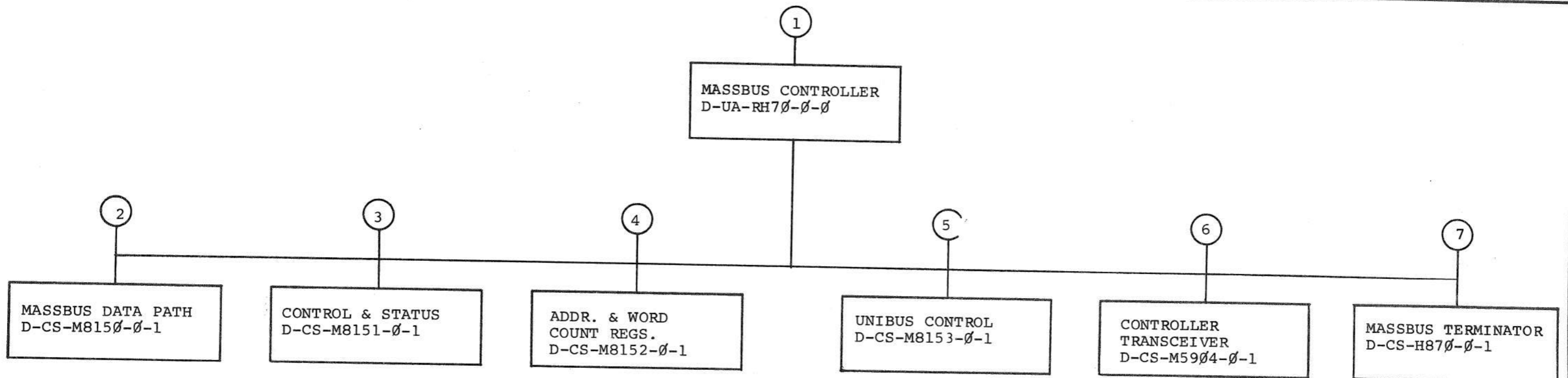
Engineering Drawings

Digital Equipment Corporation

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TITLE	SIZE	CODE	NUMBER	REV
DRAWING DIRECTORY RH7Ø	B	DD	RH7Ø-Ø	
SHEET 2 OF 3				

CUSTOMER PRINT SET		ELECTRICAL					CUSTOMER PRINT SET		ELECTRICAL						
1	MFG. SET	FIND NO.	REV	NO OF SHT	DESCRIPTION	OPTION NO./FILE DATE	1	MFG. SET	FIND NO.	REV	NO OF SHT	DESCRIPTION	OPTION NO./FILE DATE		
X		1		1	D-UA-RH7Ø-Ø-Ø	MASSBUS CONTROLLER									
				1	C-SC-1209856-0-02	MODULE HOLDER						B-MH-M8152-Ø-6	1	MODULE ECO HISTORY	
X				3	D-BS-RH7Ø-Ø-1	MASSBUS TRANSCEIVER									
X				1	D-FD-RH7Ø-Ø-2	WRITE COMMAND FLOW DIAG.									
X				1	D-FD-RH7Ø-Ø-3	WRITE CHECK COMM. FLOW DIAG.									
X				1	D-FD-RH7Ø-Ø-4	READ COMMAND FLOW DIAG.									
X				4	D-TD-RH7Ø-Ø-5	RH7Ø DATA BUFFER TIM. DIAG.									
X				1	D-TD-RH7Ø-Ø-6	WRITE MASSBUS TIMING DIAG.									
X				1	D-TD-RH7Ø-Ø-7	MASSBUS TIMING DIAG.									
					A-SP-RH7Ø-Ø-8	RH7Ø ENGIN. SPEC.	X		5		6	D-CS-M8153-Ø-1	6	UNIBUS CONTROL	
					A-SP-RH7Ø-Ø-9	RH7Ø MANUF. CHECK. PROC.						K-CO-M8153-Ø-4	1	X-Y COOR. HOLE LOCATION	
X				1	D-IC-KB11-B-7	UNIBUS CABLE & GRANT CHAIN						D-AH-M8153-Ø-5	1	ASSY/DRILLING HOLE LAYOUT	
				4	D-UA-11/70-0-0	11/70 UNIT ASSY (REF)						B-MH-M8153-Ø-6	1	MODULE ECO HISTORY	
					K-WL-7010329-0-1	KB11-B WIRELIST (REF)									
X		2		9	D-CS-M815Ø-Ø-1	MASSBUS DATA PATH	X		6		2	D-CS-M59Ø4-Ø-1	2	CONTROLLER TRANSCEIVER	
				1	K-CO-M815Ø-Ø-4	X-Y COOR. HOLE LOCATION						K-CO-M59Ø4-Ø-4	1	X-Y COOR. HOLE LOCATION	
				1	D-AH-M815Ø-Ø-5	ASSY/DRILLING HOLE LAYOUT						D-AH-M59Ø4-Ø-5	1	ASSY/DRILLING HOLE LAYOUT	
				1	B-MH-M815Ø-Ø-6	MODULE ECO HISTORY						B-MH-M59Ø4-Ø-6	1	MODULE ECO HISTORY	
X		3		6	D-CS-M8151-Ø-1	CONTROL & STATUS	X		7		1	D-CS-H87Ø-Ø-1	1	MASSBUS TERMINATOR	
				1	K-CO-M8151-Ø-4	X-Y COOR. HOLE LOCATION						K-CO-H87Ø-Ø-4	1	X-Y COOR. HOLE LOCATION	
				1	D-AH-M8151-Ø-5	ASSY/DRILLING HOLE LAYOUT						D-AH-H87Ø-Ø-5	1	ASSY/DRILLING HOLE LAYOUT	
				1	B-MH-M8151-Ø-6	MODULE ECO HISTORY						B-MH-H87Ø-Ø-6	1	MODULE ECO HISTORY	
X		4		7	D-CS-M8152-Ø-1	ADDR. & WORD COUNT REGS.									
				1	K-CO-M8152-Ø-4	X-Y COOR. HOLE LOCATION									
				1	D-AH-M8152-Ø-5	ASSY/DRILLING HOLE LAYOUT									

CUSTOMER PRINT SET CODES
X = PRINT OF DOCUMENT INCLUDED IN PRINT SET
C = INCLUDES ALL PRINTS INDICATED ON DOCUMENT
S = CONFIDENTIAL AUTHORIZED SIGNATURE REQUIRED

TITLE
DRAWING DIRECTORY RH7Ø
SHEET 3 OF 3
SIZE CODE B DD
NUMBER RH7Ø-Ø
REV

DRB 108

DEC 16-(325)-1062-28-R972

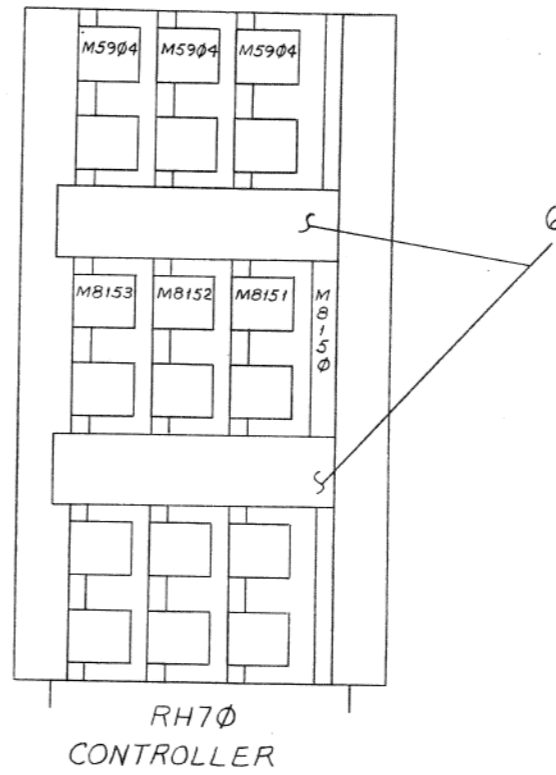
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NOTES:

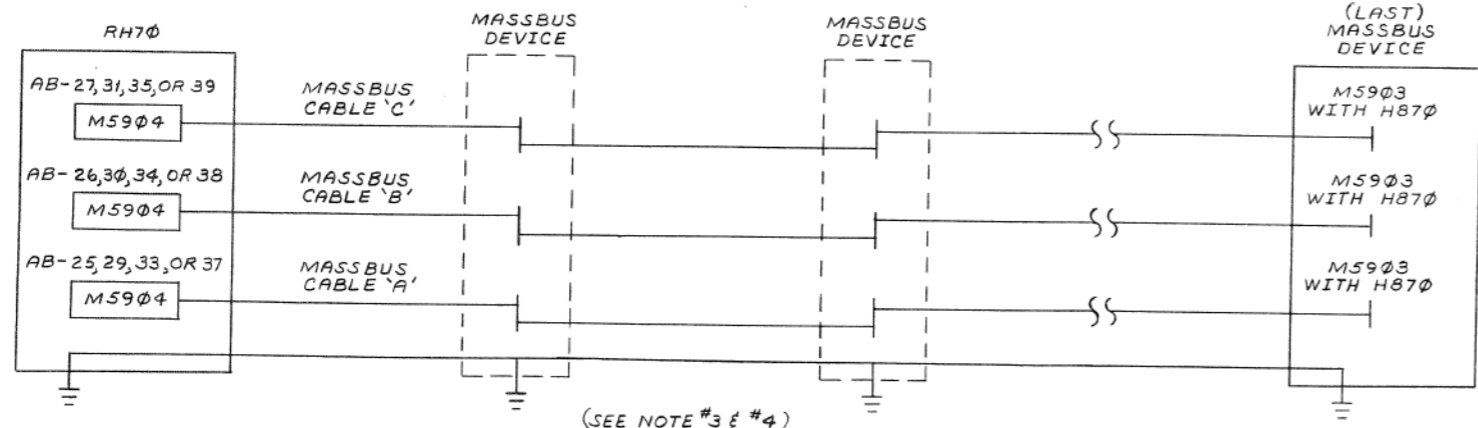
- VIEW OF LOGIC IS FROM MODULE SIDE.
- SELECT PROPER JUMPER SETTINGS FOR UNIBUS ADDRESS, REGISTER LENGTH FIELD, AND VECTOR ADDRESS AS PER MASSBUS DEVICE USED.
- INSERT ONE H870 MASSBUS TERMINATOR MODULE IN J2 (ETCH SIDE OF H870 TO COMPONENT SIDE OF M5903) OF EACH OF THE M5903 MASSBUS TRANSCIEVER MODULES IN THE LAST MASSBUS DRIVE.
- COLORLED EDGE OF MASSBUS CABLES SHOULD BE FACING MODULE HANDLE OF M5904 IN RH70 & M5903 IN MASSBUS DRIVES.
- ONE H870 MASSBUS TERMINATOR MODULE WILL BE INSERTED IN J1 (COMPONENT SIDE OUT) OF EACH OF THE 3 M5904 MODULES FOR SHIPMENT ONLY.
- M5904 MODULES MUST BE ETCH REVISION E OR LATER FOR PROPER MECHANICAL POSITION OF CABLE CONNECTOR ON MODULE.

LEGEND	
NUMBER	VARIATION
RH70-A	MASSBUS CONTROLLER PDP11/70

	4TH RH70				3RD RH70				2ND RH70				1ST RH70			
	CONTROLLER D				CONTROLLER C				CONTROLLER B				CONTROLLER A			
	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24
	M5904	M5904	M5904	MB150	M5904	M5904	M5904	MB150	M5904	M5904	M5904	MB150	M5904	M5904	M5904	MB150
A	CONTROLLER TRANS (MBSA)	CONTROLLER TRANS (MBSB)	CONTROLLER TRANS (MBSA)		CONTROLLER TRANS (MBSA)	CONTROLLER TRANS (MBSB)	CONTROLLER TRANS (MBSA)		CONTROLLER TRANS (MBSA)	CONTROLLER TRANS (MBSB)	CONTROLLER TRANS (MBSA)		CONTROLLER TRANS (MBSA)	CONTROLLER TRANS (MBSB)	CONTROLLER TRANS (MBSA)	
B	SEE NOTES 4 & 5	SEE NOTES 4 & 5	SEE NOTES 4 & 5		SEE NOTES 4 & 5	SEE NOTES 4 & 5	SEE NOTES 4 & 5		SEE NOTES 4 & 5	SEE NOTES 4 & 5	SEE NOTES 4 & 5		SEE NOTES 4 & 5	SEE NOTES 4 & 5	SEE NOTES 4 & 5	
C	MB153	MB152	MB151	MASSBUS DATA PATH (MDP)	MB153	MB152	MB151	MASSBUS DATA PATH (MDP)	MB153	MB152	MB151	MASSBUS DATA PATH (MDP)	MB153	MB152	MB151	MASSBUS DATA PATH (MDP)
D	UNIBUS CNTRL (BCT)	ADDR & WC REGS (AWR)	CONTROL & STATUS (CST)		UNIBUS CNTRL (BCT)	ADDR & WC REGS (AWR)	CONTROL & STATUS (CST)		UNIBUS CNTRL (BCT)	ADDR & WC REGS (AWR)	CONTROL & STATUS (CST)		UNIBUS CNTRL (BCT)	ADDR & WC REGS (AWR)	CONTROL & STATUS (CST)	
E	SEE NOTE 2				SEE NOTE 2				SEE NOTE 2				SEE NOTE 2			
F																



VIEW FROM MODULE SIDE



QTY.	DESCRIPTION	PART NO.	ITEM NO.
1	11/70 UNIT ASSEMBLY	D-UA-11/70-0-0	REF
1	KB11-B WIRELIST	K-WL-7010329-0-1	REF
3	MASSBUS TERMINATOR	H870	7
2	MODULE HOLDER	1209856	6
3	CONTROLLER TRANSCIEVER	M5904	5
1	UNIBUS CONTROL	MB153	4
1	ADDR. & WORD COUNT REGS.	MB152	3
1	CONTROL & STATUS	MB151	2
1	MASSBUS DATA PATH	MB150	1

FIRST USED ON OPTION/MODEL		PARTS LIST	
RH70		PARTS LIST	
DIMENSIONAL TOLERANCE		DRN. J. Vincent DATE 3-7-75	
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		CHK'D. DATE 2-11-75	
MILLIMETERS INCHES ANGLES		ENG. J. Kins DATE 4-10-75	
X,XX ±0.10	.XXX ±0.005	±0° 30'	PROJ. DATE 4-10-75
X.X ±0.5	.XX ±0.02		PROJ. DATE 4-10-75
X ±2	.X ±0.1		PROJ. DATE 4-10-75
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓	NEXT HIGHER ASSY.	
MATERIAL	FINISH	B-DD-RH70-0	
SCALE		SHEET 1 OF 1	
TITLE		MASSBUS CONTROLLER (RH70)	
NUMBER		DUA RH70-0-0	
REV.			

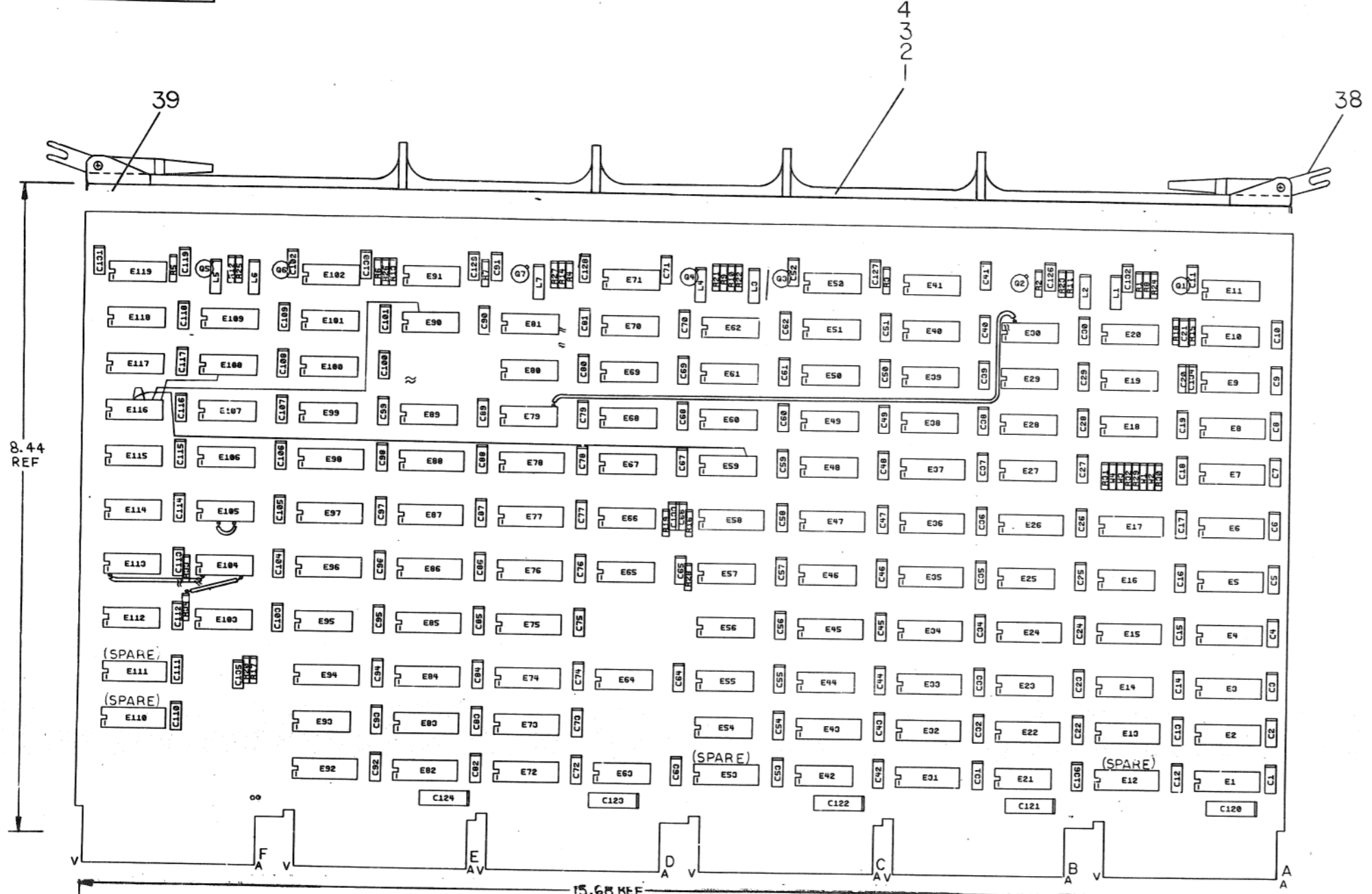
REV.	CHANGE NO.

REV. DUA RH70-0-0

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NOTES: I.C. SLOTS E12, E53, E110, AND E111 ARE SPARES.

8 1-0-0818W DCS 2 1

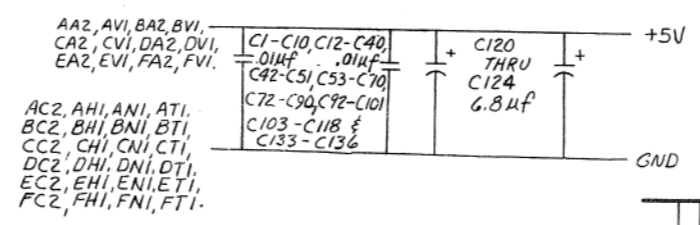


REF	DESCRIPTION	QTY	ITEM NO.
REF	ASSY/DRILLING HOLE LAYOUT		K-CO-8150-0-4
REF	MODULE ECO HISTORY		D-AH-8150-0-5
1	MODULE ECO HISTORY		B-MH-8150-0-6
1	ETCHED CIRCUIT BOARD		5011278
116	C1 THRU C10, C12 THRU C40, C42 THRU C51, C53 THRU C70, C72 THRU C90, C92 THRU C101, C103 THRU C118, C133 THRU C136		1001610-01
5	C120 THRU C124		1005306
7	C126 THRU C132		1000015
7	C11, C41, C52, C71, C91, C102, C119		1010274-00
7	R1 THRU R7		1300229
7	R8 THRU R14		1300247
3	R15, R16, R17		1300295
3	R18, R19, R20		1301424
8	R21 THRU R28		1300365
4	R29 THRU R32		1300391
7	Q1 THRU Q7		1503100
7	L1 THRU L7		1610662
7	E11, E41, E52, E71, E91, E102, E109		1611243
8	E19, E38, E50, E59, E62, E80, E99, E100		1910532
9	E42, E55, E56, E57, E63 THRU E67		1909849
1	E115		1909004
6	E20, E51, E70, E101, E112, E118		1910534
2	E40, E90		1910536
8	E10, E30, E60, E68, E107, E108, E114, E116		1910537
1	E49		1909059
1	E54		1905586
2	E39, E89		1909060
6	E28, E61, E104, E105, E106, E113		1910542
8	E9, E29, E69, E79, E109, E117, E48, E81		1910544
2	E18, E103		1910011
4	E92, E94, E96, E98		1910655
14	E31, E33, E35, E37, E72, E74, E76, E78, E58, E82, E84, E86, E88, E97		1910548
3	E22, E24, E26		1910652
18	E2, E4, E6, E13, E15, E17, E32, E34, E36, E73, E75, E77, E83, E85, E87, E43, E45, E47		1910550
5	E1, E3, E5, E7, E8		1911271
4	E21, E23, E25, E27		1909712
6	E14, E16, E44, E46, E93, E95		1911291
4	W1 THRU W4		9009185
1	HANDLE		1210711-02
12	EYELET		9006732
1	R33		1301972
1	R34		1301890
30	WIRE #30 AWG BUSS (RETROFIT)		9105740-55

IC TYPE	QTY	ITEM NO.
IC DEC 74157	8	16
IC DEC 74S157	8	16
IC DEC 74S174	8	16
IC DEC 74174	8	16
IC DEC 74298	8	16
IC TYPE	GND	+5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE.

IC PIN LOCATIONS



FIRST USED ON OPTION MODEL: RH7Ø

ETCH BOARD REV: B

REVISIONS:

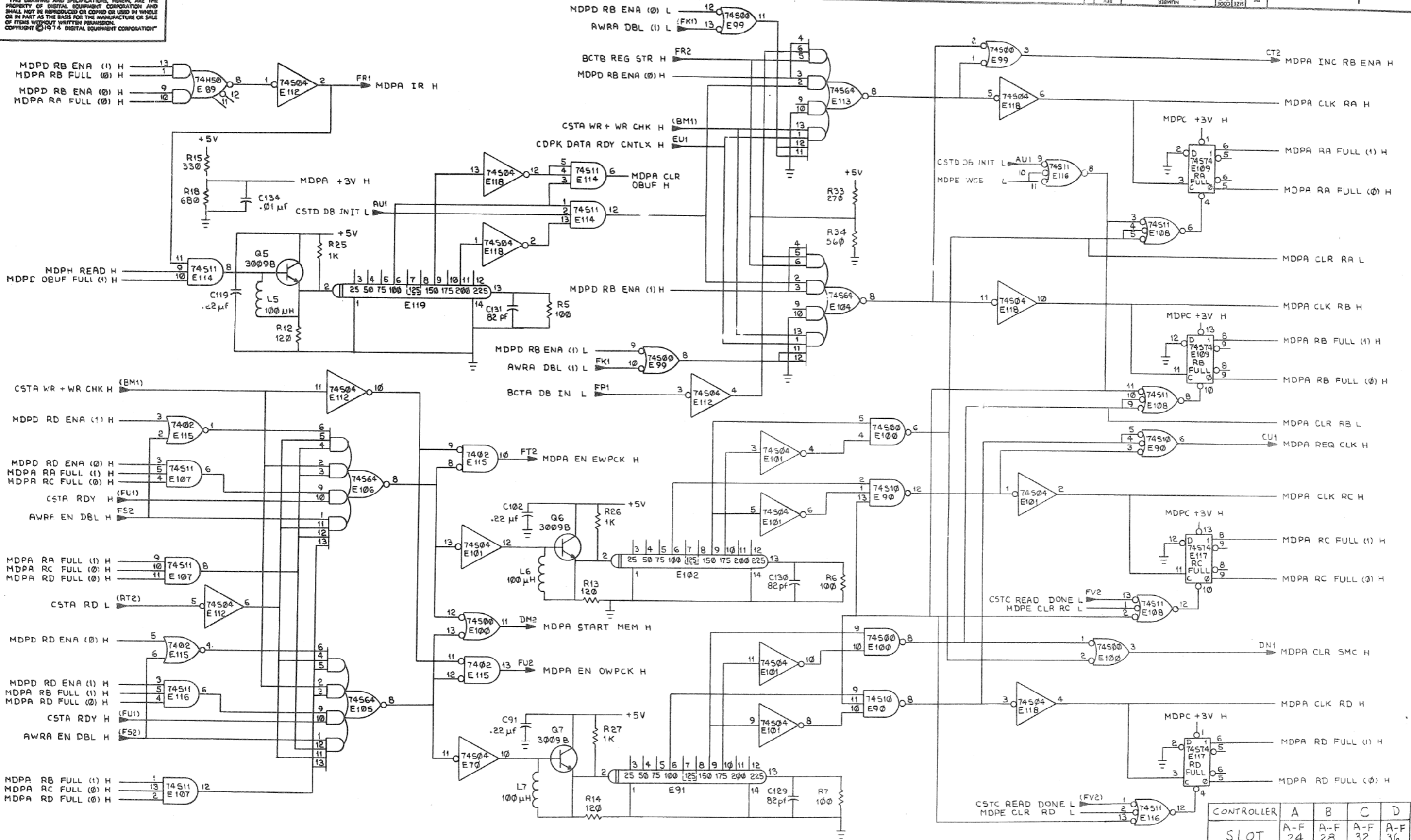
CHK	CHANGE NO.	REV

DATE: 9-15-74
 DATE: 12-18-74
 DATE: 1/29/75
 DATE: 1/29/75
 DATE: 1/20/75

digital EQUIPMENT CORPORATION
 MASSBUS DATA PATH (MDP)
 B-DD-RH7Ø-Ø
 SCALE: 1 OF 9
 SHEET: 1 OF 9
 DIST. CODE: DCS M8150-Ø-1
 NUMBER: B
 REV. NO.: B

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1-0-0918W DCS 2

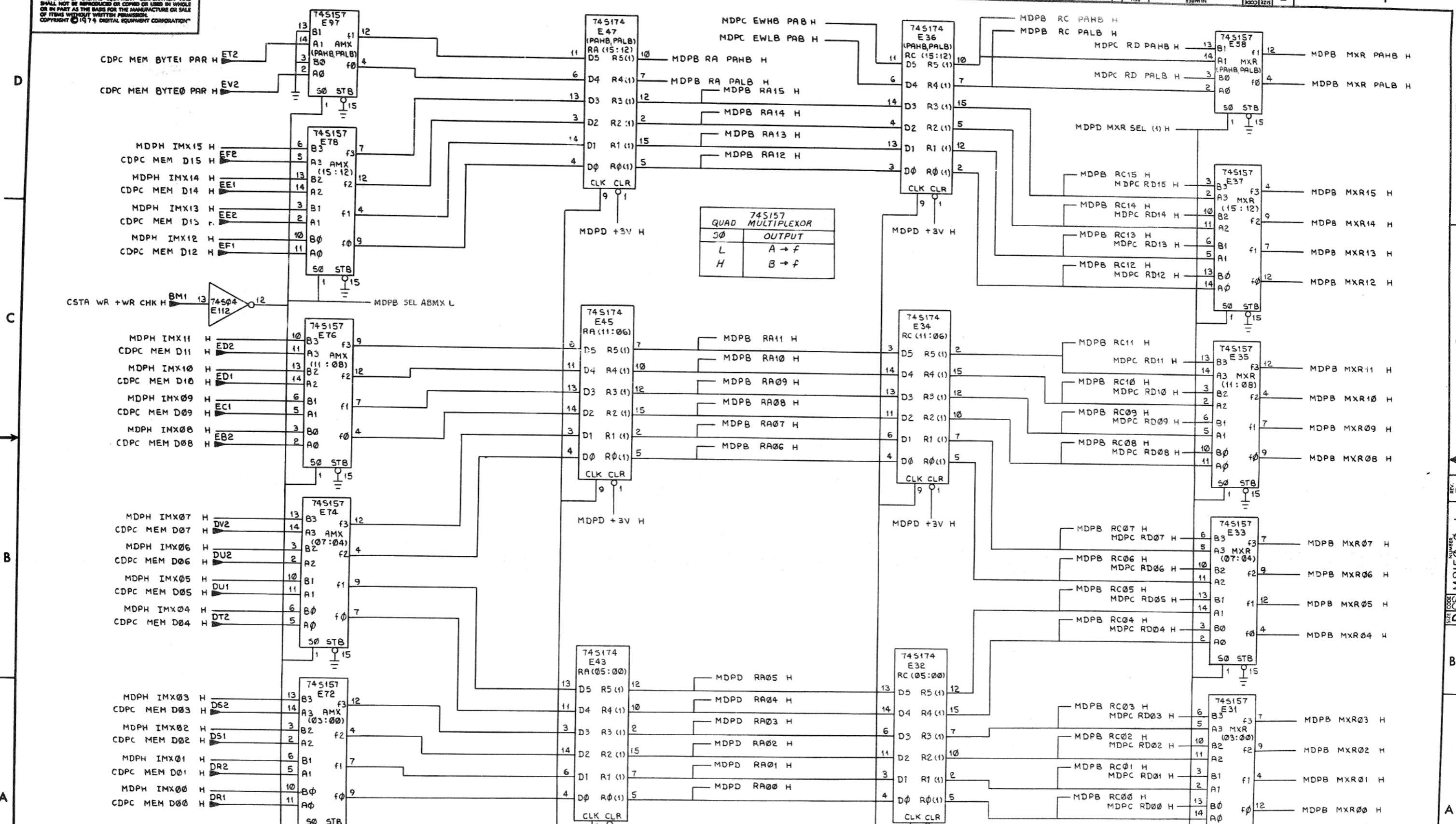


REVISIONS		
CHK	CHANGE NO.	REV.

CONTROLLER	A	B	C	D
SLOT	A-F 24	A-F 28	A-F 32	A-F 36

(MEMORY REGISTERS CONTROL)
 TITLE MASSBUS DATA PATH (MDPA) SIZE CODE NUMBER REV.
 DCS M8150-0-1 B
 SCALE SHEET 2 OF 9 DIST.

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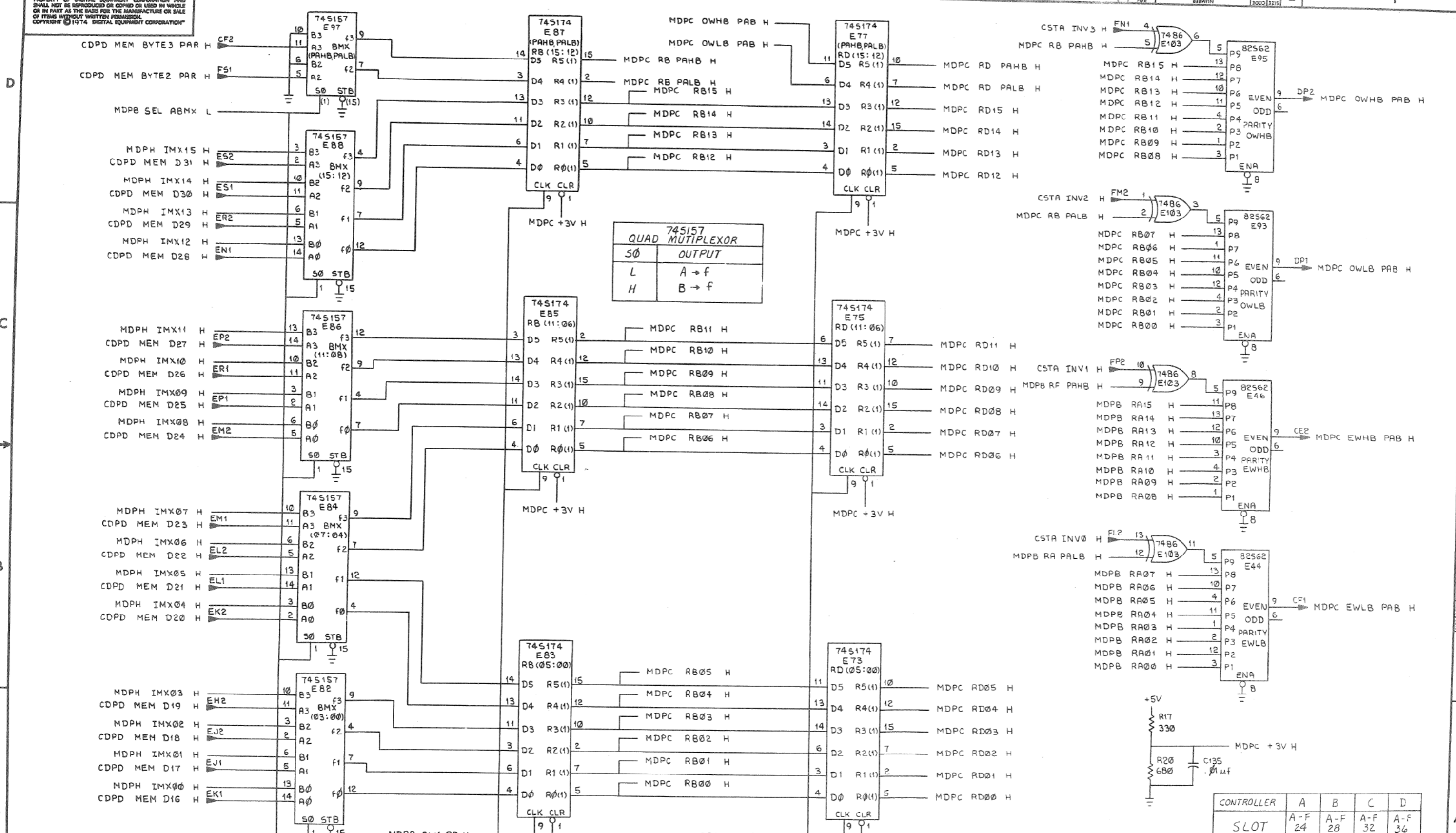
REVISIONS		
CHK	CHANGE NO.	REV.

CONTROLLER	A	B	C	D
SLOT	A-F 24	A-F 28	A-F 32	A-F 36

(EVEN WORD MEMORY DATA REGISTERS & MIXER)

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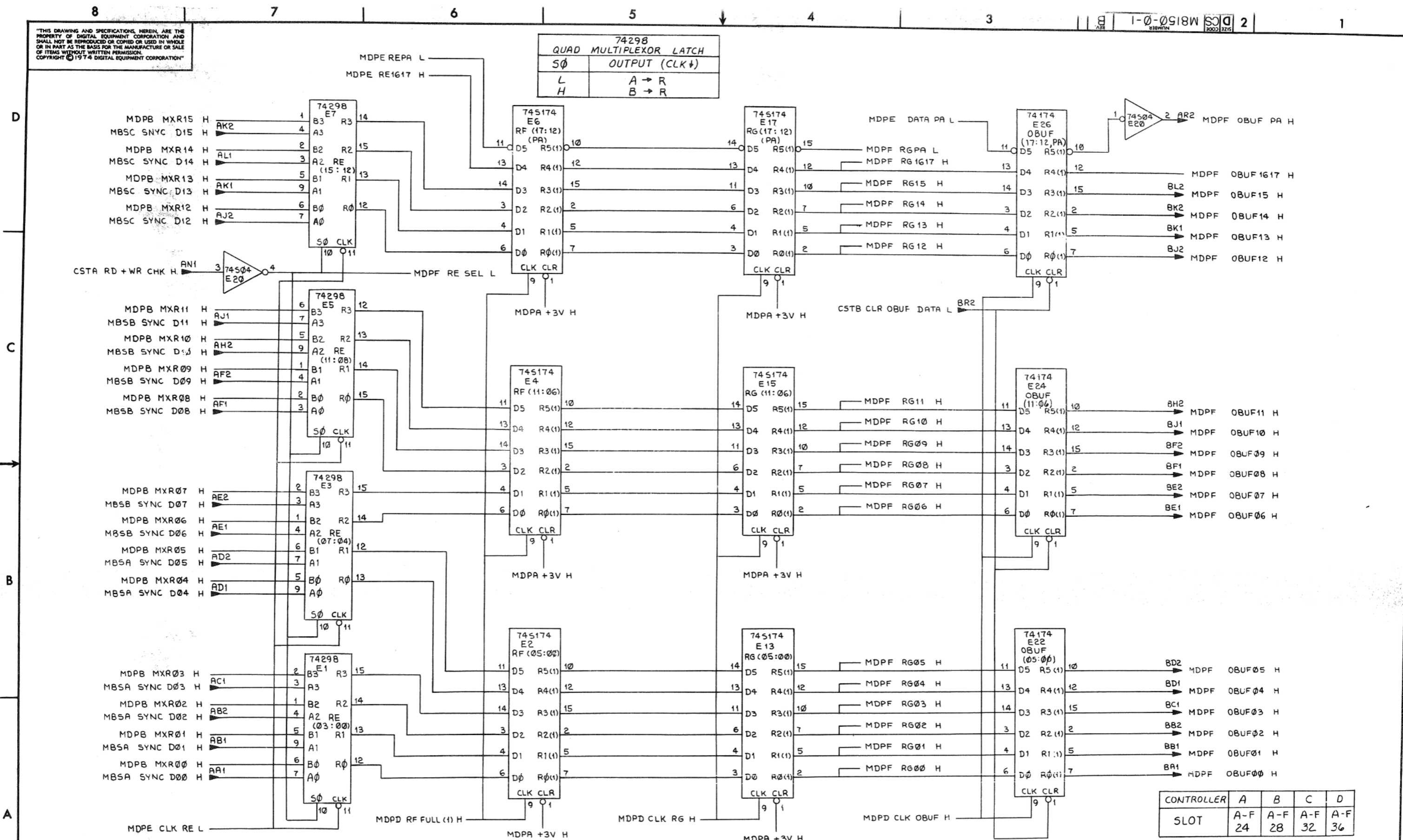
1-0-0918W SCS 2



745157 QUAD MULTIPLEXOR	
S0	OUTPUT
L	A → f
H	B → f

CONTROLLER	A	B	C	D
SLOT	A-F 24	A-F 28	A-F 32	A-F 36

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CONTROLLER	A	B	C	D
SLOT	A-F 24	A-F 28	A-F 32	A-F 36

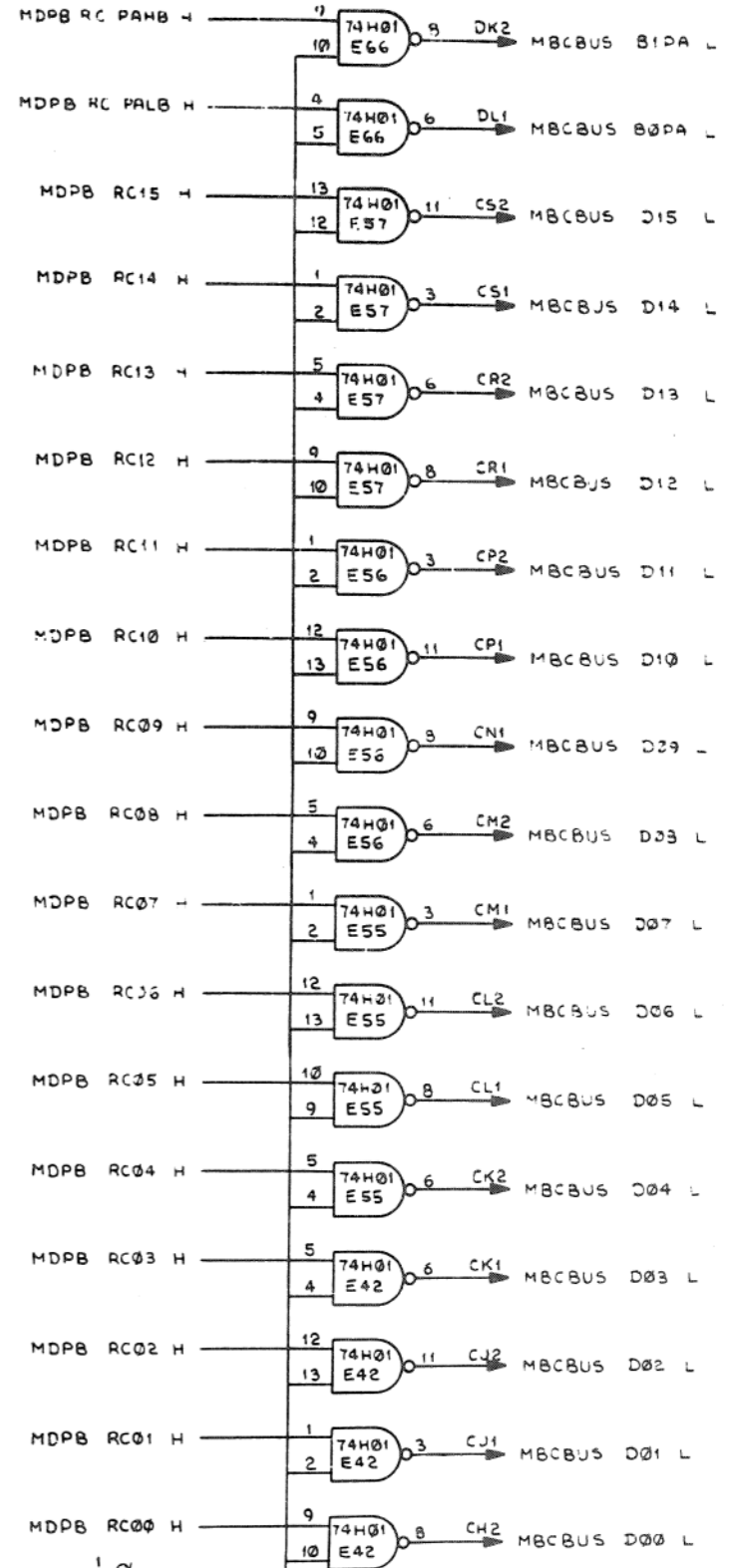
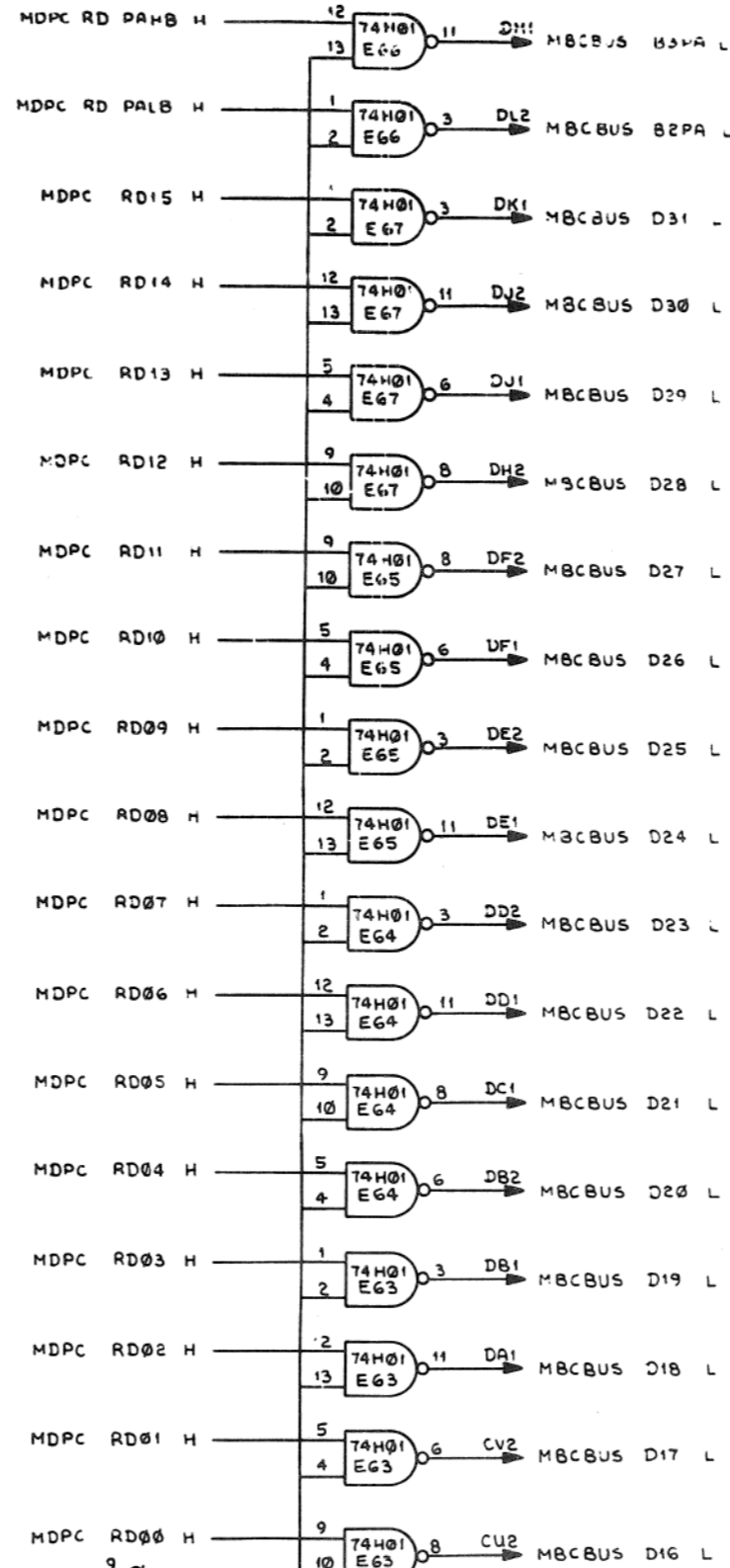
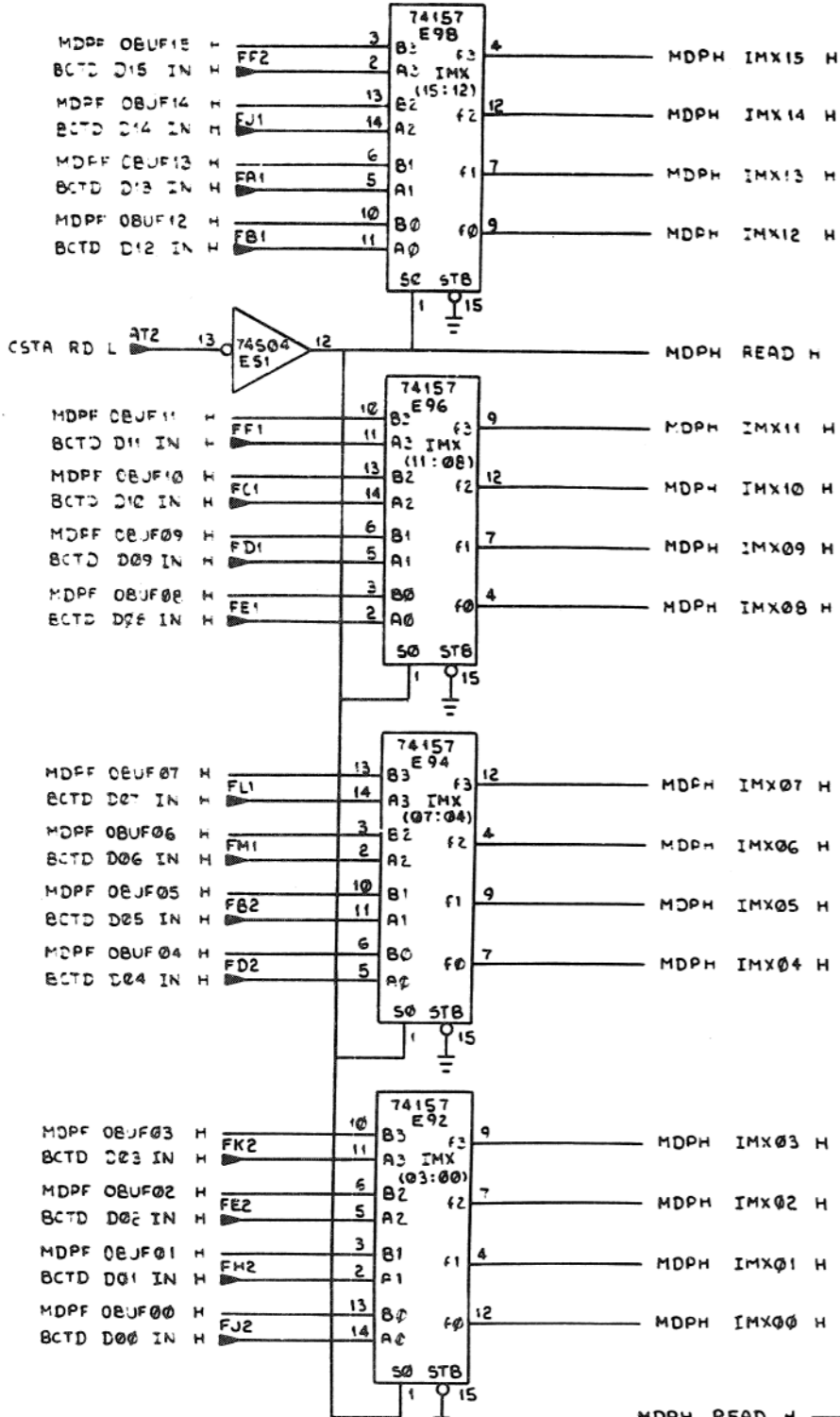
(DATA BUFFER REGISTERS)

REVISIONS		
CHK	CHANGE NO.	REV.

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74157 QUAD MULTIPLEXOR	
S0	OUTPUT
L	A → f
H	B → f

1-0-0918W SCD 2



MDPH READ H
CDPJ SELDATA CNTLX H

CONTROLLER	A	B	C	D
SLOT	A-F 24	A-F 28	A-F 32	A-F 36

(IMX & DATA DRIVERS)

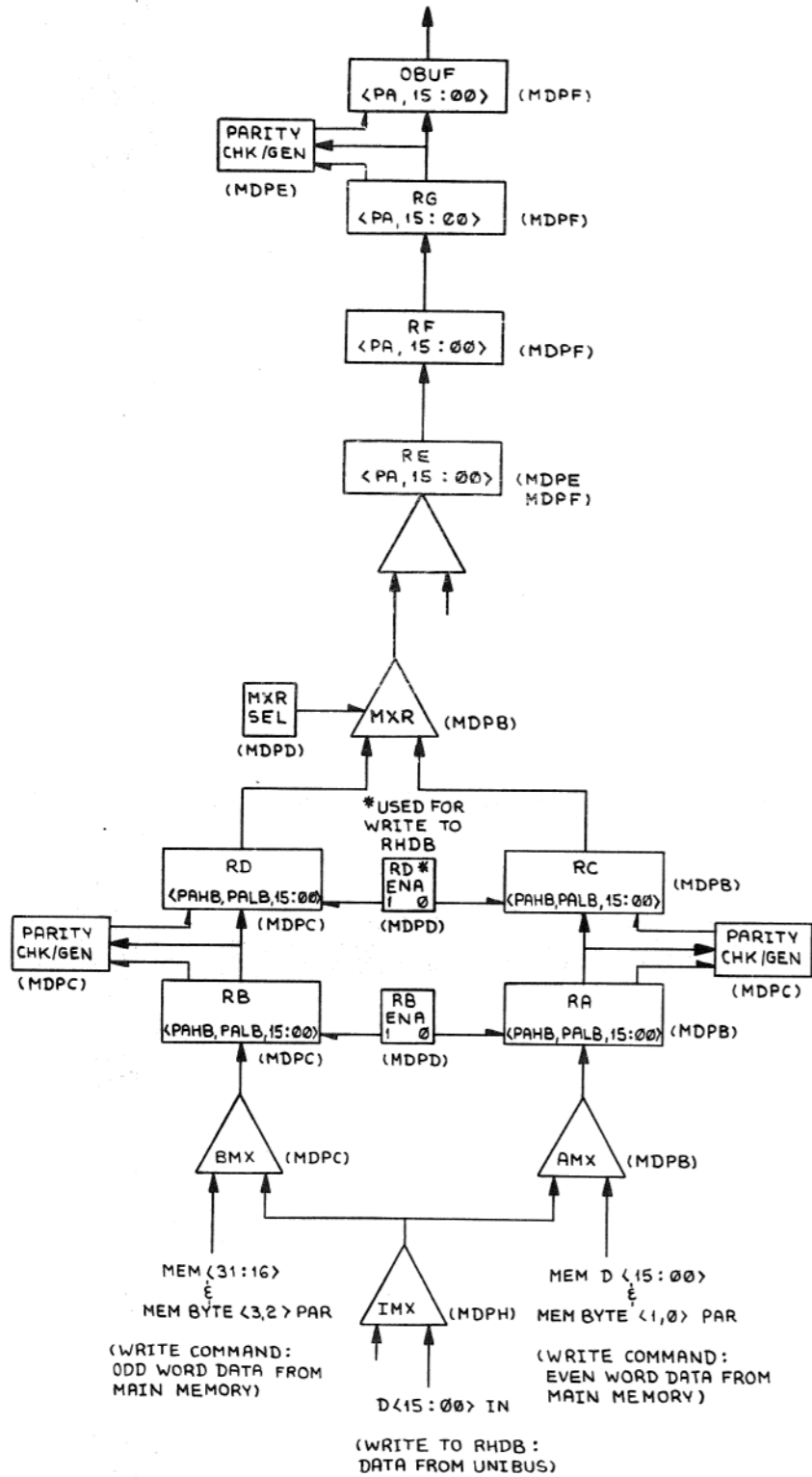
REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	MASSBUS DATA PATH (MDPH)	SIZE CODE	D CS	NUMBER	M8150-0-1	REV.	5
SCALE		SHEET	5	OF	9	DIST.	

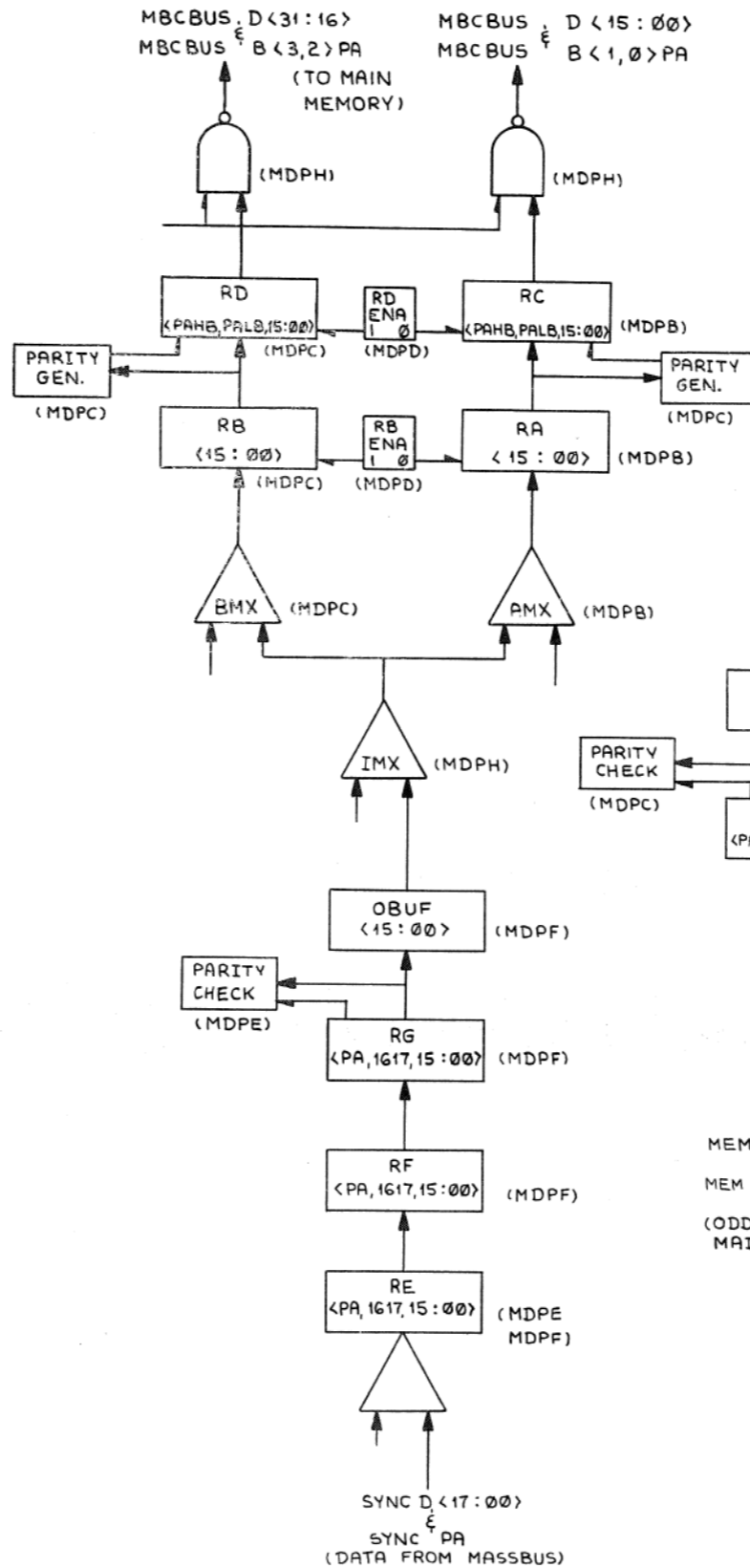
REV. B
M8150-0-1
D CS

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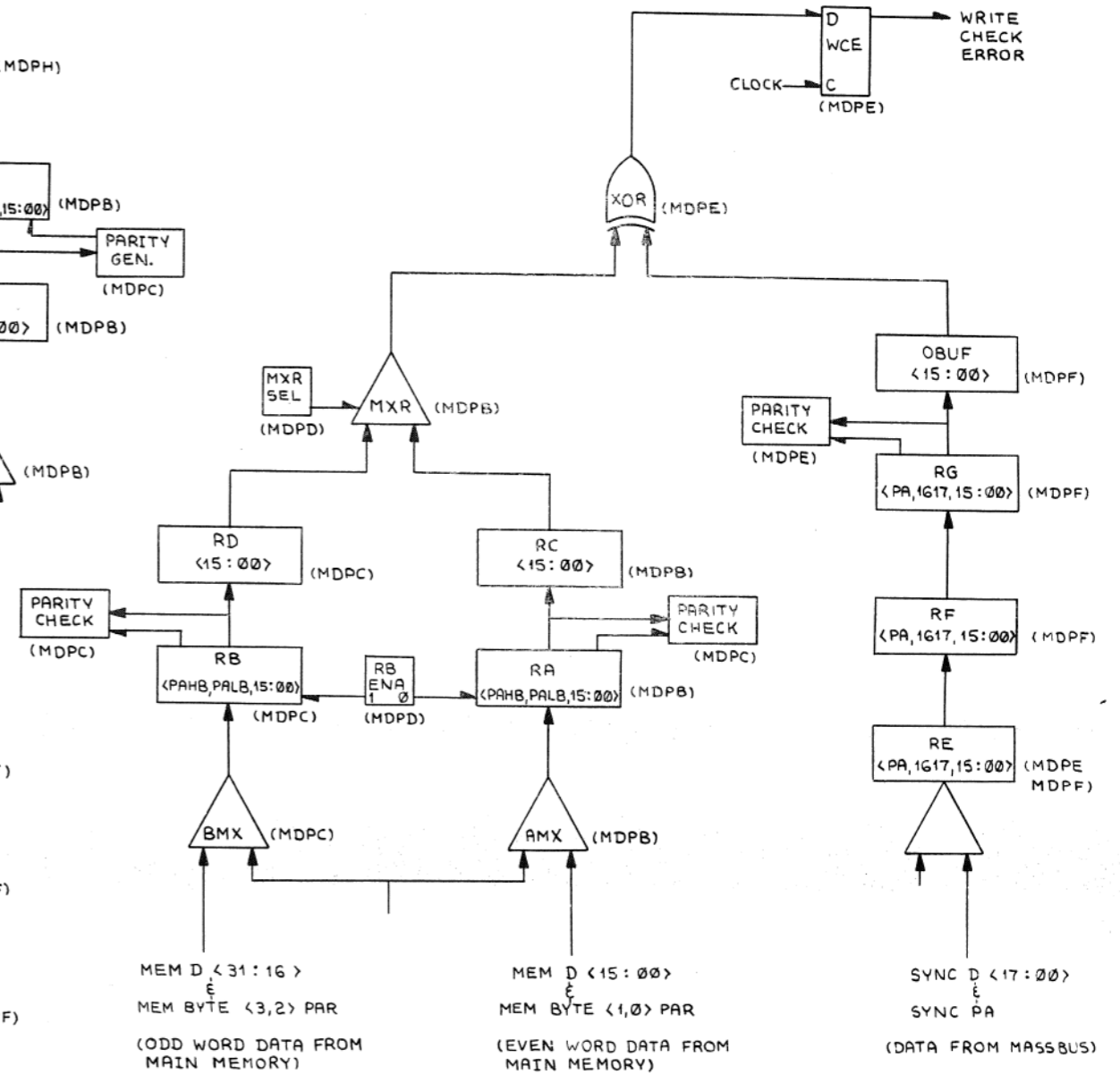
**WRITE COMMAND
OR
READ-WRITE RHDB REGISTER**
(READ FROM RHDB : TO UNIBUS)
(WRITE COMMAND : TO MASSBUS)



READ COMMAND



WRITE CHECK COMMAND



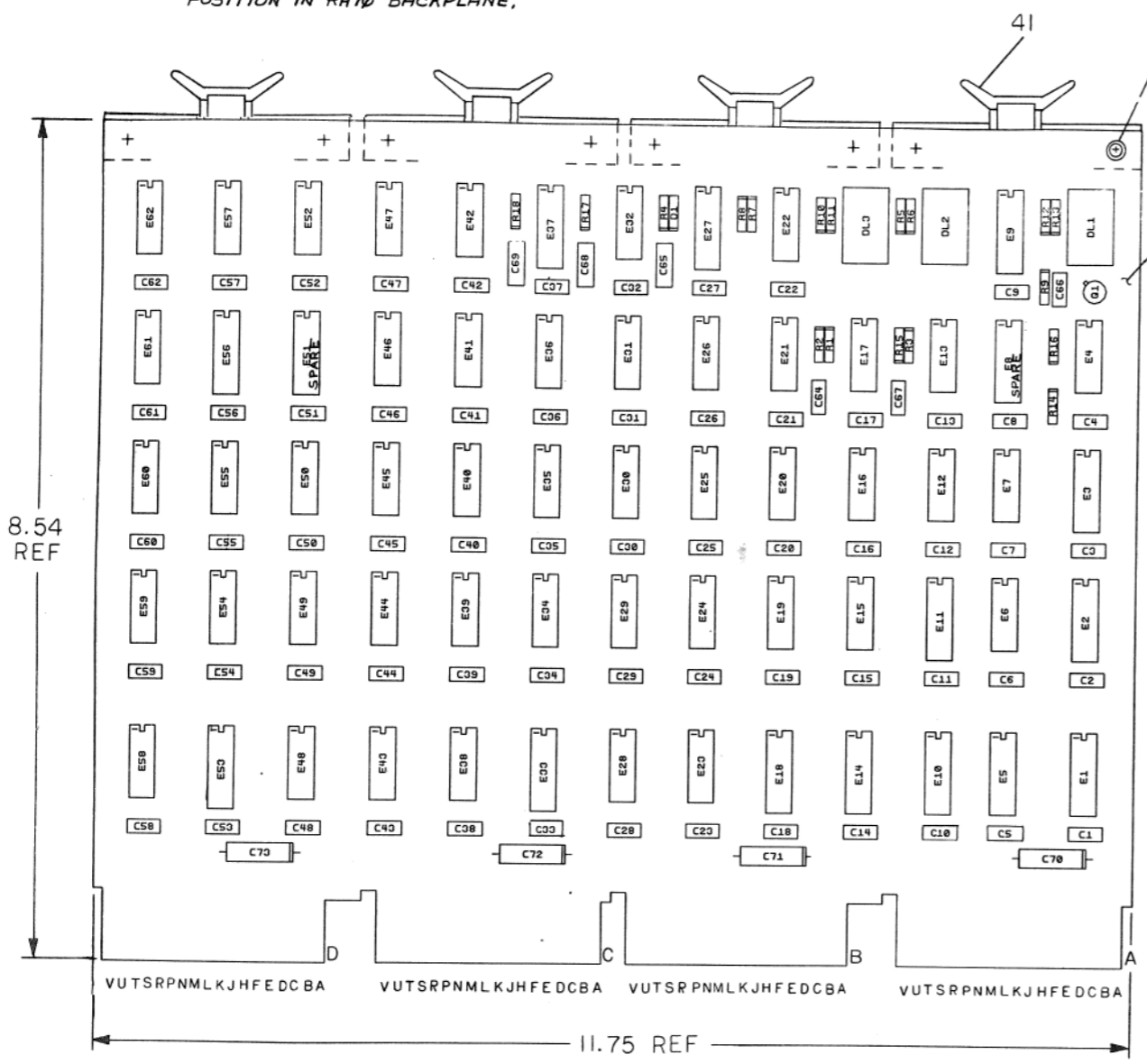
CONTROLLER	A	B	C	D
SLOT	A-F 24	A-F 28	A-F 32	A-F 36

(DATA PATH BLOCK DIAGRAM)

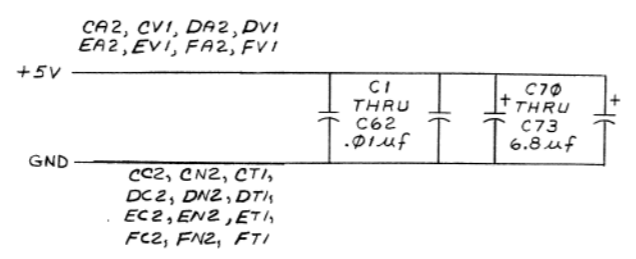
REVISIONS		
CHK	CHANGE NO.	REV.

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NOTES:
 1. IC SLOTS E8 & E51 ARE SPARES.
 2. PIN DESIGNATIONS ON CIRCUIT SCHEMATICS REFER TO MODULE POSITION IN RH70 BACKPLANE.



PIN NOMENCLATURE
 MODULE PIN BACKPLANE PIN
 A C
 B D
 C E
 D F



IC TYPE	GND	+5V
I.C. DEC 74175	8	16
I.C. DEC 74123	8	16
I.C. DEC 8640	1	8
I.C. DEC 8234	8	16
I.C. DEC 7442	8	16
I.C. DEC 74193	8	16
IC TYPE	GND	+5V

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE.

IC PIN LOCATIONS

REF	X-Y COORDINATE HOLE LOCATION	K-CO-M8151-0-4	1
REF	ASSY/DRILLING HOLE LAYOUT	D-AH-M8151-0-5	2
REF	MODULE ECO HISTORY	B-MH-M8151-0-6	3
1	ETCHED CIRCUIT BOARD	5011356	4
64	C1 THRU C62, C64, C66	CAPACITOR .01µf 100V, 20%	1001610-01
4	C70 THRU C73	CAPACITOR 6.8µf 10% 35V	1005306
1	C65	CAPACITOR 47µf 20% 25V	1010279
1	C67	CAPACITOR 47pf 5% 100V	1000011
2	C68, C69	CAPACITOR 180pf 5% 100V	1000020
1	D1	DIODE D664	1100114
3	R5, R10, R12	RESISTOR 150 OHM, 1/4 W, 5%	1300250
3	R6, R11, R13	RESISTOR 300 OHM, 1/4 W, 5%	1301425
2	R1, R8	RESISTOR 330 OHM, 1/4 W, 5%	1300295
2	R2, R9	RESISTOR 680 OHM, 1/4 W, 5%	1301424
3	R3, R14, R15	RESISTOR 1K OHM, 1/4 W, 5%	1300365
4	R7, R17, R18, R4	RESISTOR 5.6K OHM, 1/4 W, 5%	1301874
1	R16	RESISTOR 6.8K OHM, 1/4 W, 5%	1301423
1	Q1	TRANSISTOR DEC 3009 B	1503100
3	DL1, DL2, DL3	DELAY 50 NS	1609428
2	E45, E46	IC DEC 7400	1905575
3	E7, E12, E62	IC DEC 7400	1909058
2	E39, E48	IC DEC 74500	1910532
2	E34, E42	IC DEC 7402	1909004
4	E6, E36, E43, E49	IC DEC 7404	1909931
4	E35, E41, E58, E59	IC DEC 7408	1910155
3	E40, E44, E52	IC DEC 7410	1905576
2	E24, E32	IC DEC 7410	1909057
5	E4, E25, E50, E54, E57	IC DEC 7411	1909267
2	E22, E31	IC DEC 7437	1910091
1	E56	IC DEC 7442	1910046
1	E20	IC DEC 74H30	1909059
1	E28	IC DEC 74H50	1909060
10	E13, E15, E16, E21, E26, E30, E47, E55, E60, E61	IC DEC 74H74	1909667
3	E19, E23, E29	IC DEC 74S74	1910544
1	E38	IC DEC 74S64	1910542
2	E27, E37	IC DEC 74123	1910436
2	E33, E53	IC DEC 74175	1910651
1	E9	IC DEC 74193	1910018
8	E1, E2, E3, E5, E10, E11, E14, E18	IC DEC 8234	1911315
1	E17	IC DEC 8640	1911469
4	HANDLE, FLIP CHIP (MAGENTA)	9008337-6	41
8	EYELET	9006732	42

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.

FIRST USED ON OPTION MODEL
RH70

ETCH BOARD REV A

DRN. J. Vincent	DATE 11-5-74
CHK'D. [Signature]	DATE 12-26-74
ENGR. [Signature]	DATE 1-15-75
PROD. ENGR. [Signature]	DATE 1-15-75
PROD. [Signature]	DATE 1/19/75

NEXT HIGHER ASSY
B-DD-RH70-0

SCALE 1:1

SHEET 1 OF 6

digital EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

TITLE CONTROL AND STATUS (CST)

SIZE CODE DCS M8151-0-1

NUMBER 1

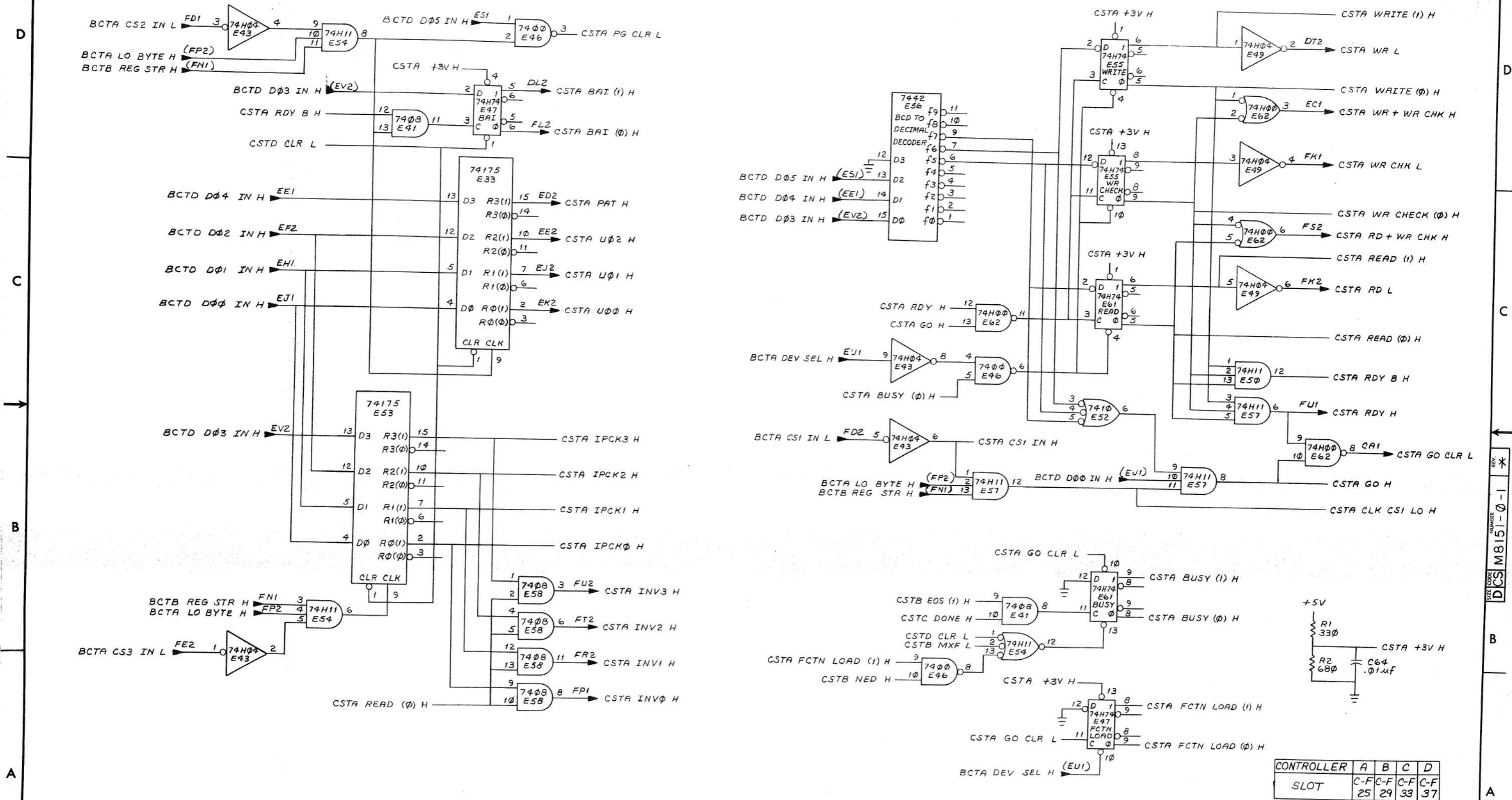
REV *

CHK	CHANGE NO.	REV	REVISIONS

DEC NO.	EIA NO.	DEC NO.	EIA NO.

SEMICONDUCTOR CONVERSION CHART

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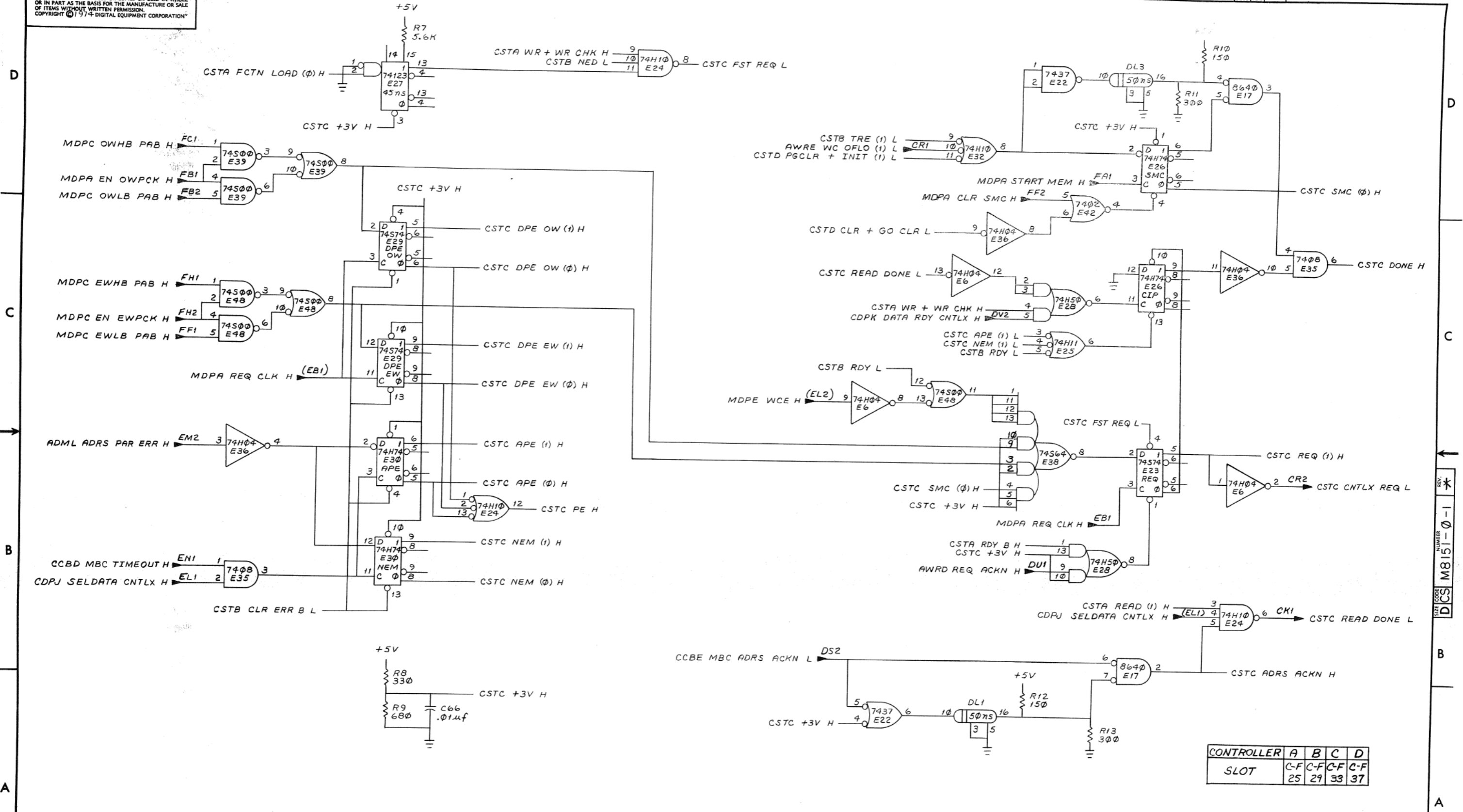
CONTROLLER	A	B	C	D
SLOT	C-F	C-F	C-F	C-F
	25	29	33	37

CSI, CS2, & CS3 CNTL & STATUS BITS; FUNCTION SELECT

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE CODE	NUMBER	REV.
CONTROL AND STATUS (CSTA)	DCS	M8151-0-1	*
SCALE	SHEET 2 OF 6	DIST.	

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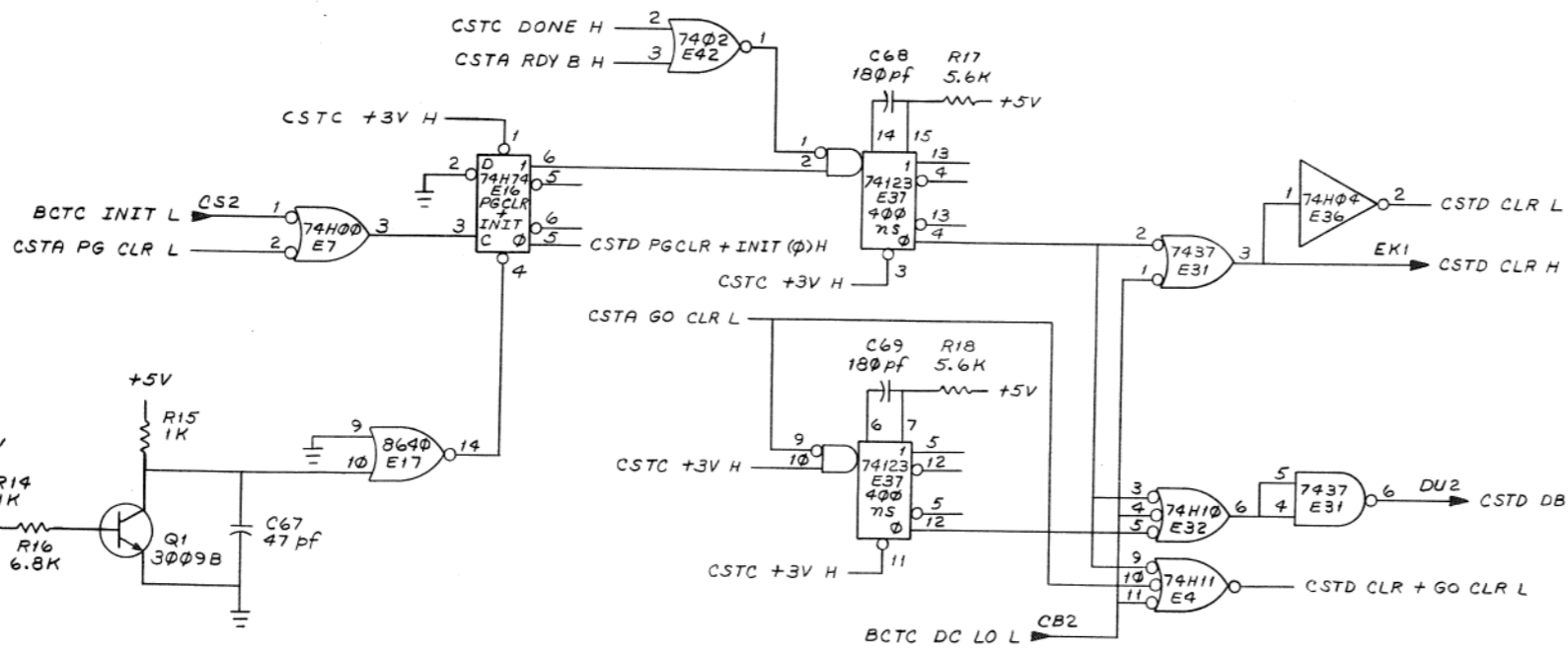
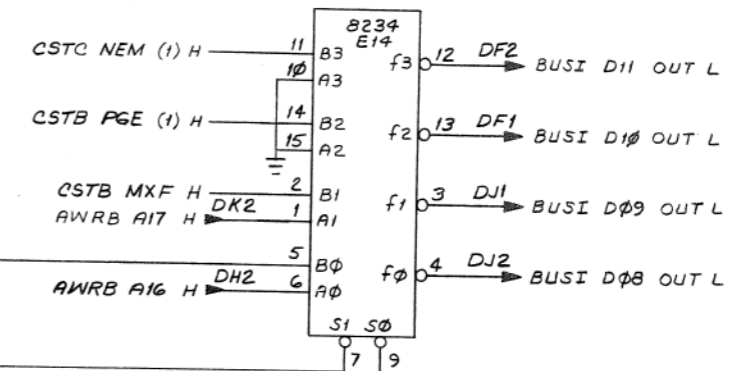
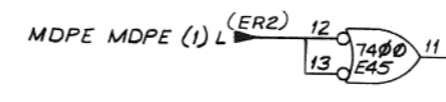
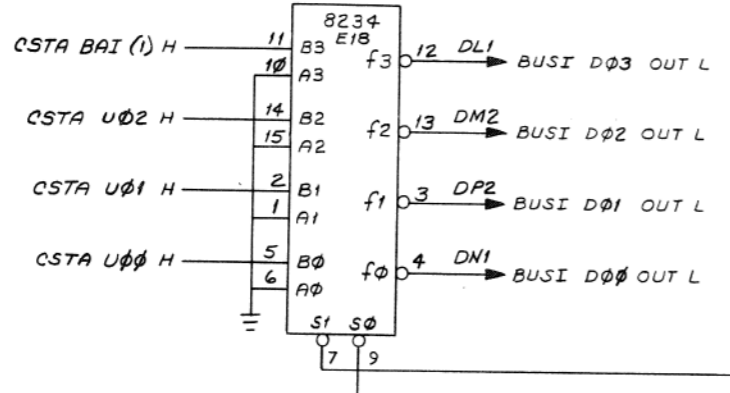
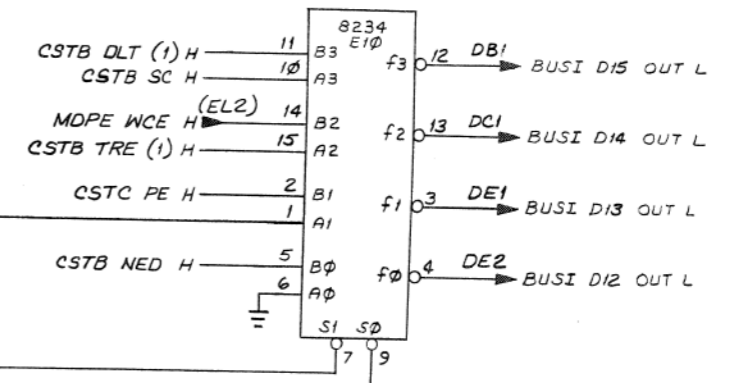
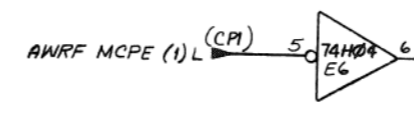
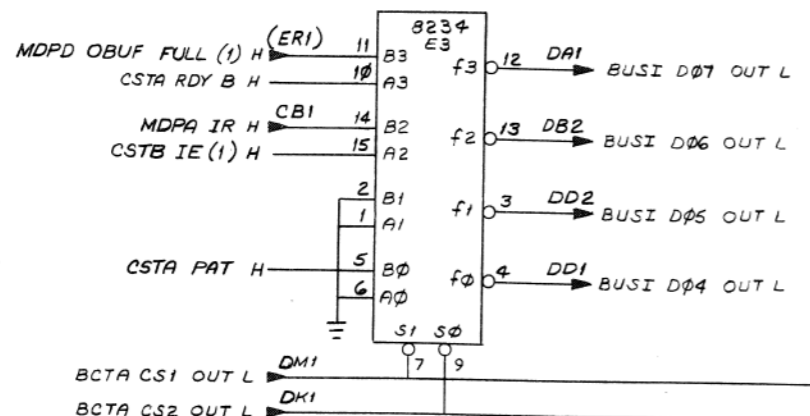


REVISIONS		
CHK	CHANGE NO.	REV.

PE; NEM & MEMORY CYCLE CONTROL

TITLE	SIZE CODE	NUMBER	REV.
CONTROL AND STATUS (CSTC)	DCS	M8151-0-1	*
SCALE	SHEET	4 OF 6	DIST.

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8234 OPEN COLLECTOR MULTIPLEXOR		
S0	S1	OUTPUT
L	L	B→f (NOT USED)
L	H	B→f
H	L	A→f
H	H	OFF

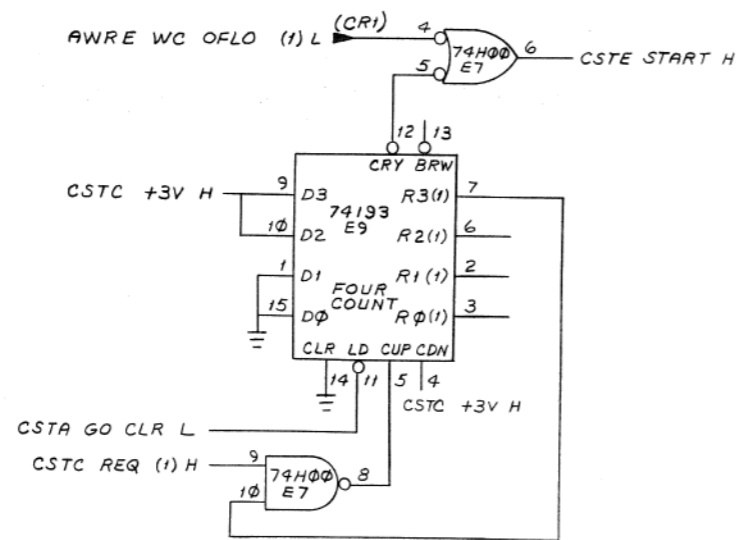
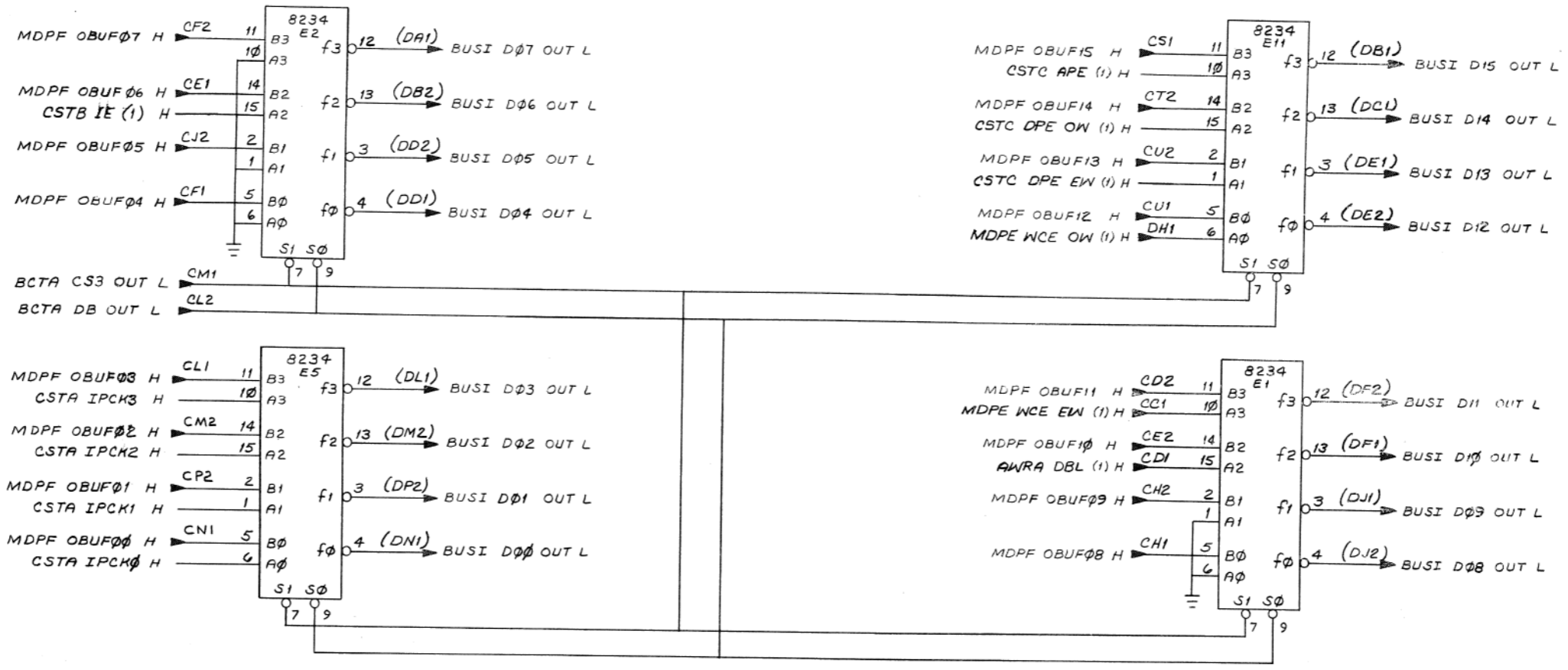
CONTROLLER	A	B	C	D
SLOT	C-F	C-F	C-F	C-F
	25	29	33	37

BUSI MUXS < CS1 & CS2 REGS. > & CLEAR LOGIC

REVISIONS		
CHK	CHANGE NO.	REV.

REV. * NUMBER M8151-0-1 SIZE CODE DCS

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8234
OPEN COLLECTOR
MULTIPLEXOR

S0	S1	OUTPUT
L	L	B→f (NOT USED)
L	H	B→f
H	L	A→f
H	H	OFF

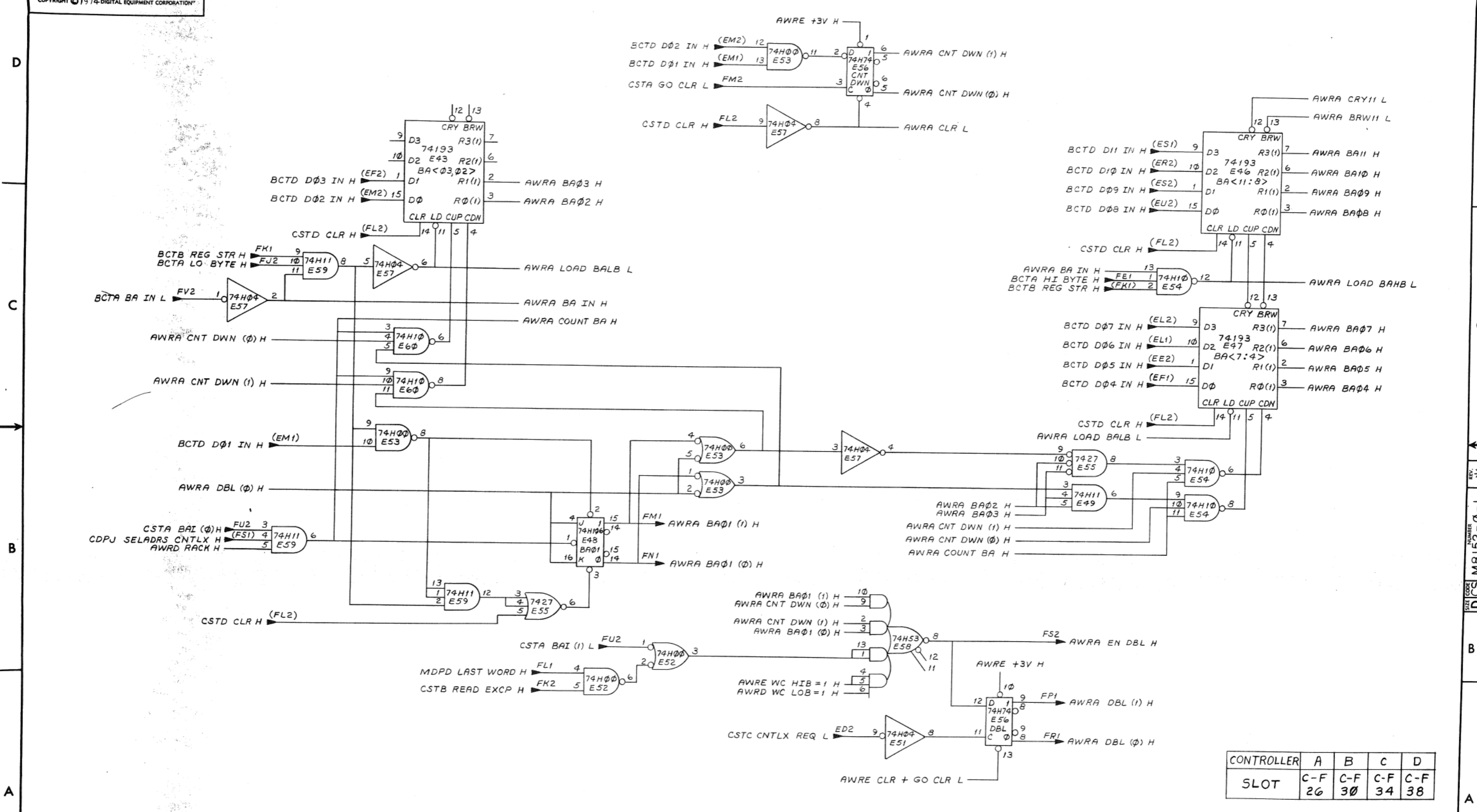
CONTROLLER	A	B	C	D
SLOT	C-F	C-F	C-F	C-F
	25	29	33	37

BUSI MUXS. <DB & CS3 REGS.> & START

REVISIONS		
CHK	CHANGE NO.	REV.

REV. *
NUMBER M8151-0-1
DCS

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CONTROLLER	A	B	C	D
SLOT	C-F	C-F	C-F	C-F
	26	30	34	38

(BUS ADDR REG. <11:01>)

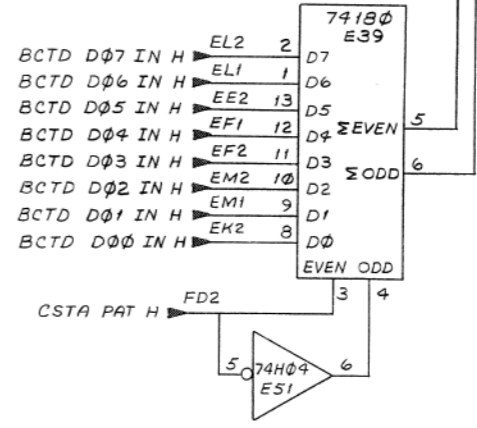
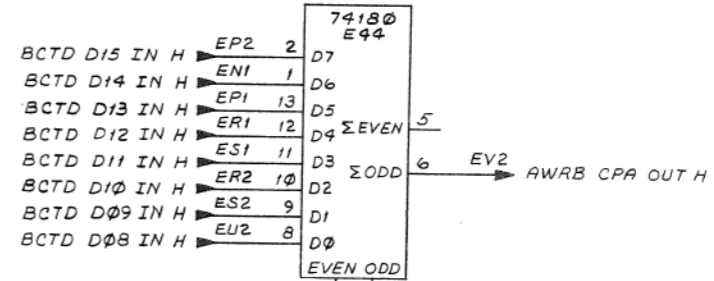
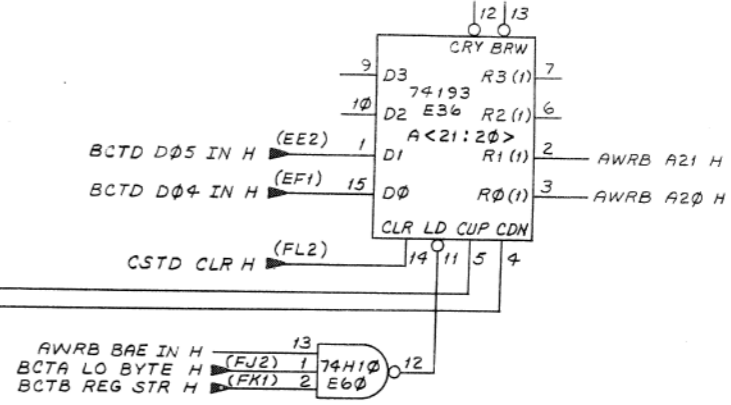
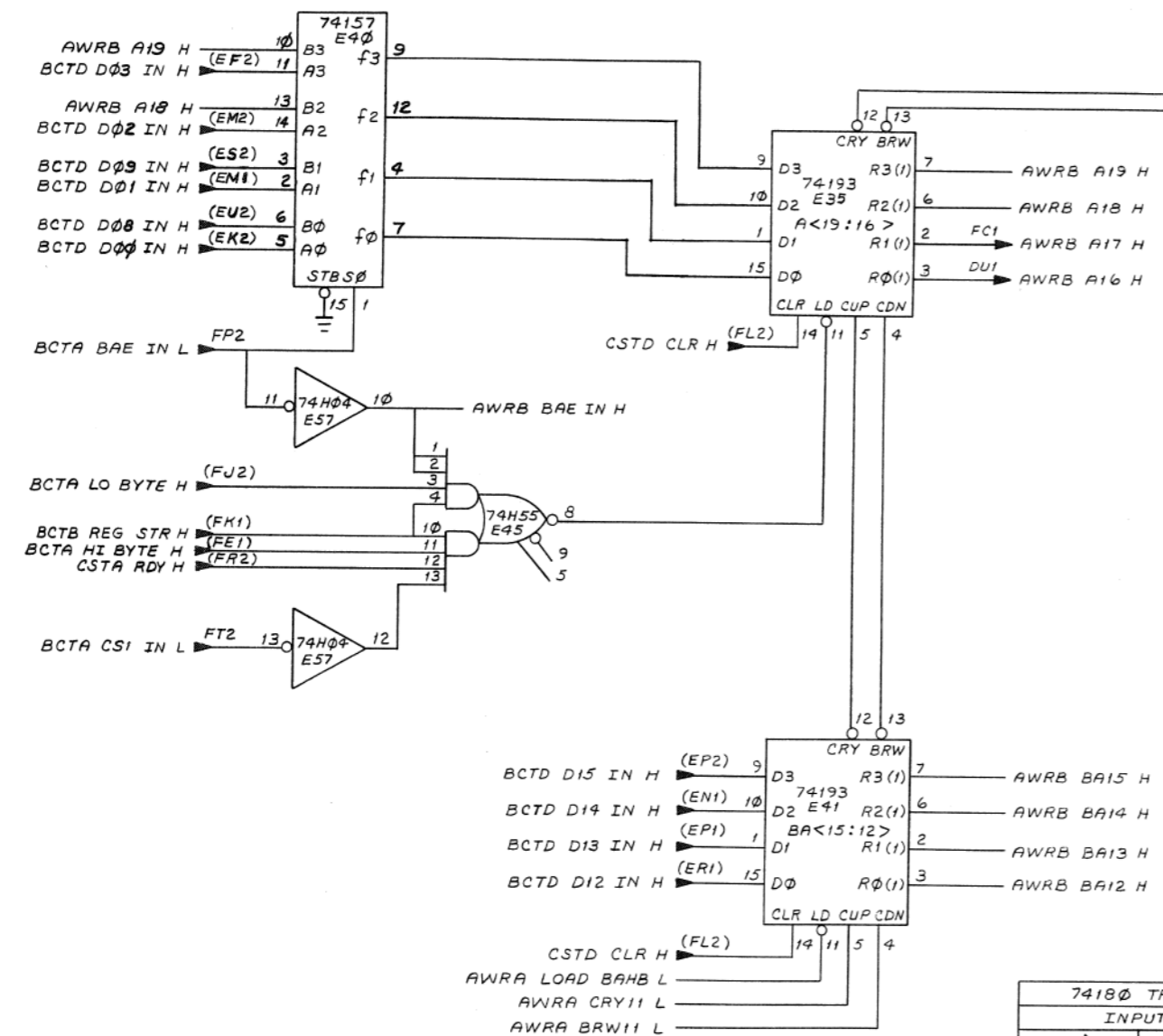
REVISIONS		
CHK	CHANGE NO.	REV.

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D
C
B
A

D
C
B
A

74157 QUAD MULTIPLEXOR	
S ϕ	OUTPUT
L	A \rightarrow F
H	B \rightarrow f



INPUTS		OUTPUTS	
Σ OF H'S AT D ϕ -D7		Σ EVEN	Σ ODD
EVEN	L	H	L
ODD	L	H	L
EVEN	H	L	L
ODD	H	L	H

CONTROLLER	A	B	C	D
SLOTS	C-F 26	C-F 30	C-F 34	C-F 38

(BUS ADDR & EXTENSION <21:12> & CNTL PARITY OUT)

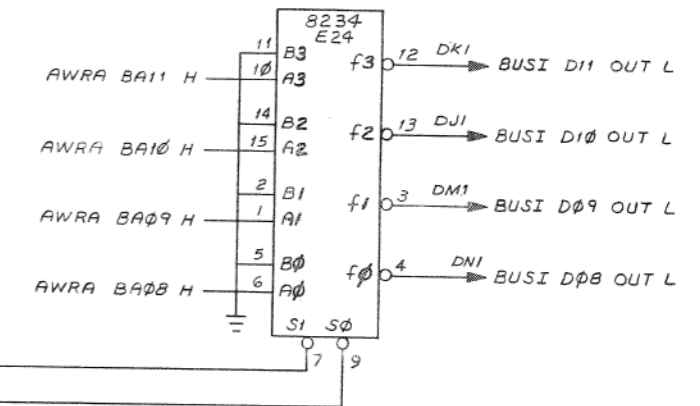
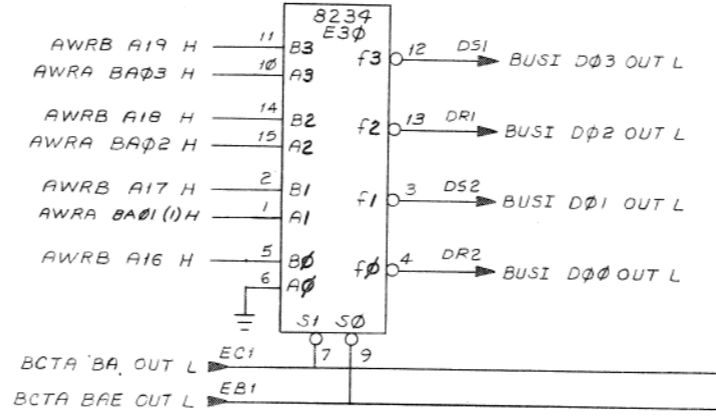
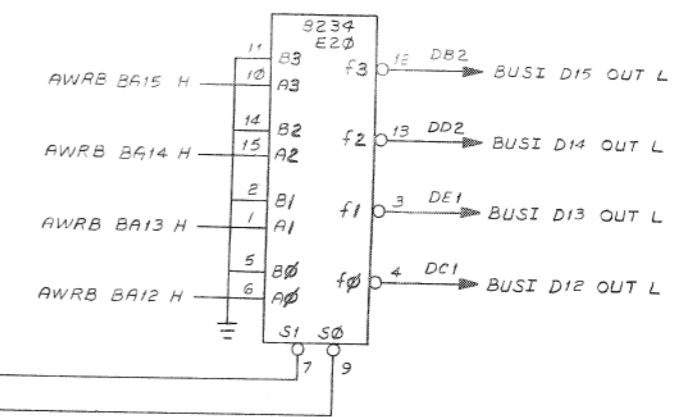
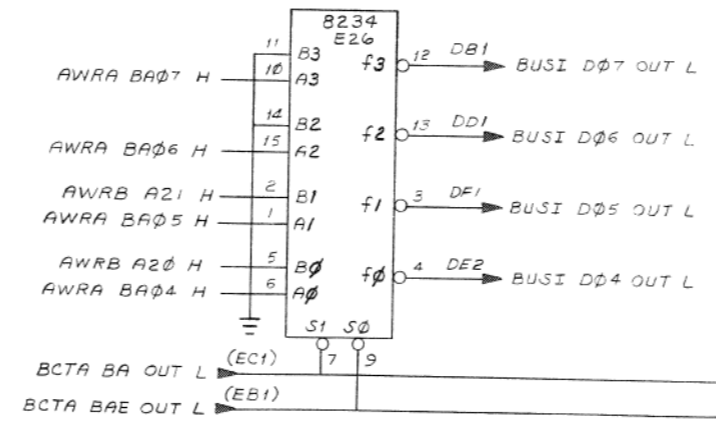
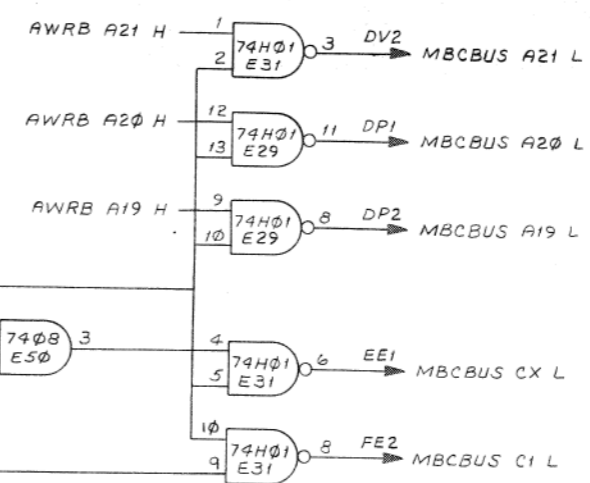
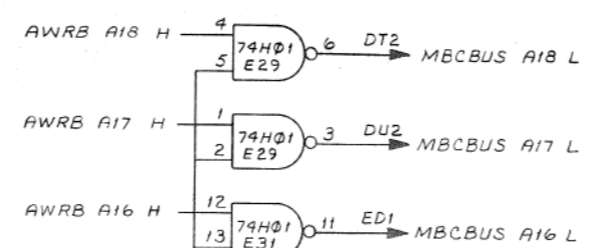
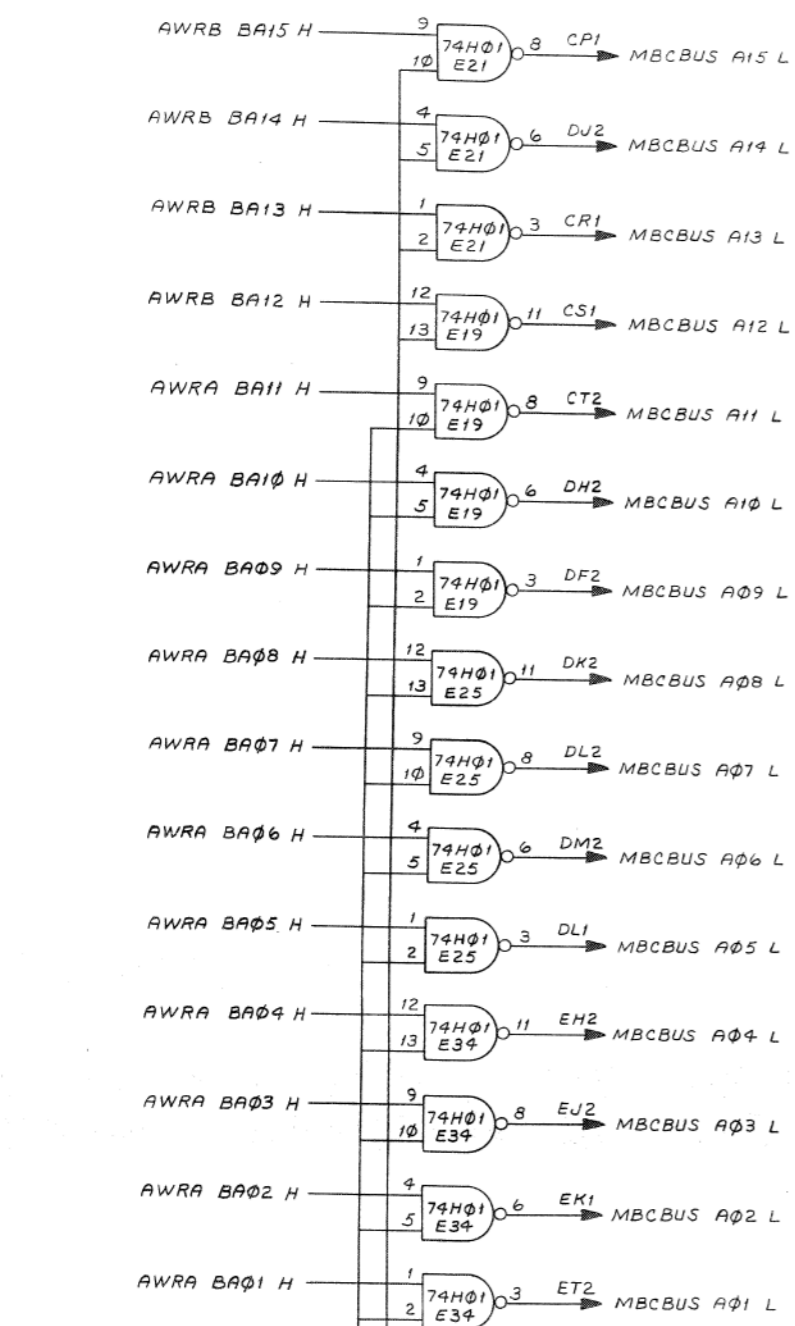
REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE CODE	NUMBER	REV.
ADDR. & WORD COUNT REGS. (AWRB)	DCS	M8152-0-1	*
SCALE	SHEET	DIST.	

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D
C
B
A

D
C
B
A



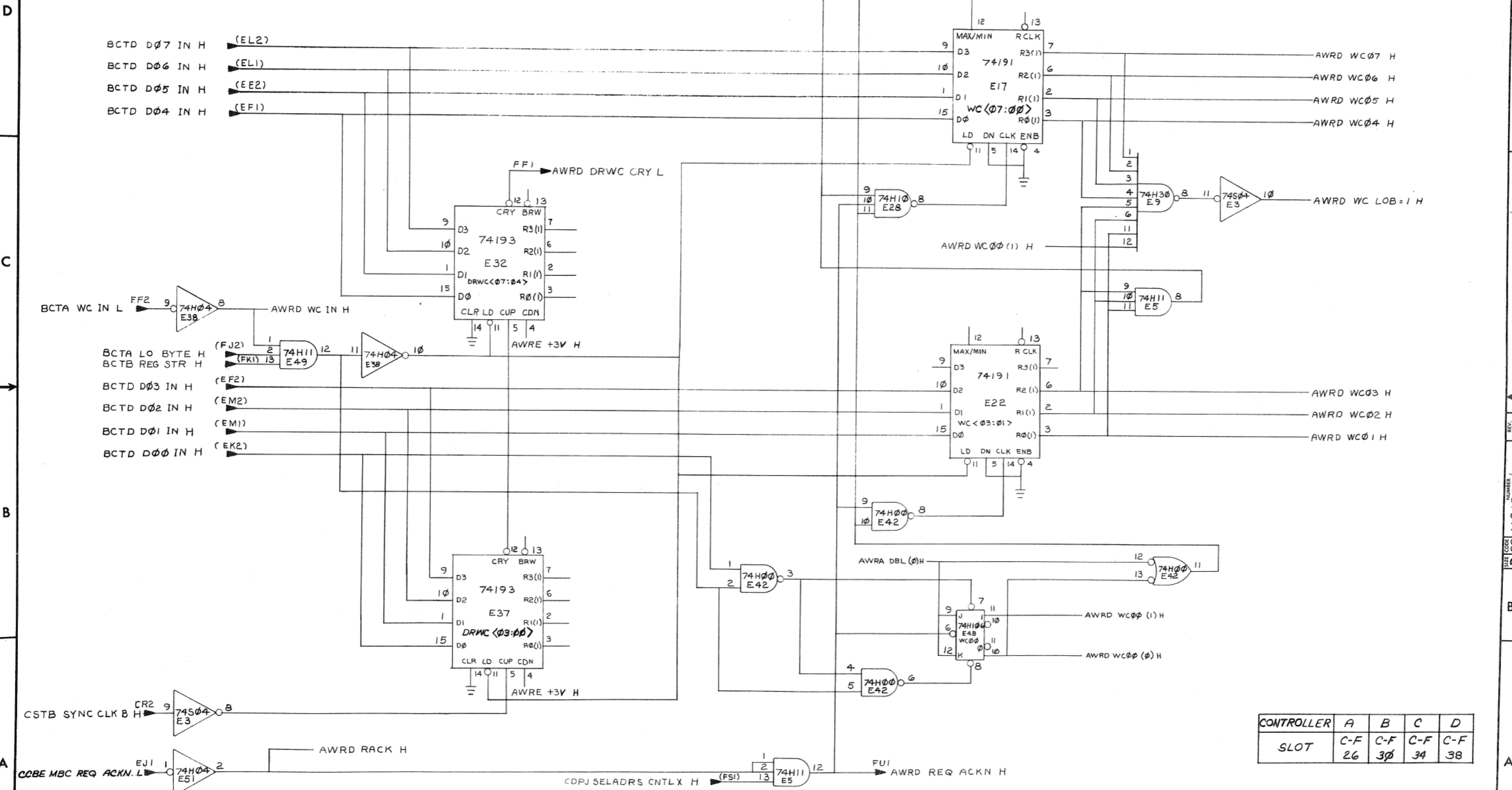
8234 OPEN COLLECTOR MULTIPLEXOR		
S0	S1	OUTPUT
L	L	B → f (NOT USED)
L	H	B → f
H	L	A → f
H	H	OFF

CONTROLLER	A	B	C	D
SLOT	C-F 26	C-F 30	C-F 34	C-F 38

(BUSI MUXTS. < BA & BAE REGS. > & ADDRESS DRIVERS)

REVISIONS		
CHK	CHANGE NO.	REV.

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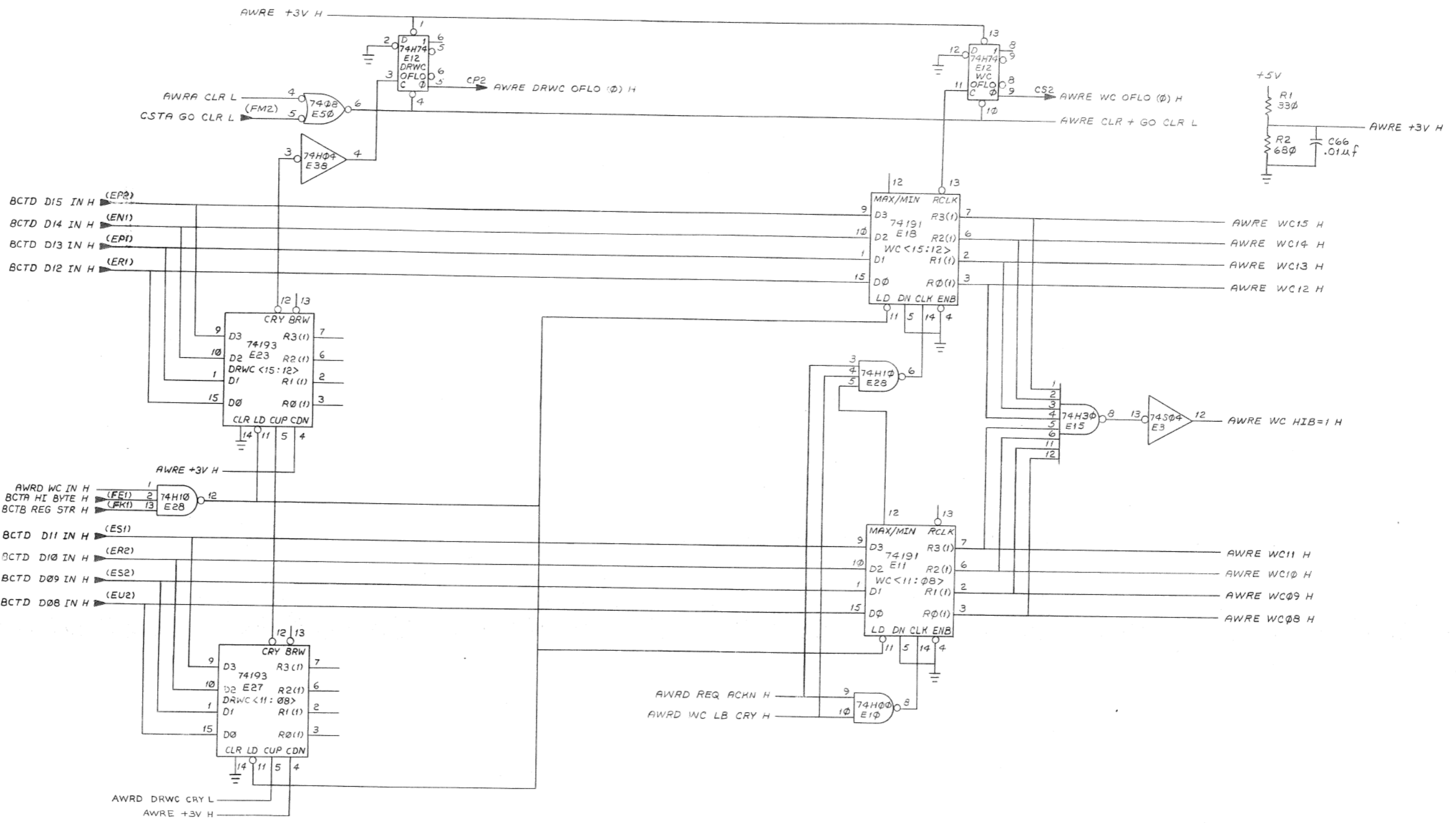
CONTROLLER	A	B	C	D
SLOT	C-F	C-F	C-F	C-F
	26	30	34	38

(WORD COUNT REGS. <07:00>)

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	ADDR. & WORD COUNT REGS. (AWRD)	SIZE CODE	D	NUMBER	M8152-0-1	REV.	*
SCALE	—/—	SHEET	5	OF	7	DIST.	

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CONTROLLER	A	B	C	D
SLOT	C-F 26	C-F 30	C-F 34	C-F 38

(WORD COUNT REGS <15:08> WC OFLO)

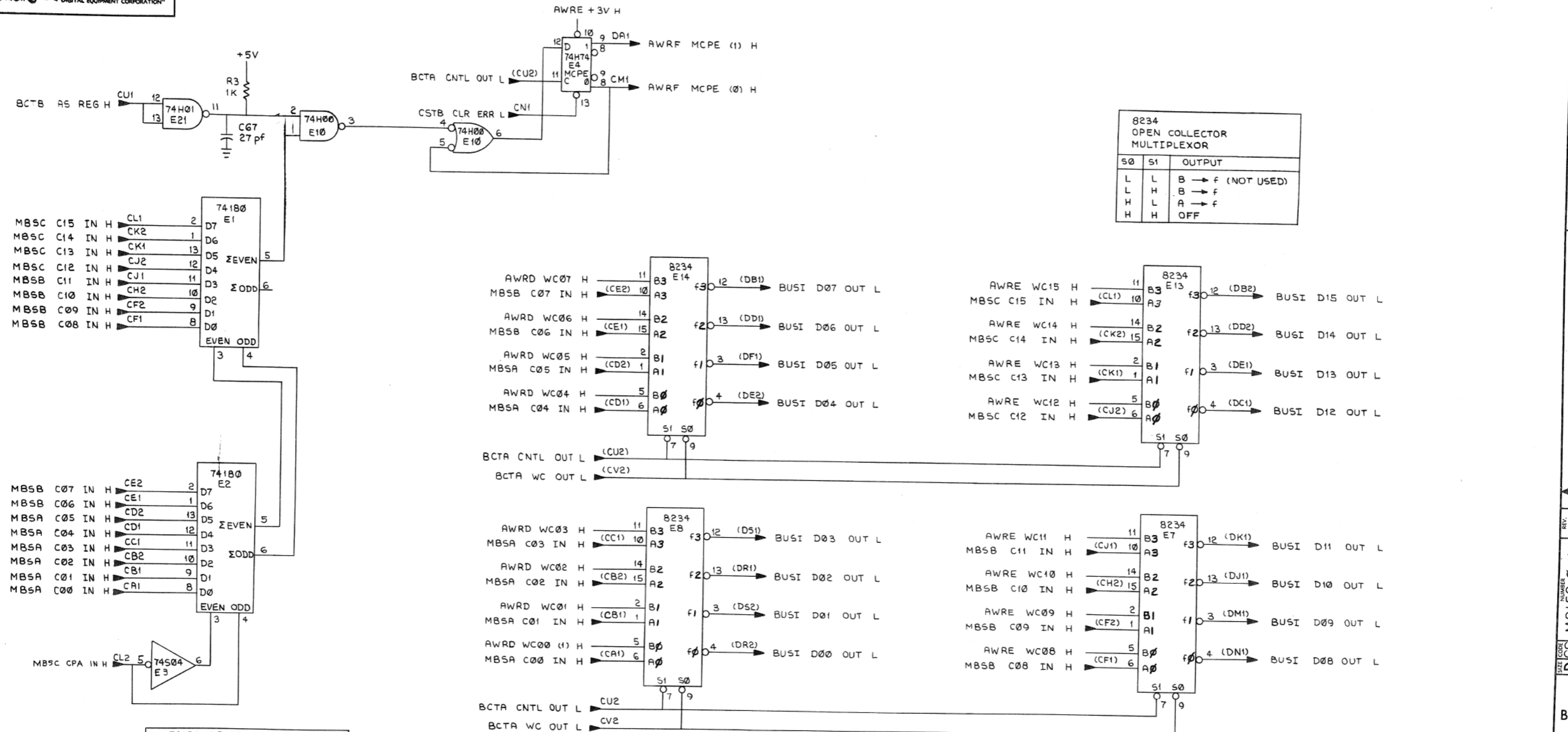
REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	ADDR. & WORD COUNT REGS. (AWRE)	SIZE CODE	D CS	NUMBER	M8152-0-1	REV.	*
SCALE	—#—	SHEET	6	OF	7	DIST.	

DATE CODE NUMBER DCS M8152-0-1 REV. *

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1-0-2918W DCS 2



8234 OPEN COLLECTOR MULTIPLEXOR		
S0	S1	OUTPUT
L	L	B → f (NOT USED)
L	H	B → f
H	L	A → f
H	H	OFF

INPUTS		OUTPUTS	
Σ OF 1'S AT D0 - D7	EVEN	ODD	Σ EVEN Σ ODD
EVEN	L	H	L H
ODD	L	H	H L
EVEN	H	L	H L
ODD	H	L	L H

CONTROLLER	A	B	C	D
SLOT	C-F	C-F	C-F	C-F
	26	30	34	38

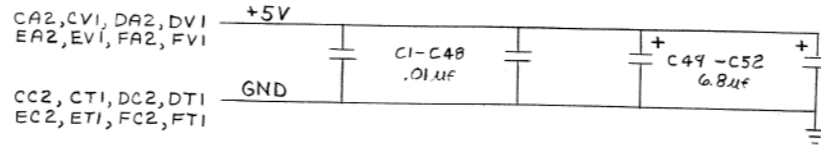
REVISIONS		
CHK	CHANGE NO.	REV.

(BUSI MUXTS. <WC & REMOTE REGS.> & MCPE)
 TITLE ADDR. & WORD COUNT REGS. (AWRF) DCS M8152-0-1 *
 SCALE ---#--- SHEET 7 OF 7 DIST. ---#---

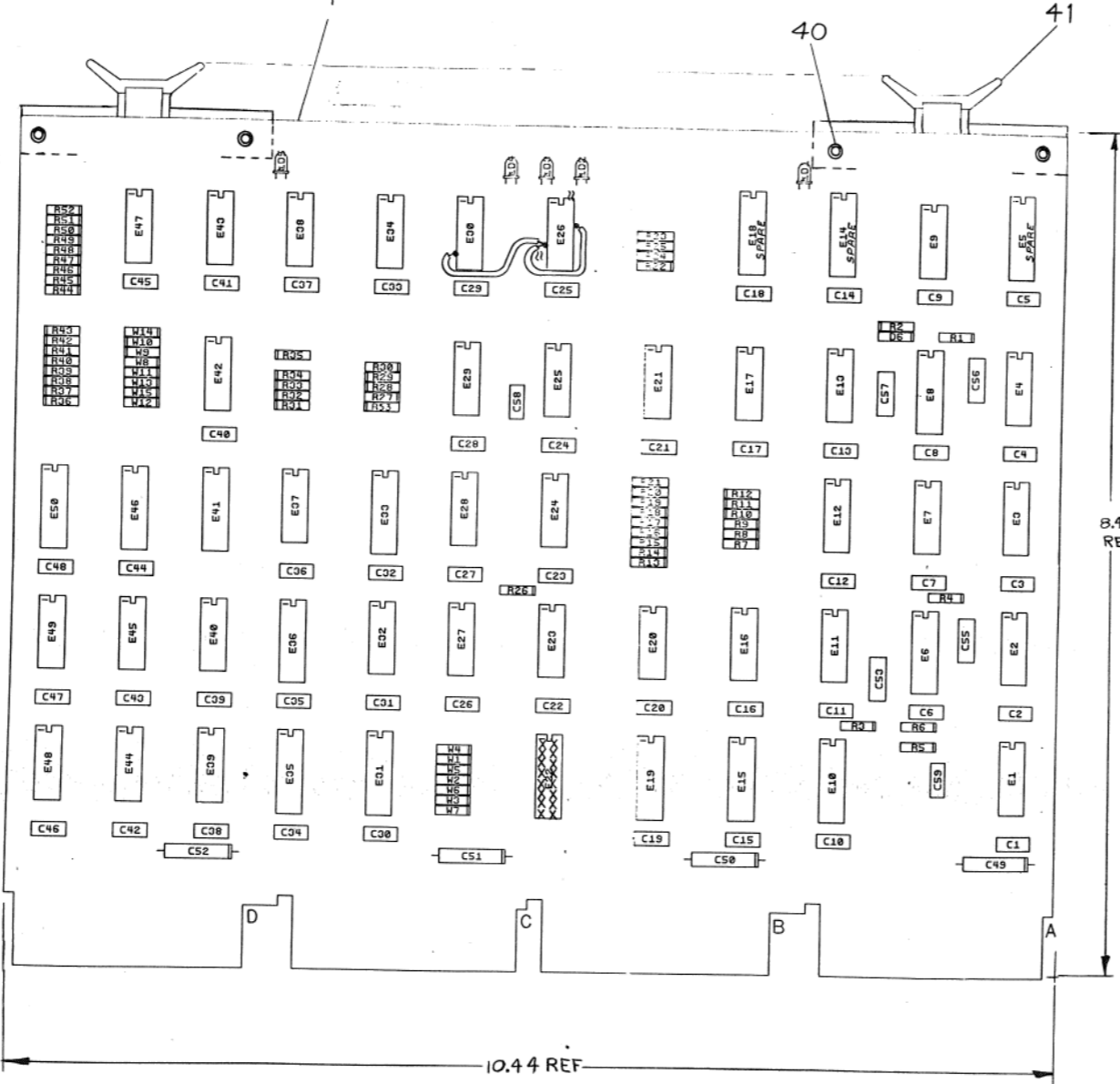
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NOTES:

- IC SLOTS E5, E14, AND E18 ARE SPARES.
- PIN DESIGNATIONS ON CIRCUIT SCHEMATICS REFER TO MODULE POSITION IN RH7Ø BACKPLANE.



PIN NOMENCLATURE	
MODULE PINS	BACKPLANE PINS
A	C
B	D
C	E
D	F



REF	DESCRIPTION	PART NO.	ITEM NO.
REF	X-Y COORDINATE HOLE LOCATION	K-CO-M8153-Ø-4	1
REF	ASSY/DRILLING HOLE LAYOUT	D-AH-M8153-Ø-5	2
REF	MODULE ECO HISTORY	B-MH-M8153-Ø-6	3
1	ETCHED CIRCUIT BOARD	5011271	4
1	C53 CAPACITOR, 47pf, 100V, 5%	1000011	5
1	C56 CAPACITOR, 100pf, 100V, 5%	1000016	6
1	C57 CAPACITOR, 220pf, 100V, 5%	1000021	7
1	C58 CAPACITOR, 330pf, 100V, 5%	1000023	8
49	C1 THRU C48, C59 CAPACITOR, .01µf, 100V, 20% DISC	1001610-01	9
4	C49 THRU C52 CAPACITOR, 6.8µf, 35V, 10%	1005306	10
1	C55 CAPACITOR, 22pf, 100V, 5%	1005820	11
1	D6 DIODE, D664	1100114	12
5	D1 THRU D5 DIODE, LED	1110864	13
1	E22 I.C. SOCKET 16 PIN	1209838	14
1	E41 I.C. COMPONENT CARRIER	1211323	15
1	R29 RESISTOR, 47, 1/4W, 5%	1300202	16
7	R6, R22 THRU R25, R28, R35, RESISTOR, 390, 1/4W, 5%	1300309	17
38	R7 THRU R21, R26, R30 THRU R34, R36 THRU R52 RESISTOR, 1K, 1/4W, 5%	1300365	18
3	R5, R27, R53 RESISTOR, 180, 1/4W, 5%	1301322	19
3	R1, R3, R4 RESISTOR, 5.6K, 1/4W, 5%	1301874	20
1	R2 RESISTOR, 27K, 1/4W, 5%	1305346	21
2	E1, E30 I.C. DEC 7402	1909004	22
2	E7, E9 I.C. DEC 74H00	1909056	23
2	E12, E38 I.C. DEC 74H10	1909057	24
2	E13, E43 I.C. DEC 74H11	1909267	25
4	E11, E17, E24, E26 I.C. DEC 74H74	1909667	26
5	E4, E27, E28, E29, E32 I.C. DEC 8881	1909705	27
2	E42, E47 I.C. DEC 8242	1909712	28
5	E3, E16, E20, E23, E34 I.C. DEC 74H04	1909931	29
3	E10, E15, E19 I.C. DEC 7442	1910046	30
2	E2, E40 I.C. DEC 7437	1910091	31
1	E25 I.C. DEC 7408	1910155	32
1	E46 I.C. DEC 7485	1910224	33
2	E6, E8 I.C. DEC 74123	1910436	34
1	E21 I.C. DEC 7427	1910878	35
4	E31, E33, E35, E36 I.C. DEC 8838	1911117	36
6	E37, E39, E44, E45, E48, E49 I.C. DEC 8640	1911469	37
1	E50 I.C. DEC 8223 PROM	23040A1	38
1	(E22) PRIORITY JUMPER LEVEL #5	5408778	39
8	EYELET	9006732	40
4	HANDLE, FLIP CHIP (MAGENTA)	9008337-06	41
15	W1 THRU W15 JUMPER, INSULATED	9009185	42
A/R	(E41) #22 AWG BUSS WIRE (UNINSULATED)	9007560-01	43
2"	WIRE #30 AWG BUS (RETROFIT)	9105740-55	44

IC TYPE	GND	+5V
IC DEC 8640	1	8
IC DEC 8838	8	16
IC DEC 74123	8	16
IC DEC 7485	8	16
IC DEC 7442	8	16
IC DEC 8223	8	16

GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE.

IC PIN LOCATIONS

FIRST USED ON OPTION MODEL RH7Ø

ETCH BOARD REV B

DRN	DATE	
CHKD	DATE	
ENG	DATE	
PRD/ENG	DATE	
PRD	DATE	

TITLE: UNIBUS CONTROL (BCT)

SIZE CODE: DCS M8153-Ø-1

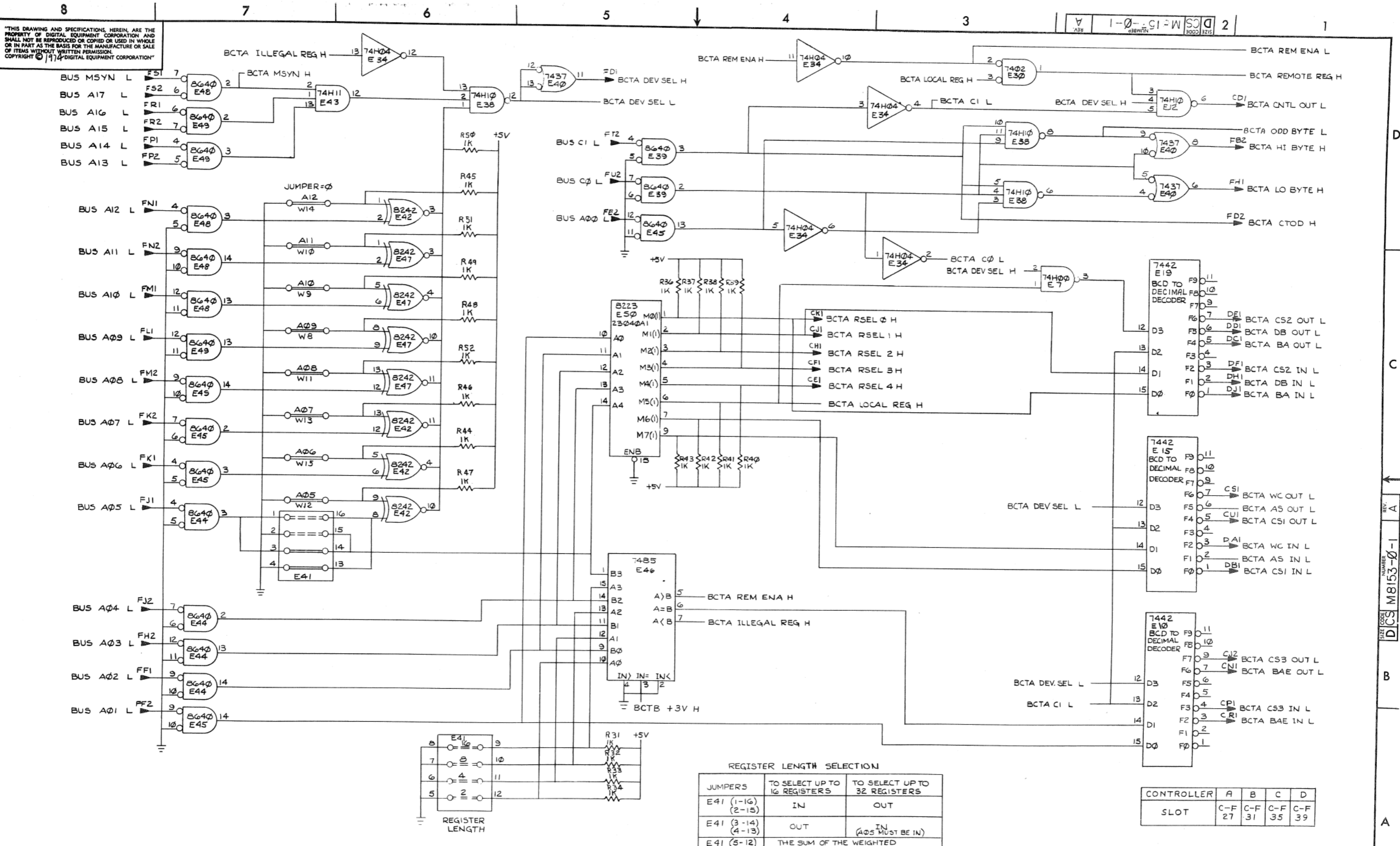
NUMBER: 1

REV: A

SEMICONDUCTOR CONVERSION CHART

SHEET 1 OF 6

DCSM8153-Ø-1



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1-0-01-W 2

REVISIONS		
CHK	CHANGE NO.	REV.

JUMPERS	TO SELECT UP TO 16 REGISTERS	TO SELECT UP TO 32 REGISTERS
E41 (1-16) (2-15)	IN	OUT
E41 (3-14) (4-13)	OUT	IN (A05 MUST BE IN)
E41 (5-12) (6-11) (7-10) (8-9)	THE SUM OF THE WEIGHTED VALUES OF JUMPERS REMOVED PLUS 2 IS THE NO. OF REGS SELECTED	

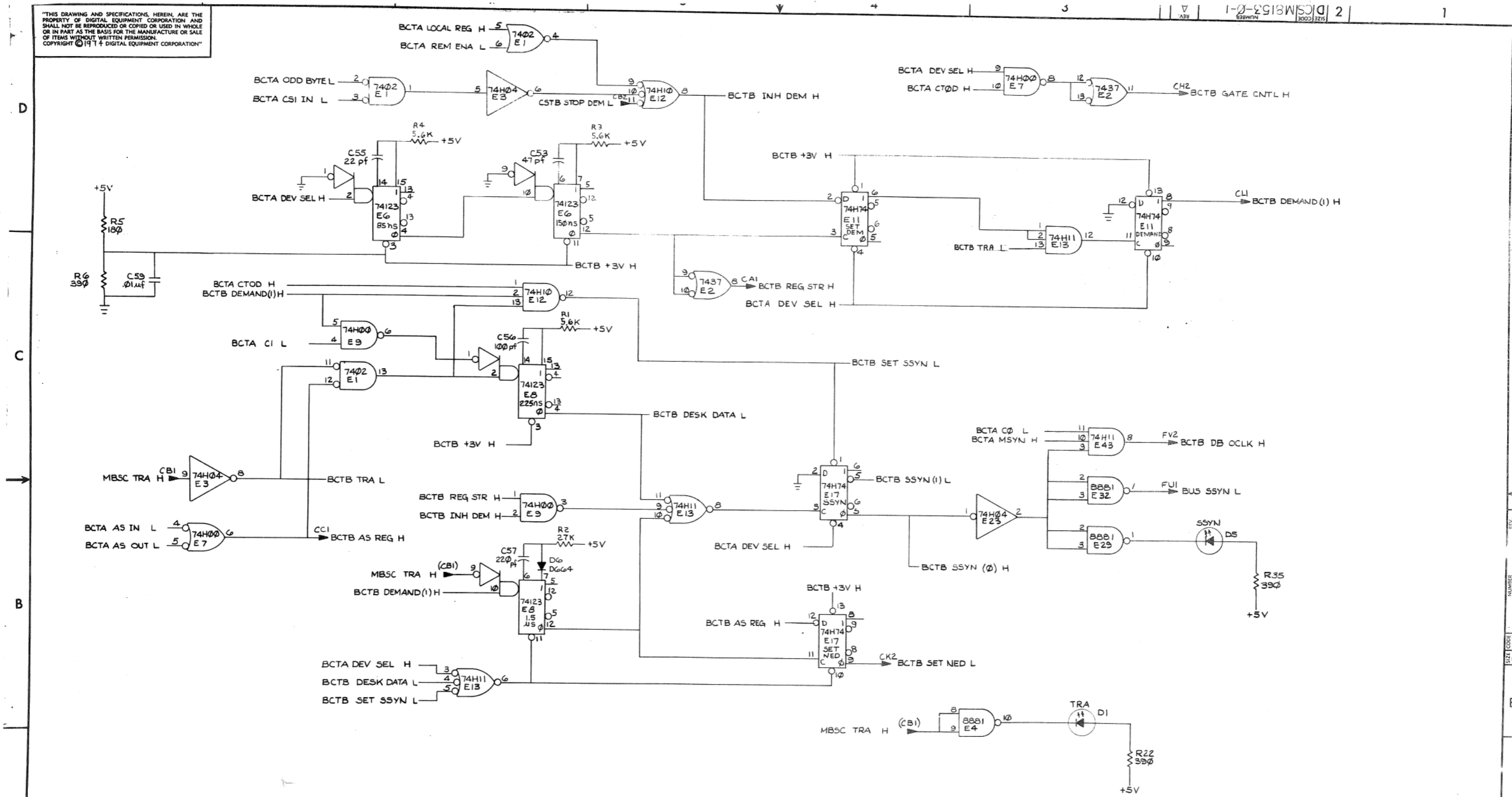
CONTROLLER	A	B	C	D
SLOT	C-F 27	C-F 31	C-F 35	C-F 39

(REGISTER SELECTION)

TITLE	UNIBUS CONTROL (BCTA)	SIZE CODE	D CS	NUMBER	M8153-0-1	REV.	A
SCALE	1/1	SHEET	2	OF	6	DIST.	

REV. A
M8153-0-1
D CS

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CONTROLLER	A	B	C	D
SLOT	C-F 27	C-F 31	C-F 35	C-F 39

REVISIONS		
CHK	CHANGE NO.	REV.

(SSYN & DEMAND LOGIC)

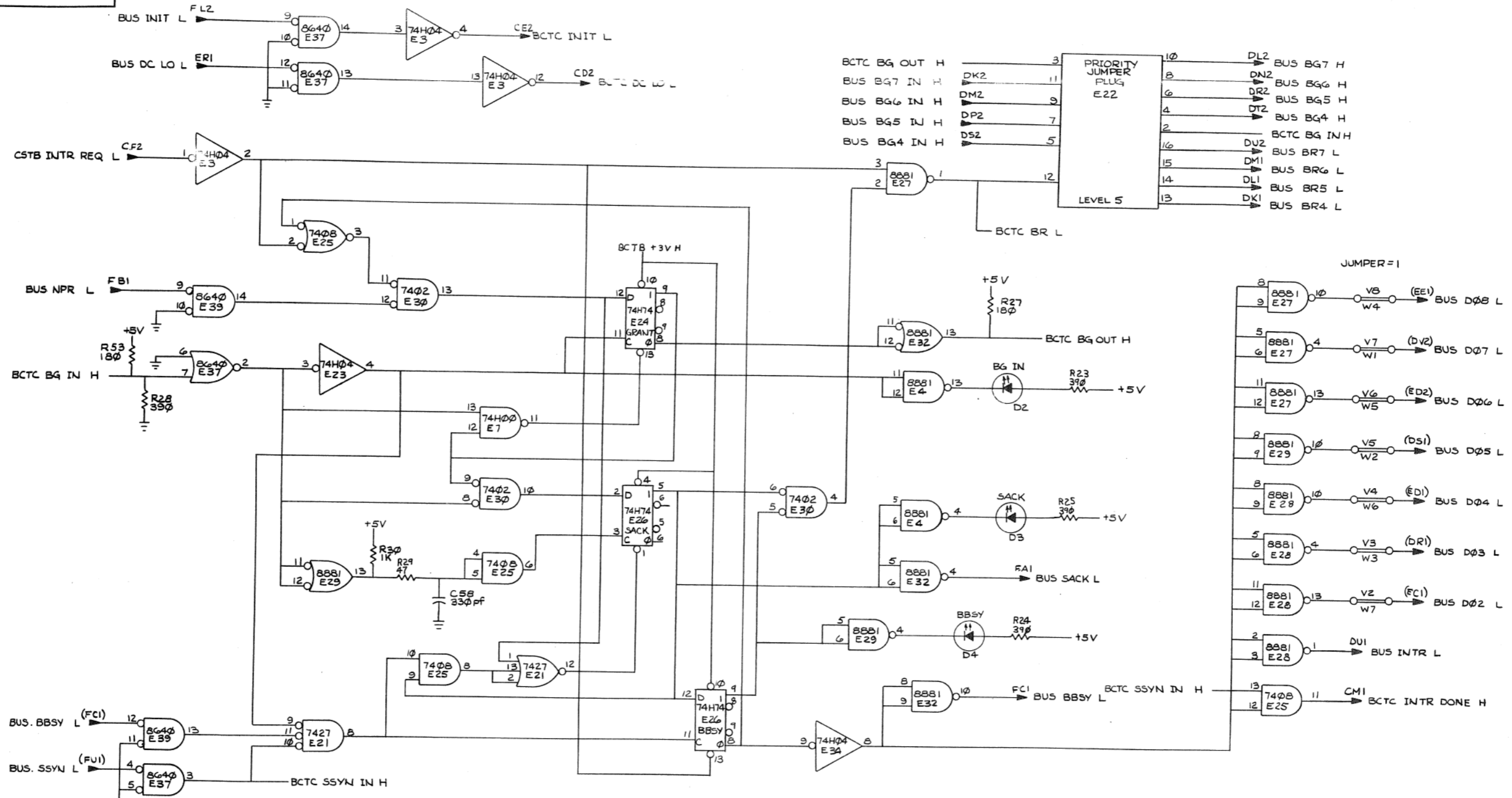
TITLE	UNIBUS CONTROL (BCTB)	SIZE CODE	D CS	NUMBER	M8153-0-1	REV.	A
SCALE	# #	SHEET	3	OF	6	DIST.	

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D
C
B
A

D
C
B
A

REV. A
NUMBER DCS M8153-0-1
SIZE CODE

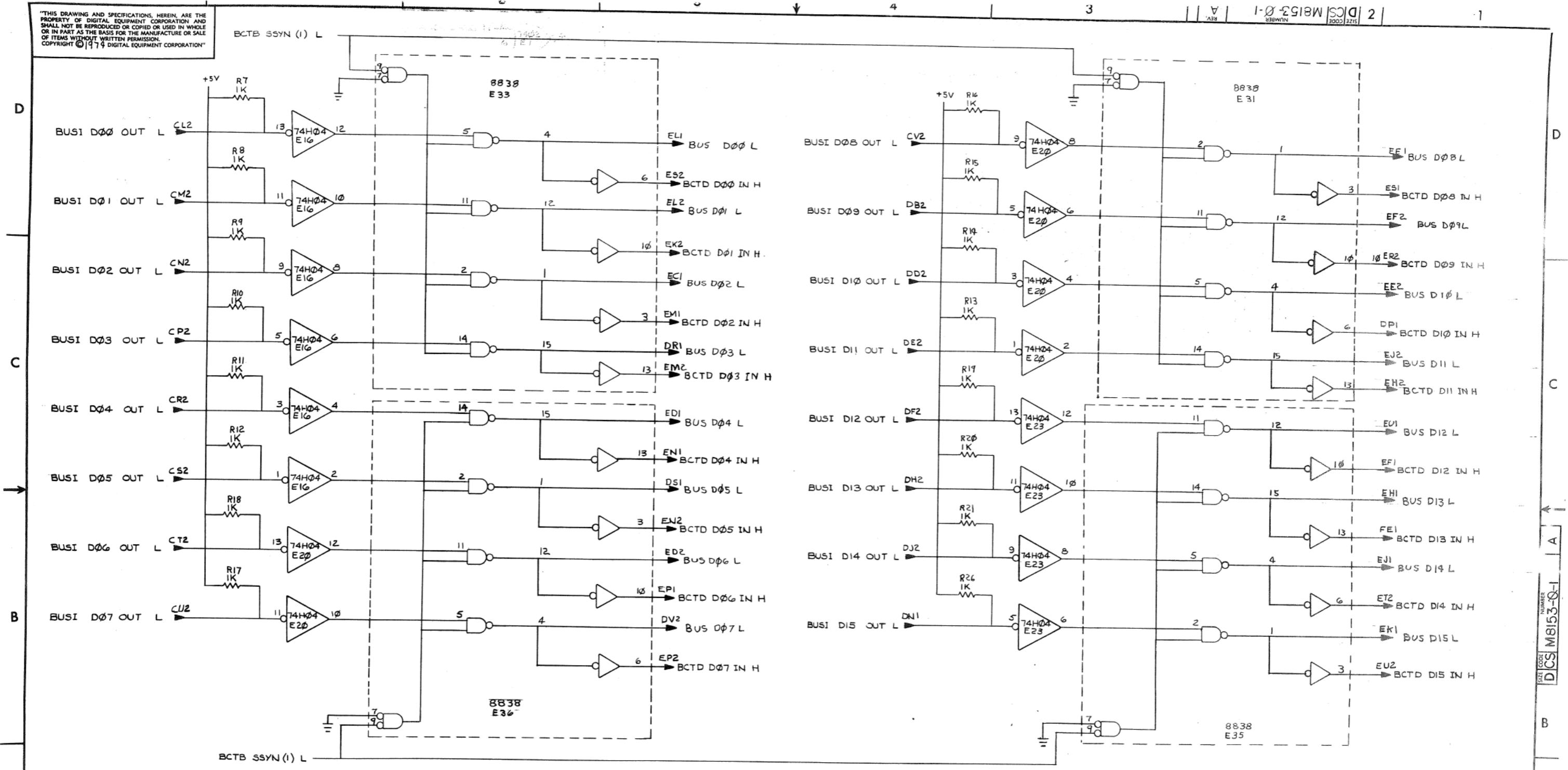


CONTROLLER	A	B	C	D
SLOT	C-F 27	C-F 31	C-F 35	C-F 39

REVISIONS		
CHK	CHANGE NO.	REV.

(UNIBUS INTERRUPT LOGIC)
 TITLE UNIBUS CONTROL (BCTC) SIZE CODE DCS NUMBER M8153-0-1 REV. A
 SCALE 1/1 SHEET 4 OF 6 DIST.

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CONTROLLER	A	B	C	D
SLOT	C-F 27	C-F 31	C-F 35	C-F 39

REVISIONS		
CHK	CHANGE NO.	REV.

(UNIBUS DATA TRANSCIVERS)		TITLE UNIBUS CONTROL(BCTD)		SIZE CODE DCS	NUMBER M8153-0-1	REV. A
SCALE	#	SHEET 5 OF 6	DIST.			

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NOTES:

1. THE RHBAE & RHCS3 REGIS RS WILL BE SELECTED AS THE LAST TWO REGISTERS IN THE REGISTER SET. THE JUMPERS ON BCTA SELECT THE DESIRED NUMBER OF REGISTERS IN THE SET. WHEN RHBAE OR RHCS3 IS SELECTED THE MASSBUS REGISTER SELECTION WILL BE DISABLED.

REGISTER SELECT PROM - L3040A1 (0223)								
OCTAL ADDR	LOCAL REG		RSEL 4	RSEL 3	RSEL 2	RSEL 1	RSEL 0	RSEL 0
	M7	M6						
00	L	L	L	L	L	L	L	L
01	H	L	H	L	L	L	L	H
02	H	H	H	L	L	L	L	L
03	H	H	L	L	L	H	L	H
04	H	H	H	L	L	L	H	L
05	H	H	L	L	L	L	L	H
06	H	H	L	L	L	L	H	L
07	L	H	L	L	L	H	L	L
10	H	H	L	L	L	H	H	H
11	H	H	H	L	L	L	L	H
12	H	H	L	L	L	L	H	H
13	H	H	L	L	L	H	H	L
14	H	H	L	L	H	L	L	L
15	H	H	L	L	H	L	L	H
16	H	H	L	L	H	L	H	L
17	H	H	L	L	H	L	H	H
20	H	H	L	L	H	H	L	L
21	H	H	L	L	H	H	L	H
22	H	H	L	L	H	H	H	L
23	H	H	L	L	H	H	H	H
24	H	H	L	H	L	L	L	L
25	H	H	L	H	L	L	L	H
26	H	H	L	H	L	L	H	L
27	H	H	L	H	L	L	H	H
30	H	H	L	H	L	H	L	L
31	H	H	L	H	L	H	L	H
32	H	H	L	H	L	H	H	L
33	H	H	L	H	L	H	H	H
34	H	H	L	H	H	L	L	L
35	H	H	L	H	H	L	L	H
36	H	H	L	H	H	L	H	L
37	H	H	L	H	H	L	H	H

REGISTER SELECTED, SEE NOTE #1	UNIBUS ADDRESS, SEE NOTE #1
RHCS1 & MASSBUS (00)	BASE ADDR
RHWC	BASE +2
RHBA	BASE +4
MASSBUS (05)	BASE +6
RHCS2	BASE +10
MASSBUS (01)	BASE +12
MASSBUS (02)	BASE +14
MASSBUS (04)	BASE +16
MASSBUS (07)	BASE +20
RHDB	BASE +22
MASSBUS (03)	BASE +24
MASSBUS (06)	BASE +26
MASSBUS (10)	BASE +30
MASSBUS (11)	BASE +32
MASSBUS (12)	BASE +34
MASSBUS (13)	BASE +36
MASSBUS (14)	BASE +40
MASSBUS (15)	BASE +42
MASSBUS (16)	BASE +44
MASSBUS (17)	BASE +46
MASSBUS (20)	BASE +50
MASSBUS (21)	BASE +52
MASSBUS (22)	BASE +54
MASSBUS (23)	BASE +56
MASSBUS (24)	BASE +60
MASSBUS (25)	BASE +62
MASSBUS (26)	BASE +64
MASSBUS (27)	BASE +66
MASSBUS (30)	BASE +70
MASSBUS (31)	BASE +72
MASSBUS (32)	BASE +74
MASSBUS (33)	BASE +76

RHBAE, RHCS3

CONTROLLER	A	B	C	D
SLOT	C-F 27	C-F 31	C-F 35	C-F 39

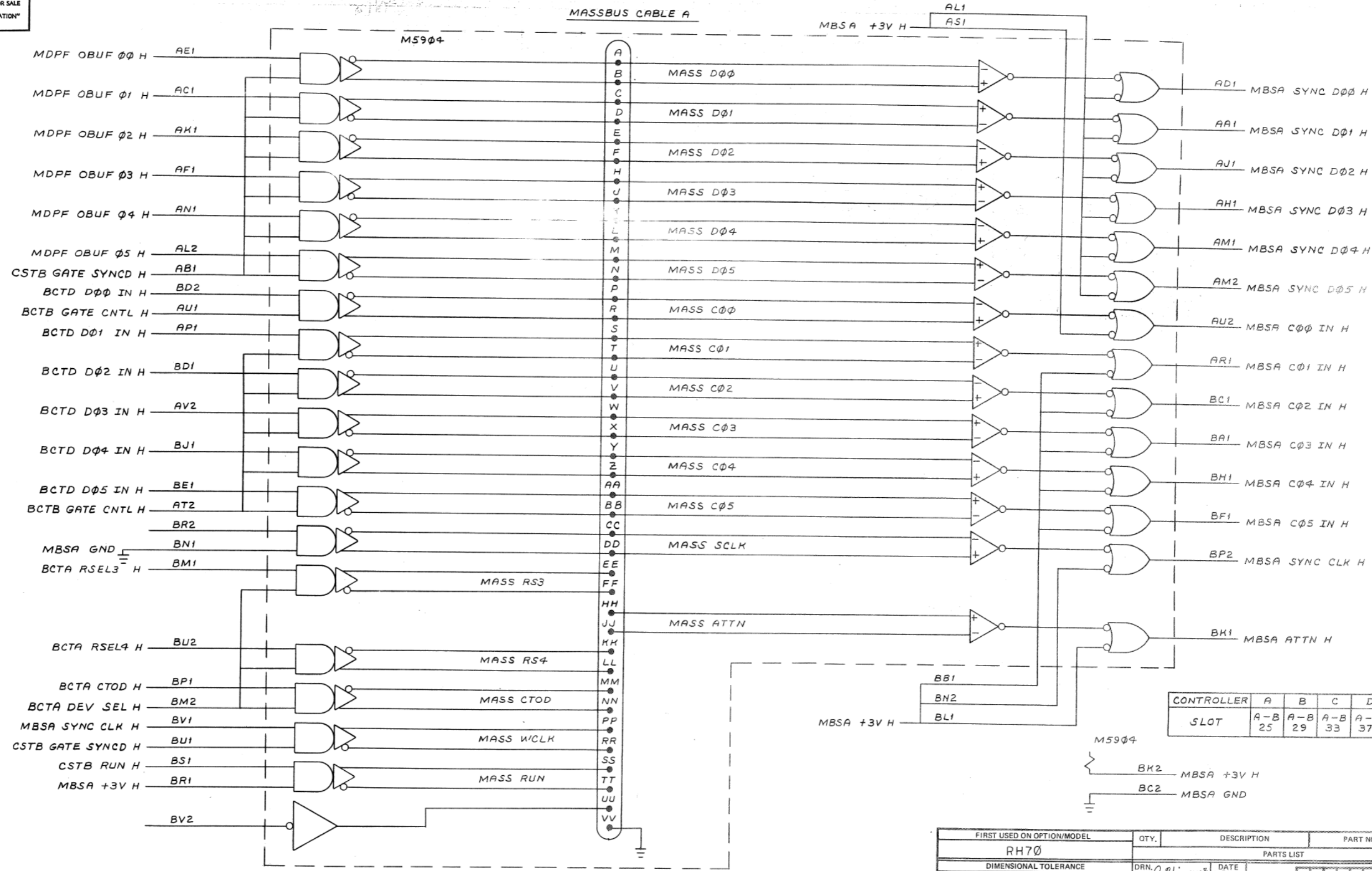
(PROM TRUTH TABLE)

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	UNIBUS CONTROL (BCTE)	SIZE CODE	D CS	NUMBER	M8153-0-1	REV.	A
SCALE	# #	SHEET	6 OF 6	DIST.			

REV. A
D CS M8153-0-1

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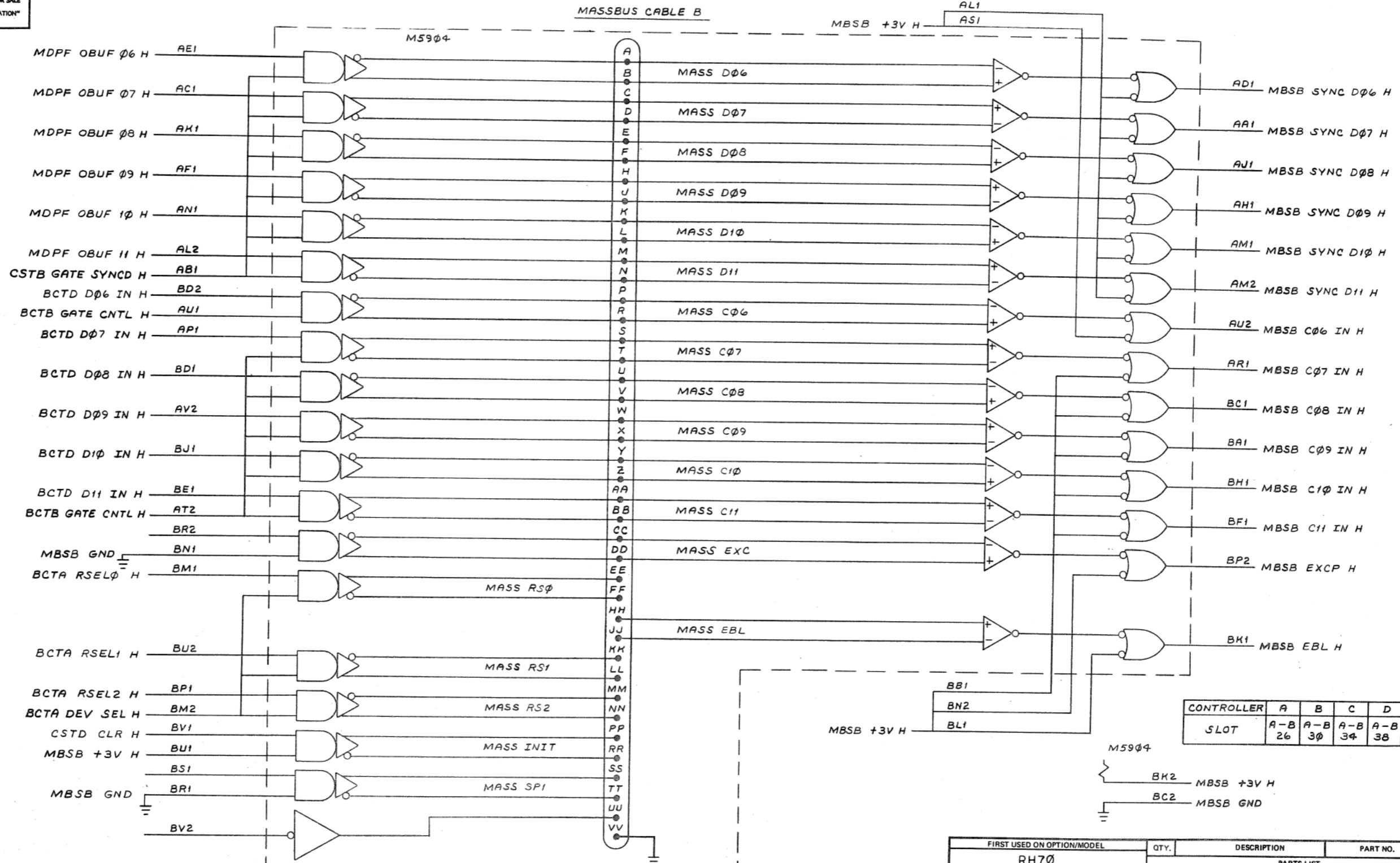
CONTROLLER	A	B	C	D
SLOT	A-B 25	A-B 29	A-B 33	A-B 37

FIRST USED ON OPTION/MODEL RH70		QTY.	DESCRIPTION	PART NO.	ITEM NO.
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS INCHES UNLESS OTHERWISE SPECIFIED		DRN. J. Vincent	DATE 1-31-75		
MILLIMETERS INCHES ANGLES		CHK'D. J. Vincent	DATE 8-11-75		
X.XX = ±0.10 .XXX = ±0.005		ENG. S. Jenkins	DATE 4-16-75		
.XX = ±0.5 .XX = ±.02		PROJ. ENG. S. Jenkins	DATE 4-10-75		
X = ±2 .X = ±.1		PROJ. K. Taylor	DATE 4/11/75		
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY	NEXT HIGHER ASSY.		TITLE MASSBUS TRANSCEIVER (MBSA)	
MATERIAL	FINISH	B-DD-RH70-0	SIZE CODE	NUMBER	REV.
		SCALE	D BS	RH70-0-1	
		SHEET 1 OF 3	DIST		

REV.	
CHANGE NO.	
CHK	

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1-0-02HR DBS RH70-0-1



CONTROLLER	A	B	C	D
SLOT	A-B 26	A-B 30	A-B 34	A-B 38

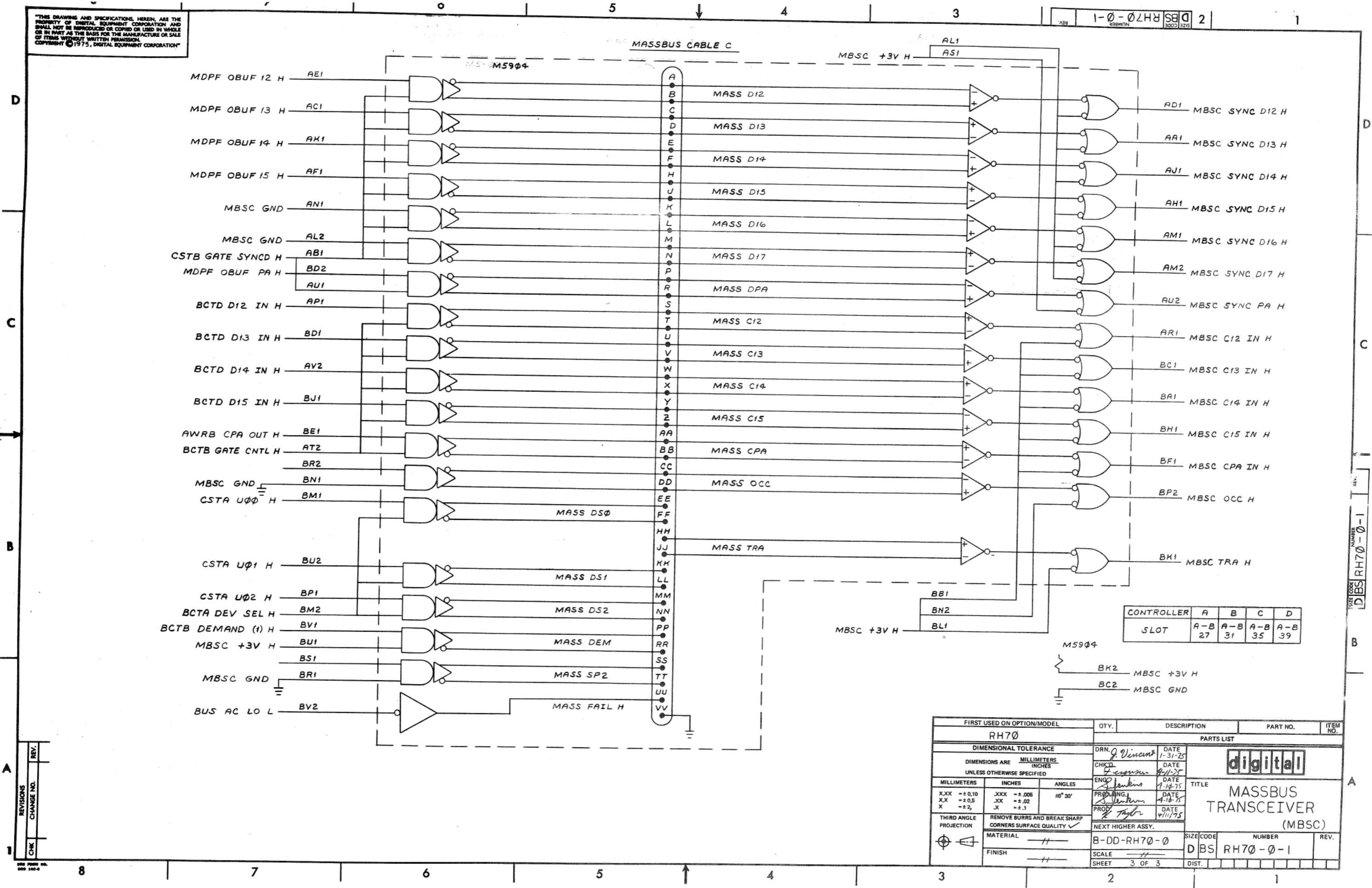
FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
RH70					
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		DRN. J. Vincent DATE 1-31-75			
MILLIMETERS INCHES ANGLES		CHK'D. & signon DATE 9-1-75			
X,XX ±0.10	.XXX ±.005	ENG. J. Jenkins DATE 1-10-75			
X,X ±0.5	.XX ±.02	PRJ. ENG. J. Jenkins DATE 1-10-75			
X ±.2	.X ±.1	PROB. J. Tap DATE 4/1/75			
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓	NEXT HIGHER ASSY.			
MATERIAL	FINISH	B-DD-RH70-0		SIZE CODE	NUMBER
		SCALE		DBS	RH70-0-1
SHEET 2 OF 3		DIST.			

REV.	CHANGE NO.
1	

REV. NUMBER DBS RH70-0-1

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REV. 1-0-0-1 DBS RH70-0-1 2

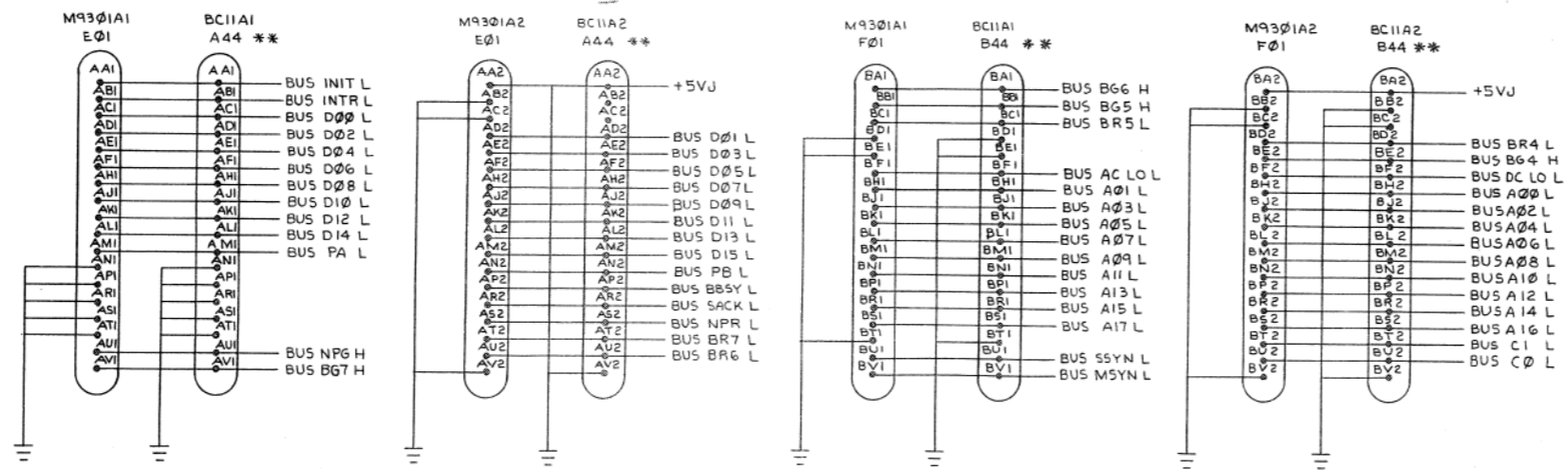
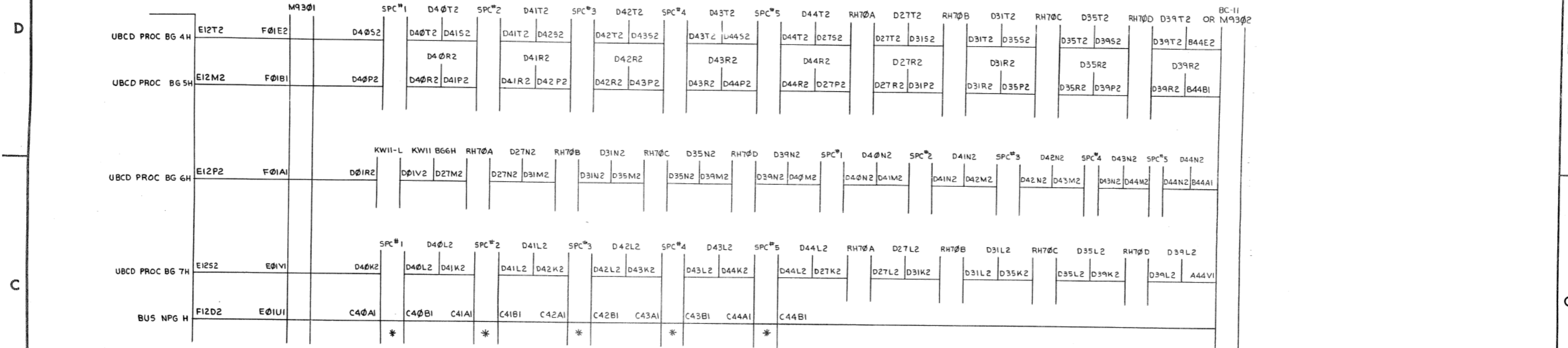


CONTROLLER	A	B	C	D
SLOT	A-B 27	A-B 31	A-B 35	A-B 39

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.										
RH70															
DIMENSIONAL TOLERANCE		PARTS LIST													
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		<table border="1"> <tr> <td>DRN. <i>J. Vincens</i></td> <td>DATE 1-31-75</td> </tr> <tr> <td>CHK'D. <i>J. Vincens</i></td> <td>DATE 4/1/75</td> </tr> <tr> <td>ENGR. <i>J. Vincens</i></td> <td>DATE 1-14-75</td> </tr> <tr> <td>PROJ. ENG. <i>J. Vincens</i></td> <td>DATE 4-14-75</td> </tr> <tr> <td>PROF. <i>J. Taylor</i></td> <td>DATE 4/11/75</td> </tr> </table>				DRN. <i>J. Vincens</i>	DATE 1-31-75	CHK'D. <i>J. Vincens</i>	DATE 4/1/75	ENGR. <i>J. Vincens</i>	DATE 1-14-75	PROJ. ENG. <i>J. Vincens</i>	DATE 4-14-75	PROF. <i>J. Taylor</i>	DATE 4/11/75
DRN. <i>J. Vincens</i>	DATE 1-31-75														
CHK'D. <i>J. Vincens</i>	DATE 4/1/75														
ENGR. <i>J. Vincens</i>	DATE 1-14-75														
PROJ. ENG. <i>J. Vincens</i>	DATE 4-14-75														
PROF. <i>J. Taylor</i>	DATE 4/11/75														
MILLIMETERS	INCHES	ANGLES	TITLE												
X.XX ±0.10	.XX ±0.008	50° 30'	digital MASSBUS TRANSCEIVER (MBCS)												
XX ±0.05	.X ±0.02														
X ±2	. ±0.1														
THIRD ANGLE PROJECTION	REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY	NEXT HIGHER ASSY.	MATERIAL												
			FINISH												
MATERIAL		B-DD-RH70-0		SIZE CODE	NUMBER										
FINISH		SCALE		DBS	RH70-0-1										
		SHEET 3 OF 3		DIST.											

REV.	CHANGE NO.

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* A TO B JUMPER CONNECTION TO BE REMOVED IF AN NPG DEVICE IS INSERTED IN AN S.P.C. SLOT.
 ** IF NO UNIBUS DEVICES ARE PRESENT, REPLACE BC11 CABLE WITH M9302 UNIBUS TERM.

REV.	REV.
1	A
2	A

CHG. NO. KBII-B-00004
 CHK. P. DUBE
 DATE 11/23/75

FIRST USED ON OPTION/MODEL	QTY.	DESCRIPTION	PART NO.	ITEM NO.
KBII				
PARTS LIST				
DIMENSIONAL TOLERANCE		DRN. D. Thullen	DATE 3/5/75	
DIMENSIONS ARE <u>MILLIMETERS</u> UNLESS OTHERWISE SPECIFIED		CHK'D. P. Dube	DATE 3/21/75	
MILLIMETERS		ENG. P. Dube	DATE 3/21/75	
THIRD ANGLE PROJECTION		PROJ. ENG. P. Dube	DATE 3/21/75	
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY		PROD. P. Dube	DATE 3/21/75	TITLE
FINISH		NEXT HIGHER ASSY.		UNIBUS CABLE AND GRANT CHAIN
MATERIAL		SCALE NONE		SIZE CODE
FINISH		SHEET 1 OF 1		NUMBER
		DIST.		REV.
				A

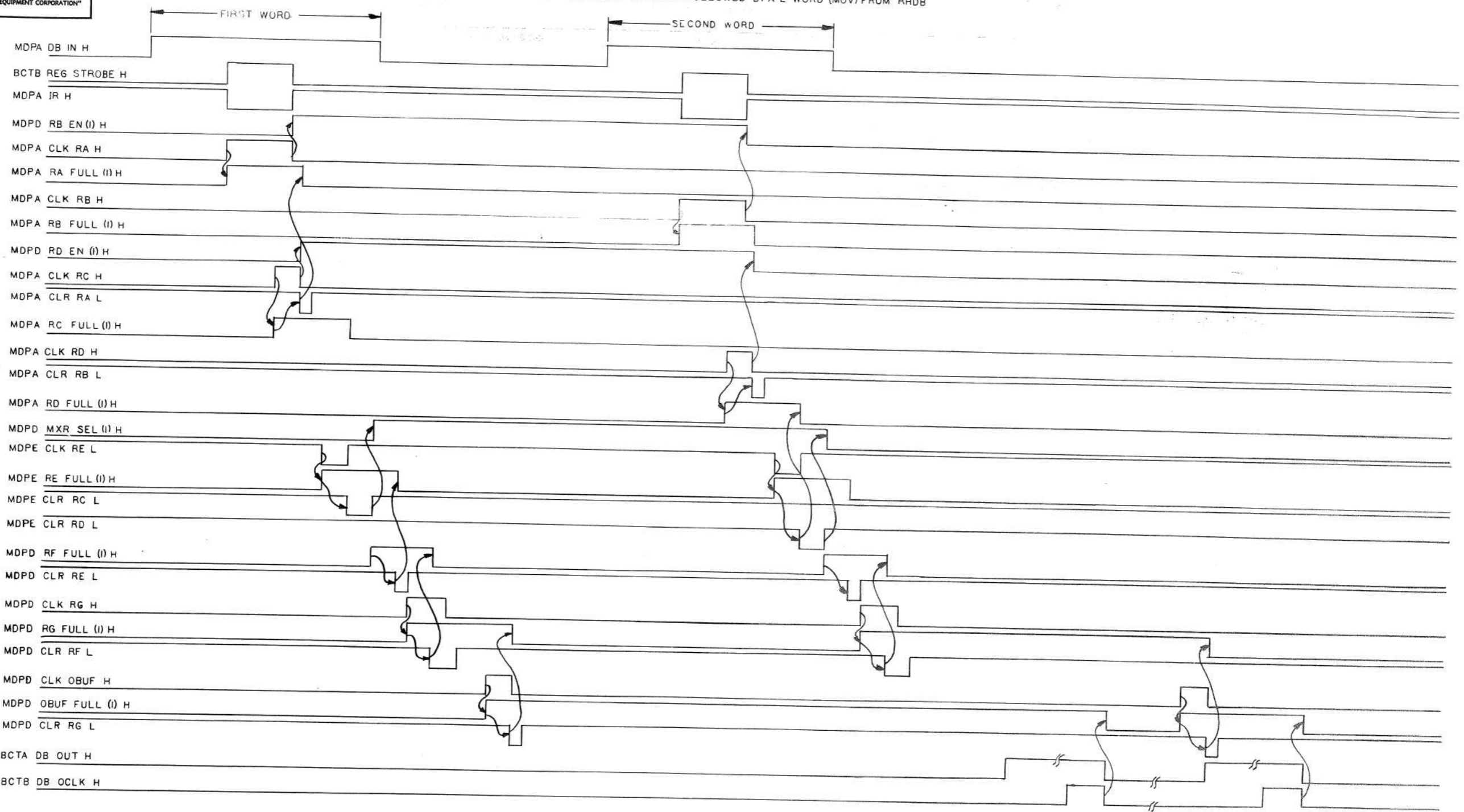
REV. A
 NUMBER KBII-B-7
 D I C

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WRITE AND READ DATA BUFFER
A 2 WORD (MOV) TO RHDB FOLLOWED BY A 2 WORD (MOV) FROM RHDB

REV. 2
DITD RH70-0-5

1



D

D

C

C

B

B

A

A

REV.	
CHANGE NO.	
CHK	

DEC FORM NO. 080 102-C

8 7 6 5 4 3 2 1

(WRITE+READ MAINTENANCE OPERATION)

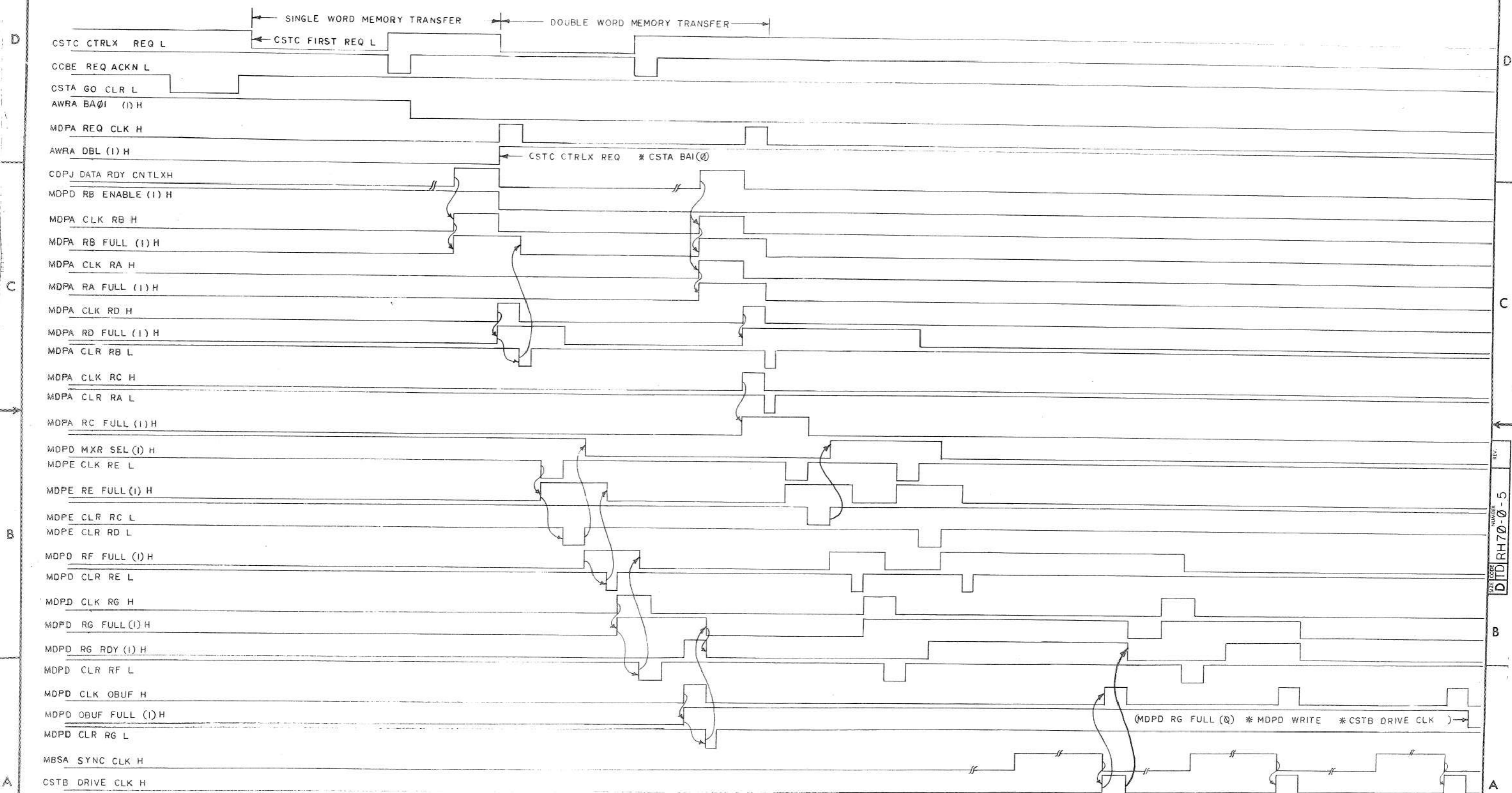
FIRST USED ON OPTION/MODEL RH70		QTY.	DESCRIPTION	PART NO.	ITEM NO.
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		DRN M. Bostate	DATE 3/8/75		
		CHK'D F. [unclear]	DATE 4-11-75		
		END S. Jenkins	DATE 4-10-75		
		PROJ. ENG. S. Jenkins	DATE 4-10-75		
		PROD. E. Taylor	DATE 7/11/75	TITLE RH70 DATA BUFFER TIMING DIAG.	
THIRD ANGLE PROJECTION		REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓		NEXT HIGHER ASSY.	
MATERIAL		FINISH		SCALE	
FINISH		SCALE		SIZE CODE NUMBER REV.	
		SCALE		DITD RH70-0-5	
		SHEET 1 OF 4		DIST.	

REV. 2
DITD RH70-0-5

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WRITE COMMAND DATA BUFFER TIMING
 3 WORD WRITE STARTING ON AN ODD WORD BOUNDARY (BA01 BIT=1)
 A SINGLE WORD FOLLOWED BY A DOUBLE WORD

REV. 2
 SIZE CODE DTD
 NUMBER RH70-0-5



REVISIONS		
CHK	CHANGE NO.	REV.

TITLE		SIZE CODE	NUMBER	REV.
RH70 DATA BUFFER TIMING DIAG.		DTD	RH70-0-5	
SCALE	SHEET	DIST.		
	2 OF 4			

8 7 6 5 4 3 2 1

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READ COMMAND DATA BUFFER TIMING
 3 WORDS STARTING ON AN EVEN WORD BOUNDARY (BA0 BIT=0)
 A DOUBLE WORD FOLLOWED BY A SINGLE WORD

REV. 2
 DTD RH70-0-5



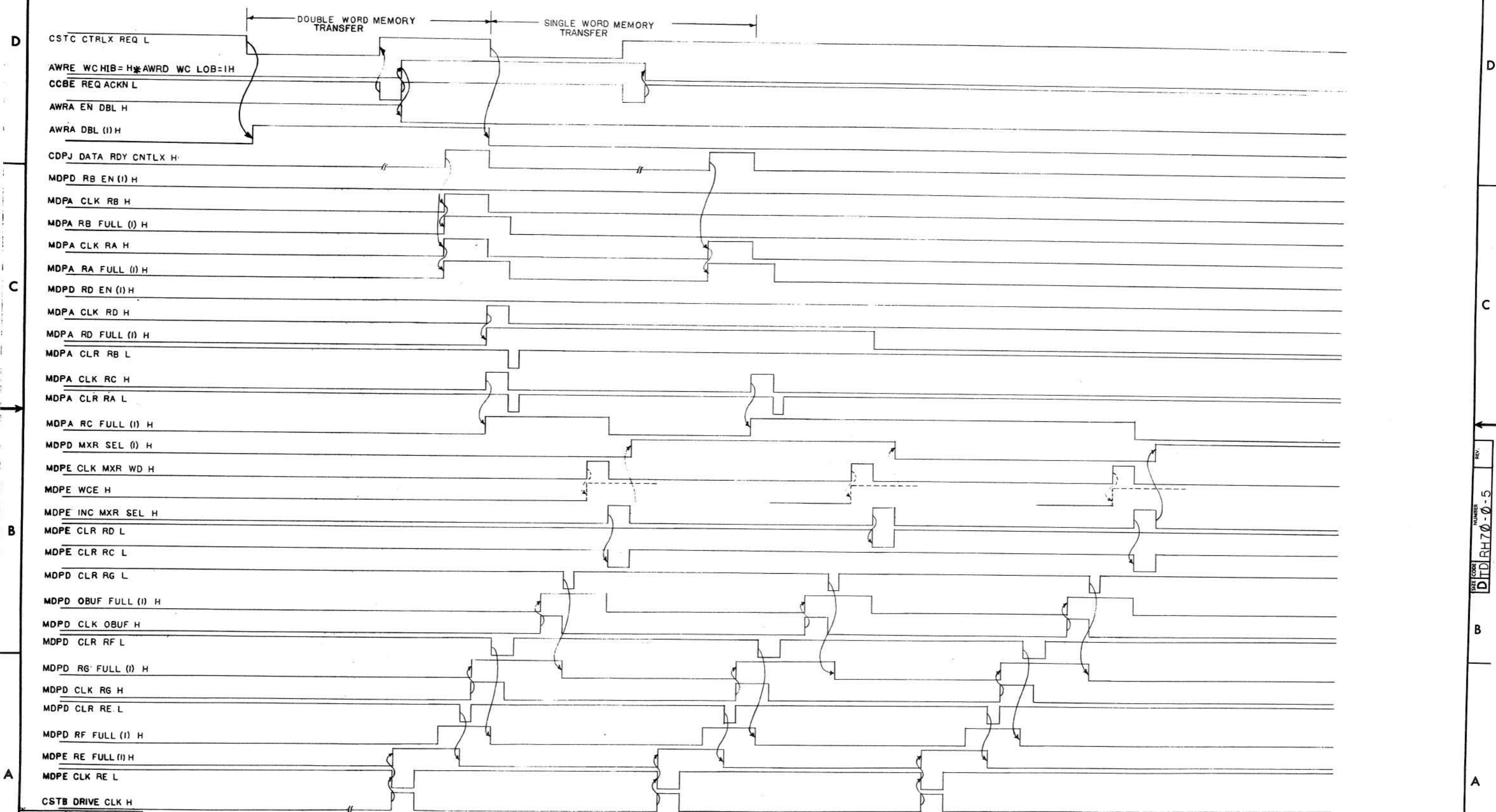
REVISIONS		
CHK	CHANGE NO.	REV.

TITLE RH70 DATA BUFFER TIMING DIAG. SIZE CODE NUMBER REV.
 DTD RH70-0-5
 SCALE SHEET 3 OF 4 DIST.

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WRITE CHECK DATA BUFFER TIMING
 3 WORDS STARTING ON AN EVEN WORD BOUNDRY (BA01 BIT = 0)
 A DOUBLE WORD FOLLOWED BY A SINGLE WORD

REV. 2
 NUMBER DTD RH70-0-5



REVISIONS		
CHK	CHANGE NO.	REV.

(WRITE CHECK COMMAND)

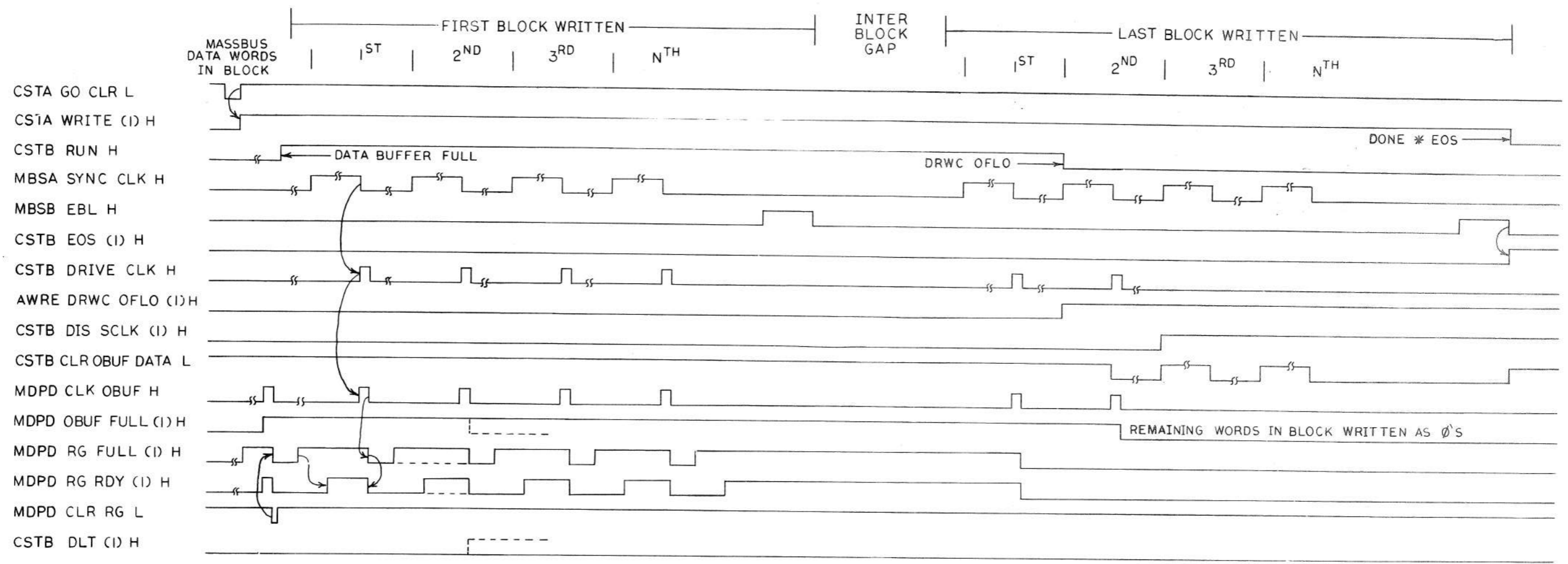
TITLE	RH70 DATA BUFFER TIMING DIAG	SIZE CODE	D TD	NUMBER	RH70-0-5	REV.	
SCALE	//	SHEET	4 OF 4	DIST.			

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WRITE MASSBUS TIMING DIAGRAM

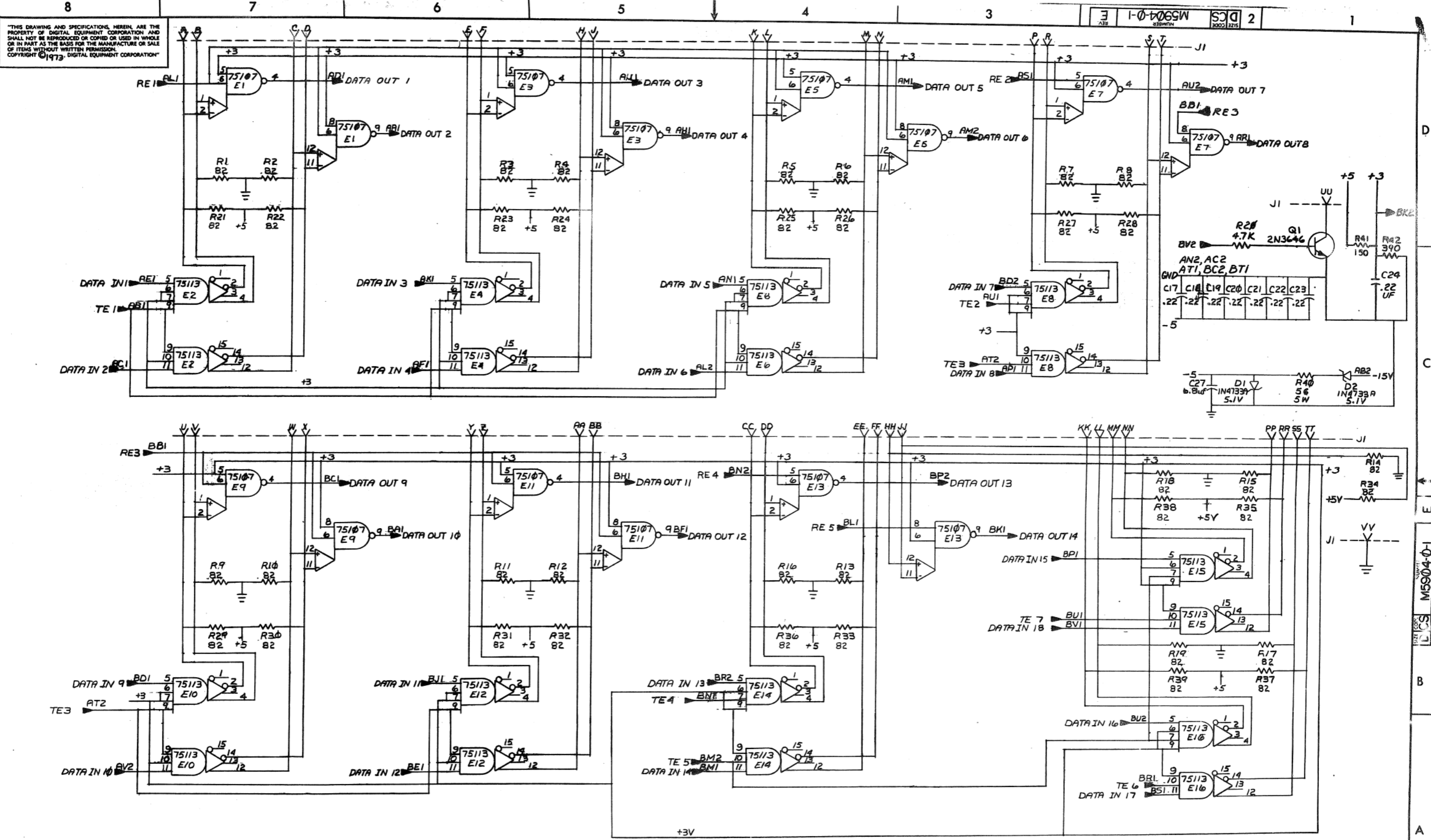
D
 C
 B
 A

D
 C
 B
 A



REV. 1	REV. 1
CHANGE NO.	CHANGE NO.
CHK	CHK

THIRD ANGLE PROJECTION	DRN. J. V. Smith 2-8-75	FIRST USED ON	digital
REMOVE BURRS AND BREAK SHARP CORNERS	CHK'D J. V. Smith 6-7-75	TITLE	WRITE MASSBUS TIMING DIAGRAM
DO NOT SCALE DWG	PROJ. ENG. J. V. Smith 4-10-75	SIZE	D
MATERIAL	PROD. K. Taylor 4/11/75	CODE	TD
FINISH	NEXT HIGHER ASSY.	NUMBER	RH70-0-6
	B-DD-RH70-0	REV.	
	SCALE + +	SHEET	1 OF 1
		DIST.	



REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	CONTROLLER TRANSCEIVER	SIZE CODE	D.C.S.	NUMBER	M5904-0-1	REV.	E
SCALE	SHEET 2 OF 2		DIST.				

