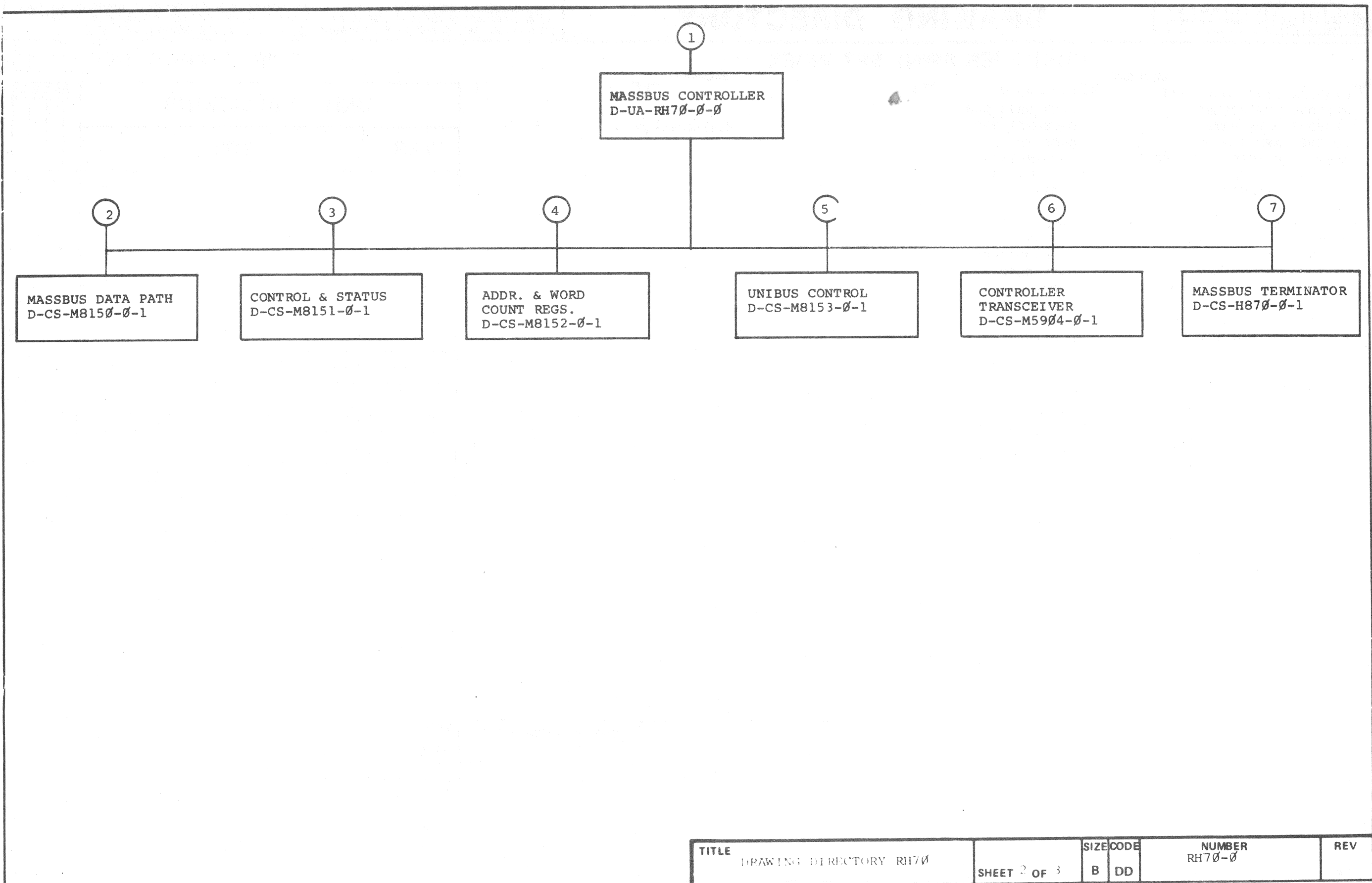


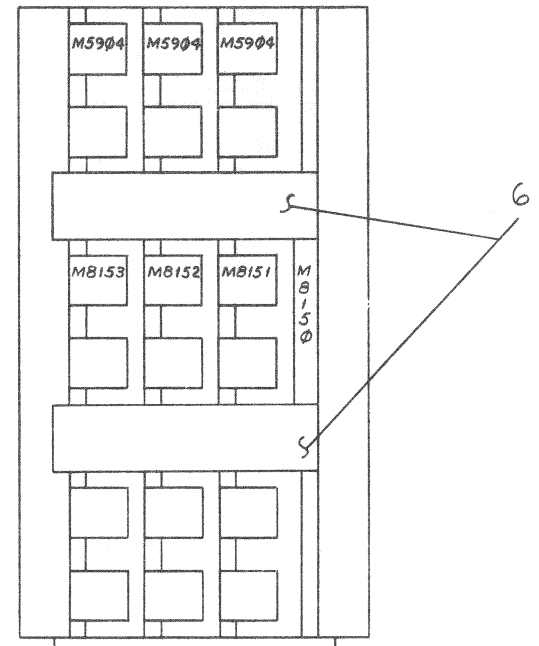


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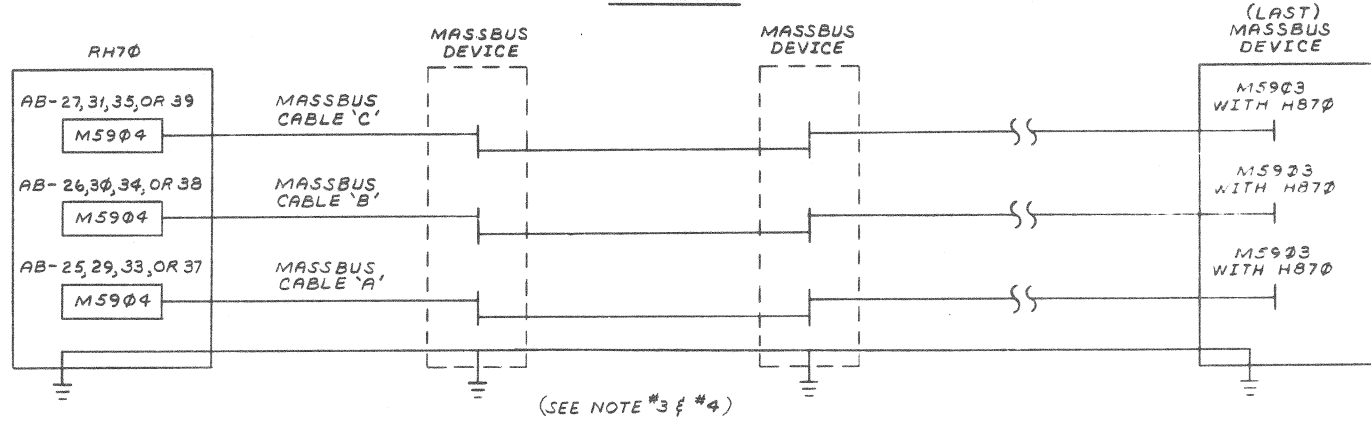
- NOTES:
1. VIEW OF LOGIC IS FROM MODULE SIDE.
 2. SELECT PROPER JUMPER SETTINGS FOR UNIBUS ADDRESS, REGISTER LENGTH FIELD, AND VECTOR ADDRESS AS PER MASSBUS DEVICE USED.
 3. INSERT ONE H870 MASSBUS TERMINATOR MODULE IN J2 (ETCH SIDE OF H870 TO COMPONENT SIDE OF M5903) OF EACH OF THE M5903 MASSBUS TRANSCEIVER MODULES IN THE LAST MASSBUS DRIVE.
 4. COLORED EDGE OF MASSBUS CABLES SHOULD BE FACING MODULE HANDLE OF M5904 IN RH70 & M5903 IN MASSBUS DRIVES.
 5. ONE H870 MASSBUS TERMINATOR MODULE WILL BE INSERTED IN J1 (COMPONENT SIDE OUT) OF EACH OF THE 3 M5904 MODULES FOR SHIPMENT ONLY.
 6. 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 PDPII/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	M8150	M5904	M5904	M5904	M8150	M5904	M5904	M5904	M8150	M5904	M5904	M5904	M8150
A	CONTROL- LER TRANS (MBSC)	CONTROL- LER TRANS (MBSB)	CONTROL- LER TRANS (MBSA)		CONTROL- LER TRANS (MBSC)	CONTROL- LER TRANS (MBSB)	CONTROL- LER TRANS (MBSA)		CONTROL- LER TRANS (MBSC)	CONTROL- LER TRANS (MBSB)	CONTROL- LER TRANS (MBSA)		CONTROL- LER TRANS (MBSC)	CONTROL- LER TRANS (MBSB)	CONTROL- LER 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	M8153	M8152	M8151	MASSBUS DATA PATH (MDP)	M8153	M8152	M8151	MASSBUS DATA PATH (MDP)	M8153	M8152	M8151	MASSBUS DATA PATH (MDP)	M8153	M8152	M8151	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



(SEE NOTE #3 & #4)

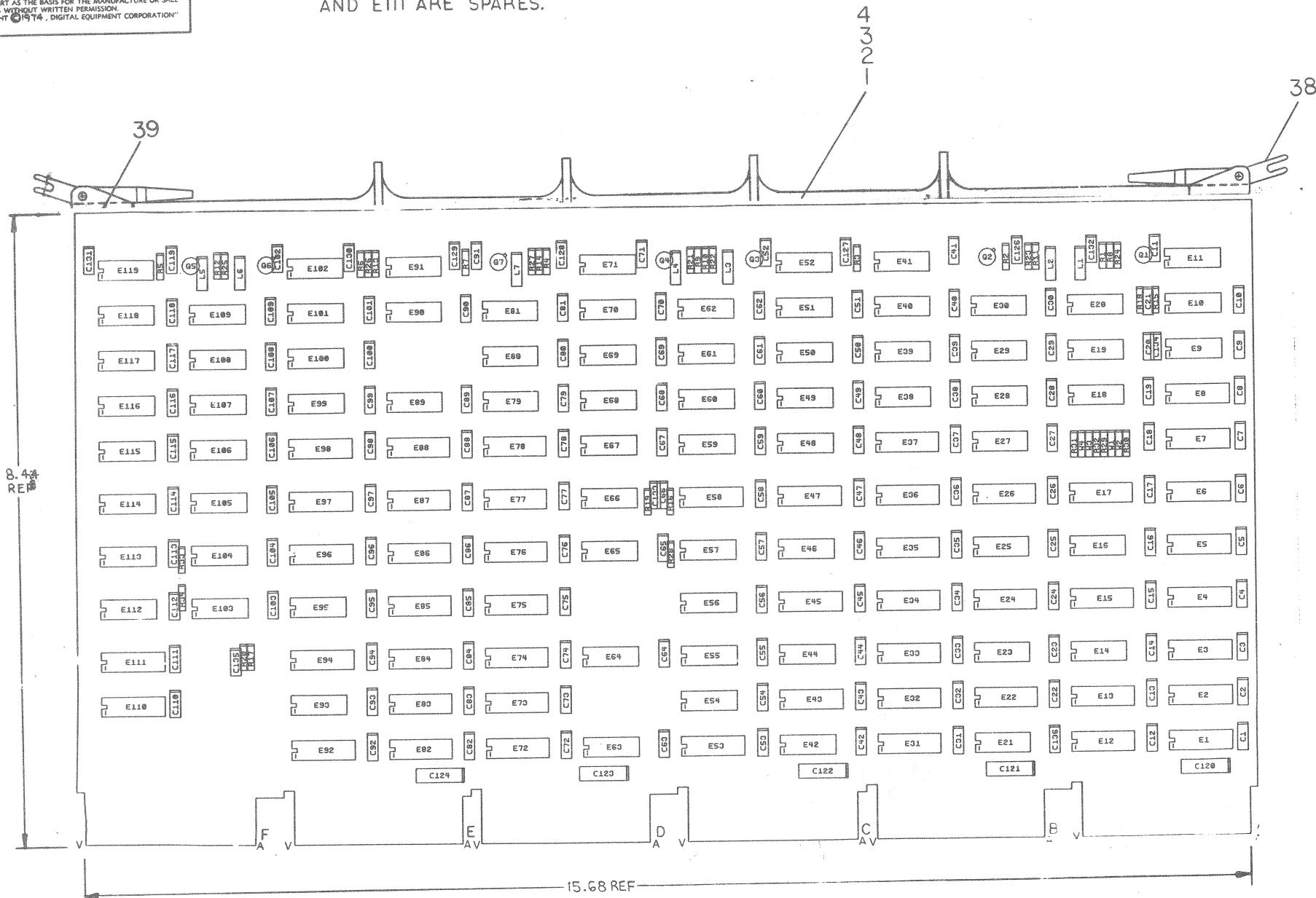
11/70 UNIT ASSEMBLY	D-LA-11/70-0-0	REF
KB11-B WIRELIST	H-WL-7010329-0-1	REF
3 MASSBUS TERMINATOR	H870	7
2 MODULE HOLDER	1209856	6
3 CONTROLLER TRANSCEIVER	M5904	5
1 UNIBUS CONTROL	M8153	4
1 ADDR. & WORD COUNT REGS.	M8152	3
1 CONTROL & STATUS	M8151	2
1 MASSBUS DATA PATH	M8150	1

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
RH70					
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		digital			
MILLIMETERS		TITLE			
X.XX ±0.10		MASSBUS CONTROLLER (RH70)			
X.X ±0.5					
X ±2					
THIRD ANGLE PROJECTION					
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY					
MATERIAL					
FINISH					
B-DD-RH70-0		SIZE CODE			
SCALE		DUA RH70-0-0			
SHEET 1 OF 1		DIST.			

REV.	
CHG	
CHK	
DEC FORM NO. 000 100-C	

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



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		

AA2, AV1, BA2, BV1, CA2, CV1, DA2, DV1, EA2, EV1, FA2, FV1.
AC2, AH1, AN1, AT1, BC2, BH1, BN1, BT1, CC2, CH1, CN1, CT1, DC2, DH1, DN1, DT1, EC2, EH1, EN1, ET1, FC2, FH1, FN1, FT1.

C1-C10, C12-C40, C42-C51, C53-C70, C72-C90, C92-C101, C103-C118, C123-C136
C120 THRU C124
6.8uf

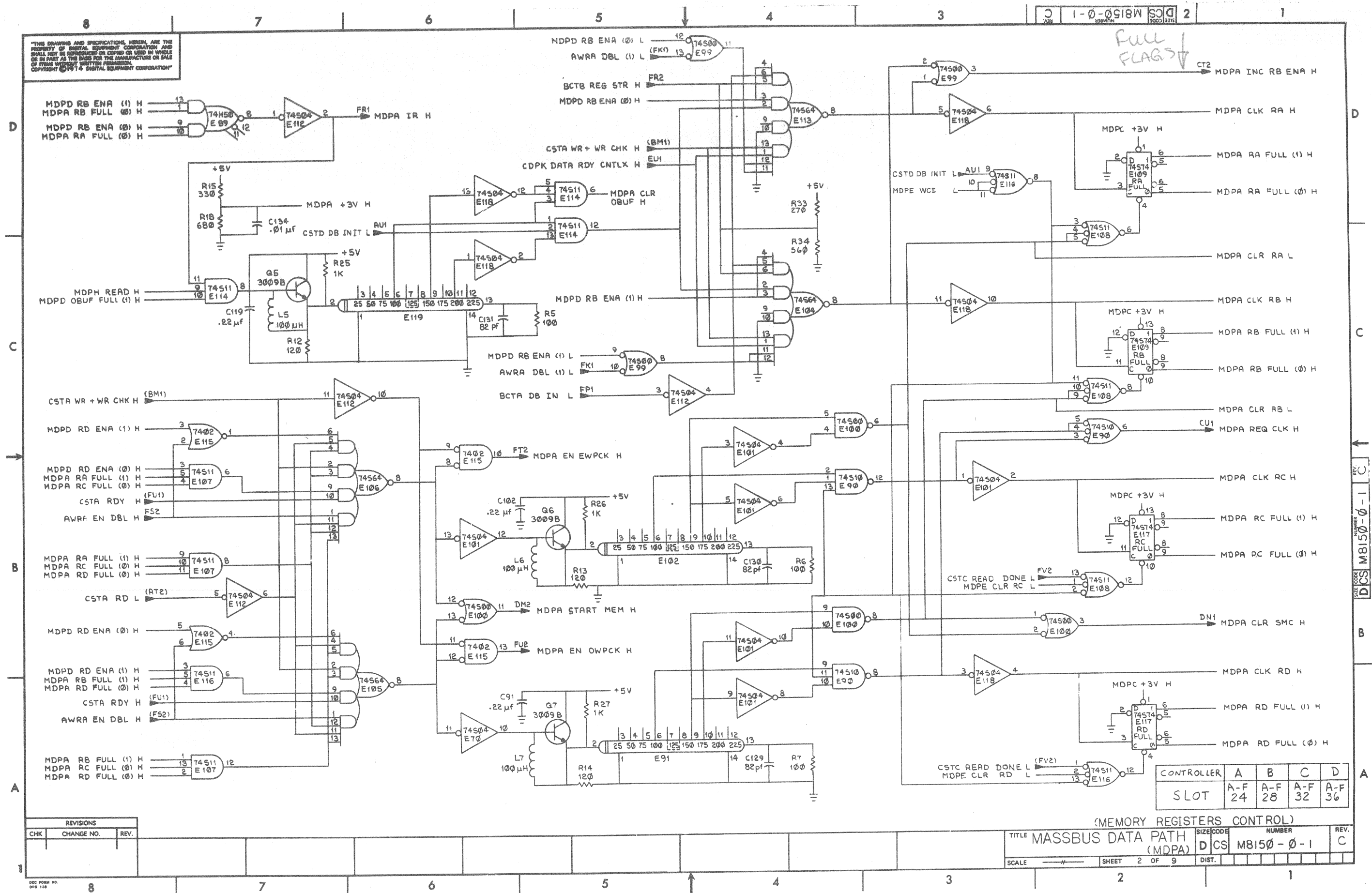
+5V
GND

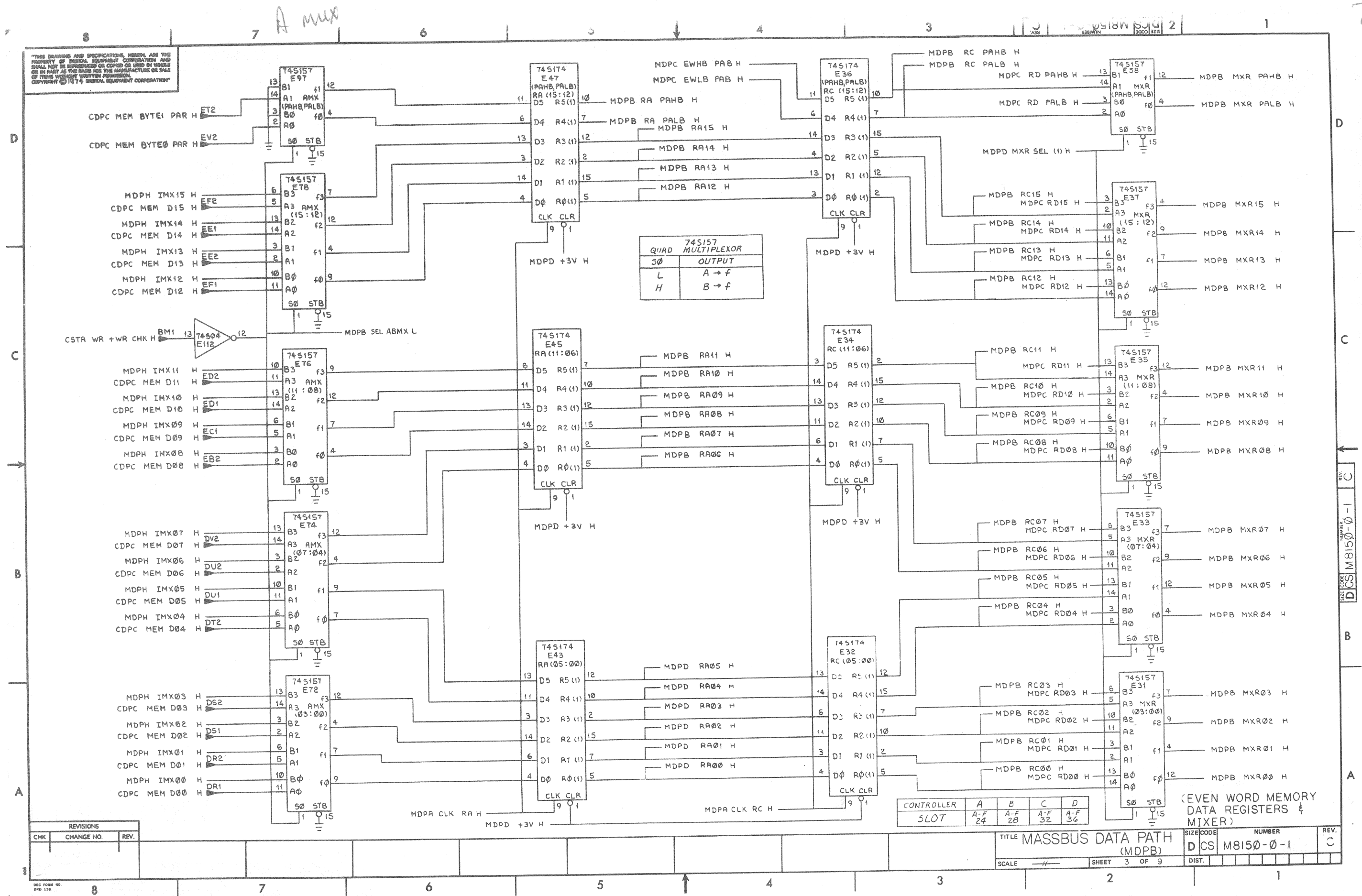
T. LUTON
C. J. M8150-00002
S. JENKINS
B. J. M8150-00001
CHK
REV
CHG
CHANGE NO.
REV

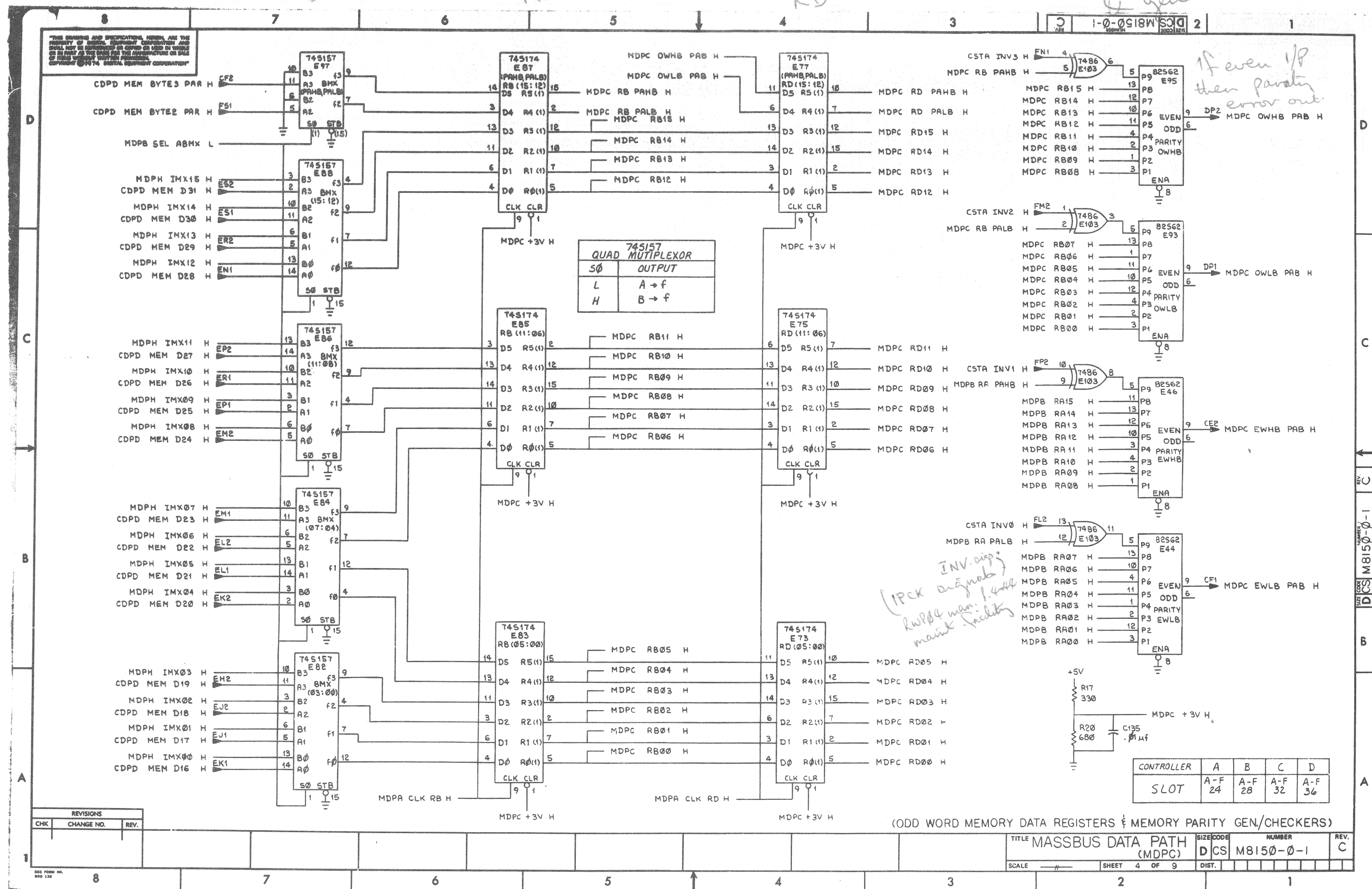
FIRST USED ON OPTION MODEL		RH70	
ETCH BOARD REV		C	
DEC NO.	EIA NO.	DEC NO.	EIA NO.
SEMICONDUCTOR CONVERSION CHART			

DRN. K. Seoddy	DATE 9-15-74
CHKD. J. Seoddy	DATE 12-75-74
ENG. S. Jenkins	DATE 1/29/75
PROB. S. Jenkins	DATE 1/29/75
PROD. S. Jenkins	DATE 1/29/75
NEXT HIGHER ASSY B-DD-RH70-0	
SCALE	SHEET 1 OF 9
TITLE MASSBUS DATA PATH (MDP)	
SIZE/CODE DCS	NUMBER M8150-0-1
DIST.	REV. C

REF	X-Y COORDINATE HOLE LOCATION	K-CO-8150-0-4	1
REF	ASSY/DRILLING HOLE LAYOUT	D-AH-8150-0-5	2
REF	MODULE ECO HISTORY	B-MH-8150-0-6	3
1	ETCHED CIRCUIT BOARD	501127C	4
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	CAP .01uf 20% 100V DISC	1001610-01
5	C120 THRU C124	CAP 6.8uf 10% 35V	1005306
7	C126 THRU C132	CAP 62pf 5% 100V	1000015
7	C11, C41, C52, C71, C91, C102, C119	CAP .22uf 50V CERAMIC	1010274-00
7	R1 THRU R7	RES 100 OHM 5% 1/4W	1300229
7	R8 THRU R14	RES 120 OHM 5% 1/4W	1300247
3	R15, R16, R17	RES 330 OHM 5% 1/4W	1300295
3	R18, R19, R20	RES 680 OHM 5% 1/4W	1301424
8	R21 THRU R28	RES 1K 5% 1/4W	1300365
4	R29 THRU R32	RES 1.5K 5% 1/4W	1300391
7	Q1 THRU Q7	TRANSISTOR DEC 3009B	1503100
7	L1 THRU L7	INDUCTOR 100uh	1610662
7	E11, E41, E52, E71, E91, E102, E109	DELAY - 10 TAP 250ns 100 OHM	1611243
8	E19, E38, E50, E59, E62, E80, E99, E100	IC DEC 74S00	1910532
9	E42, E55, E56, E57, E63 THRU E67	IC DEC 74H01-1	1909849
1	E115	IC DEC 7402	1909004
8	E20, E51, E70, E101, E112, E118	IC DEC 74S04	1910534
2	E40, E90	IC DEC 74S10	1910536
8	E10, E30, E60, E68, E107, E108, E114, E116	IC DEC 74S11	1910537
1	E49	IC DEC 74H30	1909059
1	E54	IC DEC 74H40	1905586
2	E39, E89	IC DEC 74H50	1909060
8	E28, E61, E104, E105, E106, E113	IC DEC 74S64	1910542
8	E9, E29, E69, E79, E109, E117, E48, E81	IC DEC 74S74	1910544
2	E18, E103	IC DEC 7486	1910011
4	E92, E94, E96, E98	IC DEC 74157	1910655
14	E31, E33, E35, E37, E72, E74, E76, E78, E58, E82, E84, E86, E88, E97	IC DEC 74S157	1910548
3	E22, E24, E26	IC DEC 74174	1910652
10	E2, E4, E6, E13, E15, E17, E32, E34, E36, E73, E75, E77, E83, E85, E87, E43, E45, E47	IC DEC 74S174	1910550
5	E1, E3, E5, E7, E8	IC DEC 74298	1911271
4	E21, E23, E25, E27	IC DEC 8242	1909712
6	E14, E16, E44, E46, E93, E95	IC DEC 82S62	1911291
4	W1 THRU W4	INSULATED JUMPERS	9009185
1		HANDLE	1210711-02
12		EYELET	9006732
1	R33	RES 270 OHM 5% 1/4 W	1301972
1	R34	RES 560 OHM 5% 1/4 W	1301890







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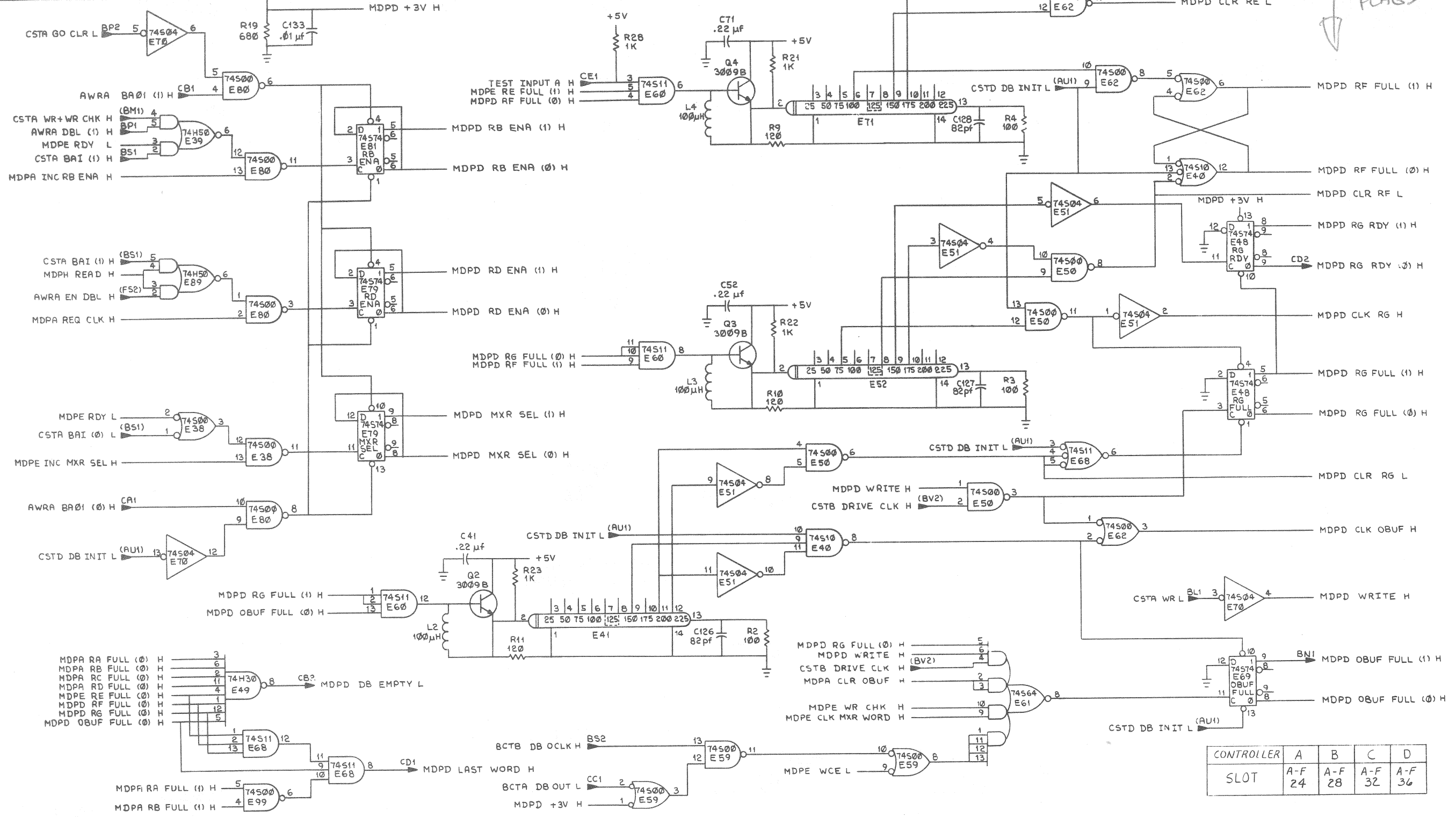
FULL
FLAGS

D
C
B
A

D
C
B
A

REV. 1-0-0018 DCS M8150-0-1

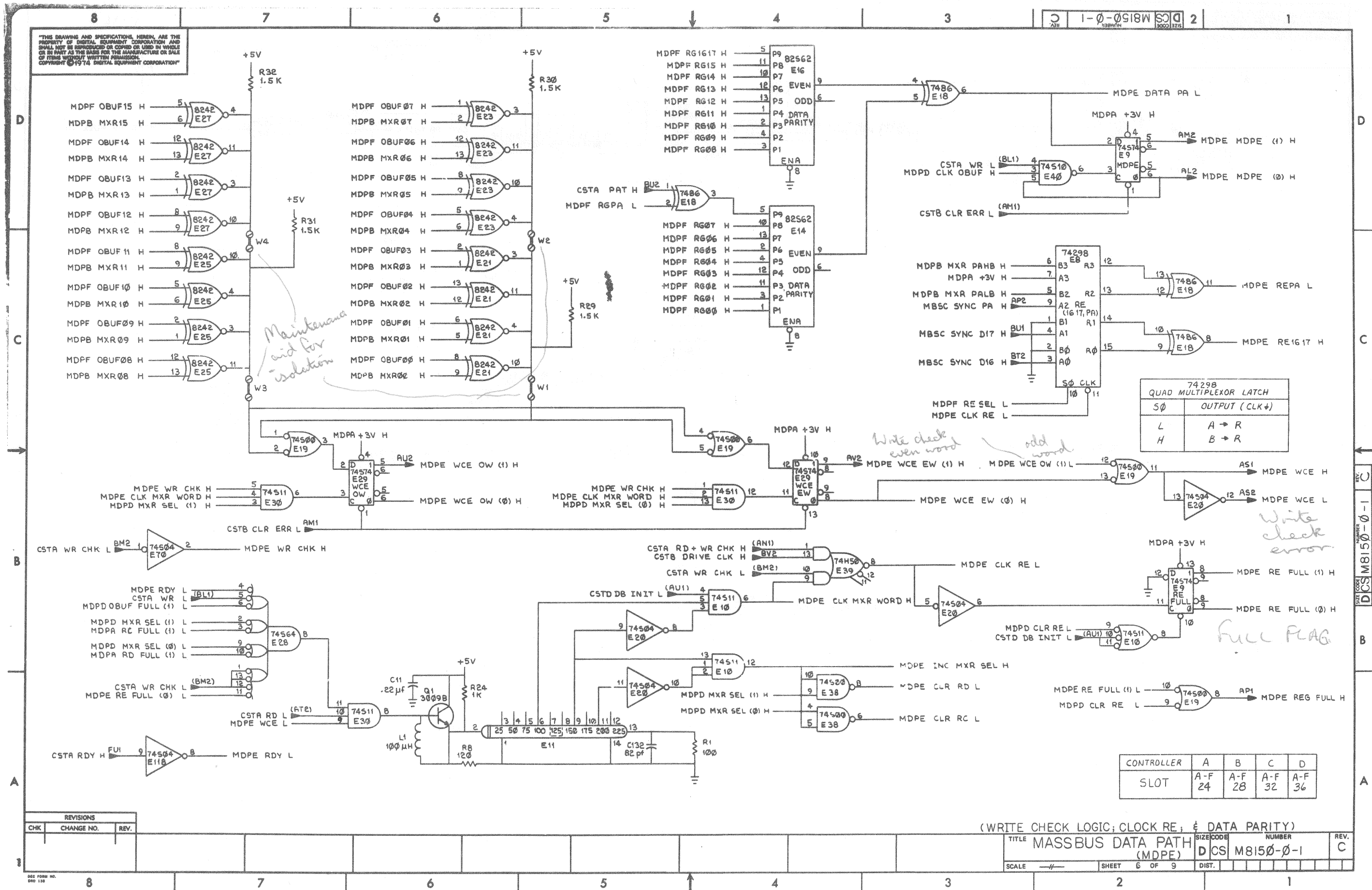
A



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

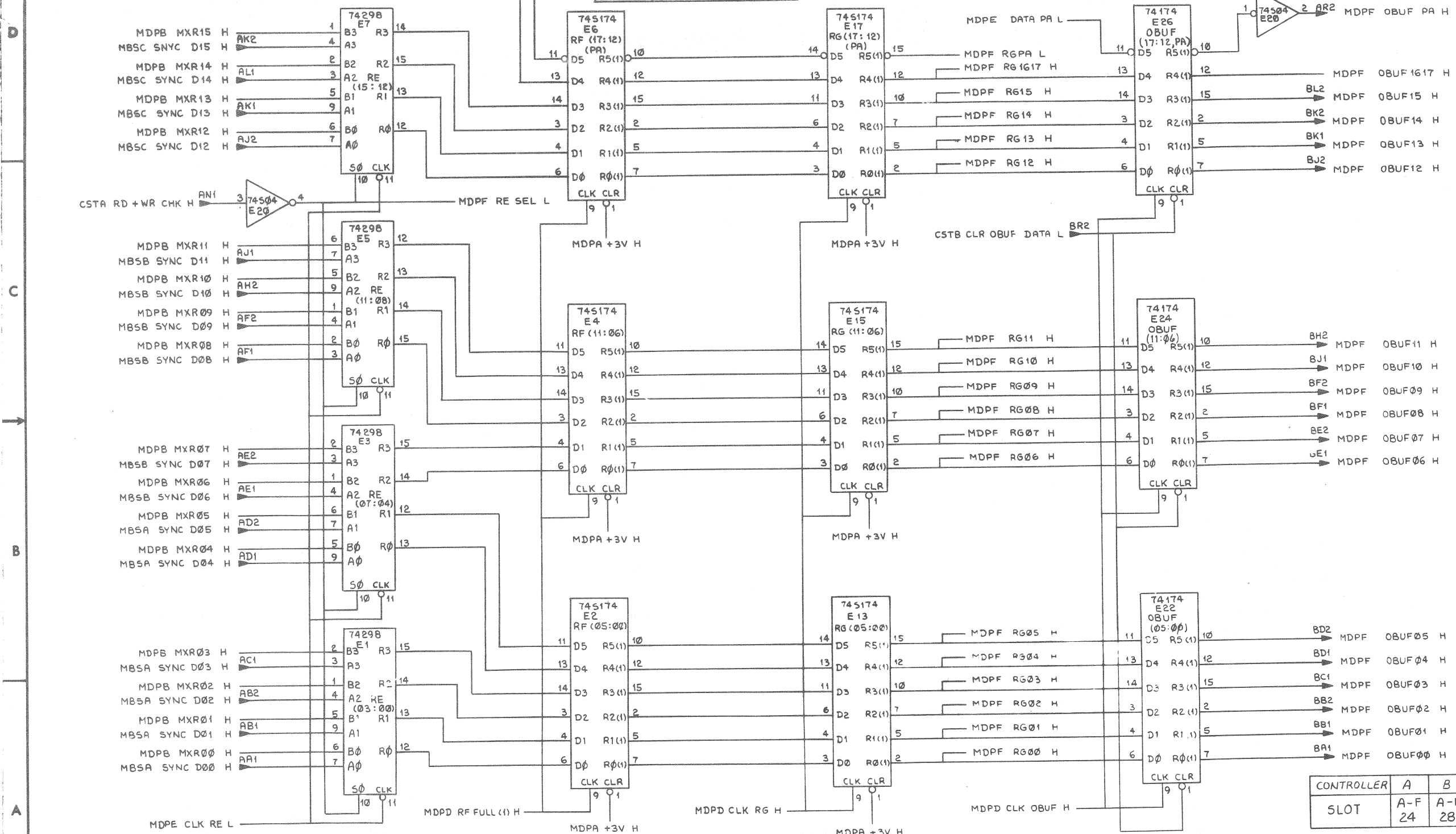
(DATA REGISTERS CONTROL)

CHK	CHANGE NO.	REV.	TITLE	SCALE	SHEET	OF	DIST.	REV.
			MASSBUS DATA PATH (MDPD)		5	9		C



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74298 QUAD MULTIPLEXOR LATCH	
S $\emptyset$	OUTPUT (CLK $\downarrow$)
L	A $\rightarrow$ R
H	B $\rightarrow$ R



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

(DATA BUFFER REGISTERS)

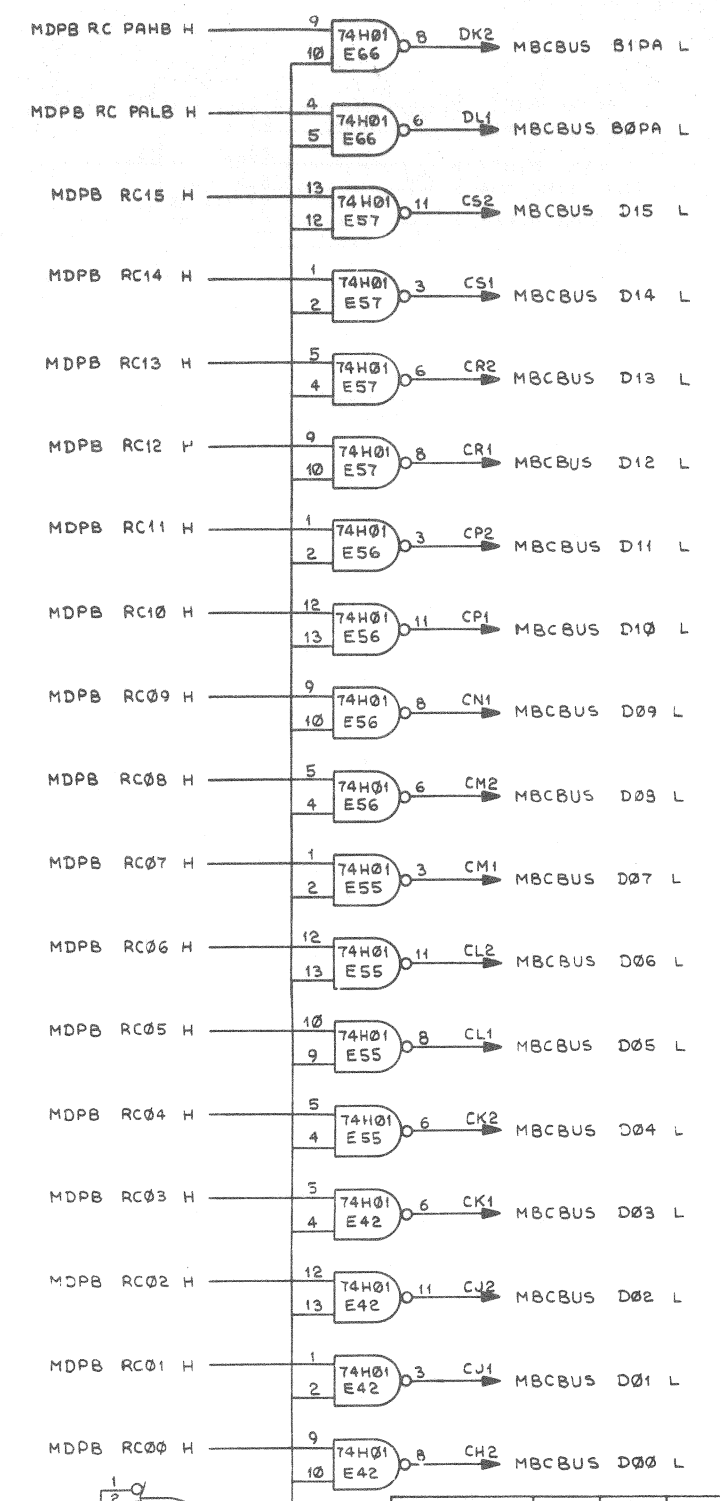
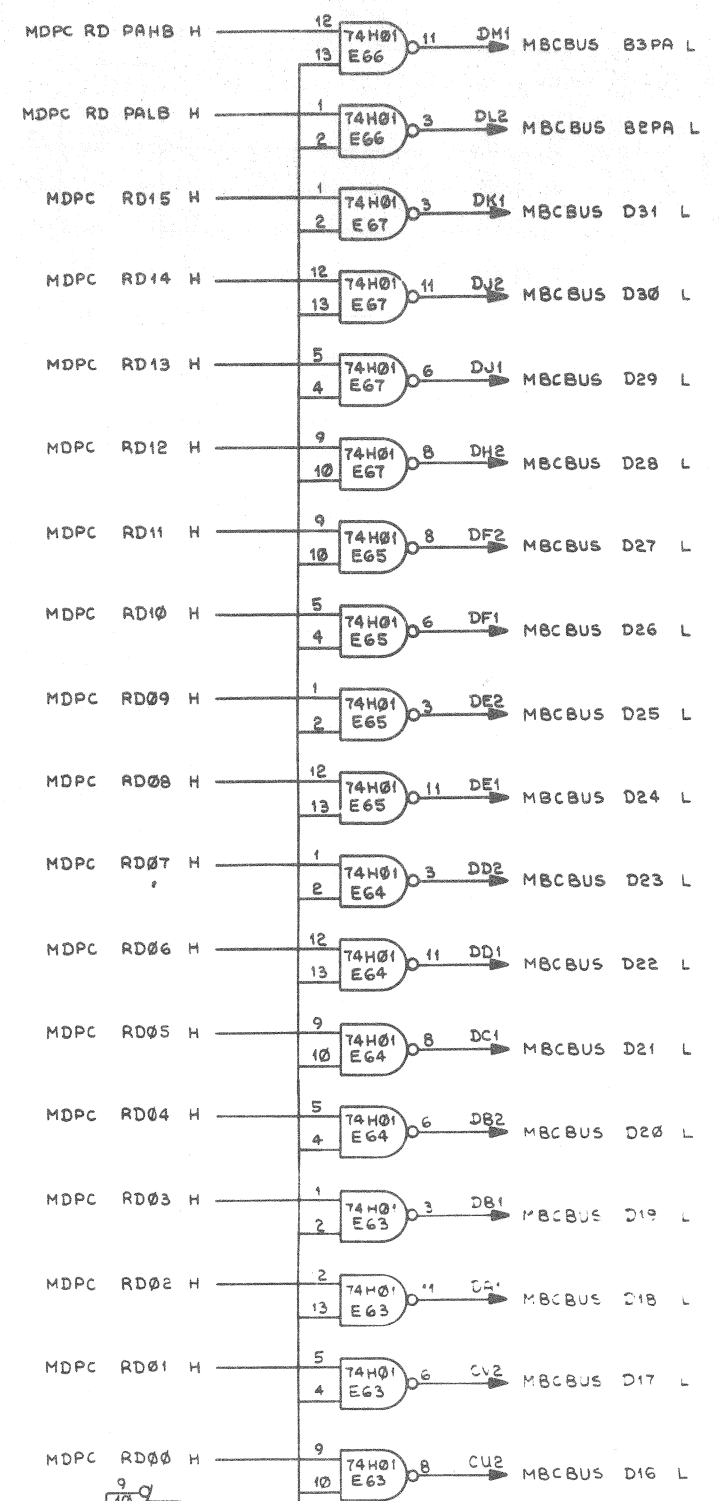
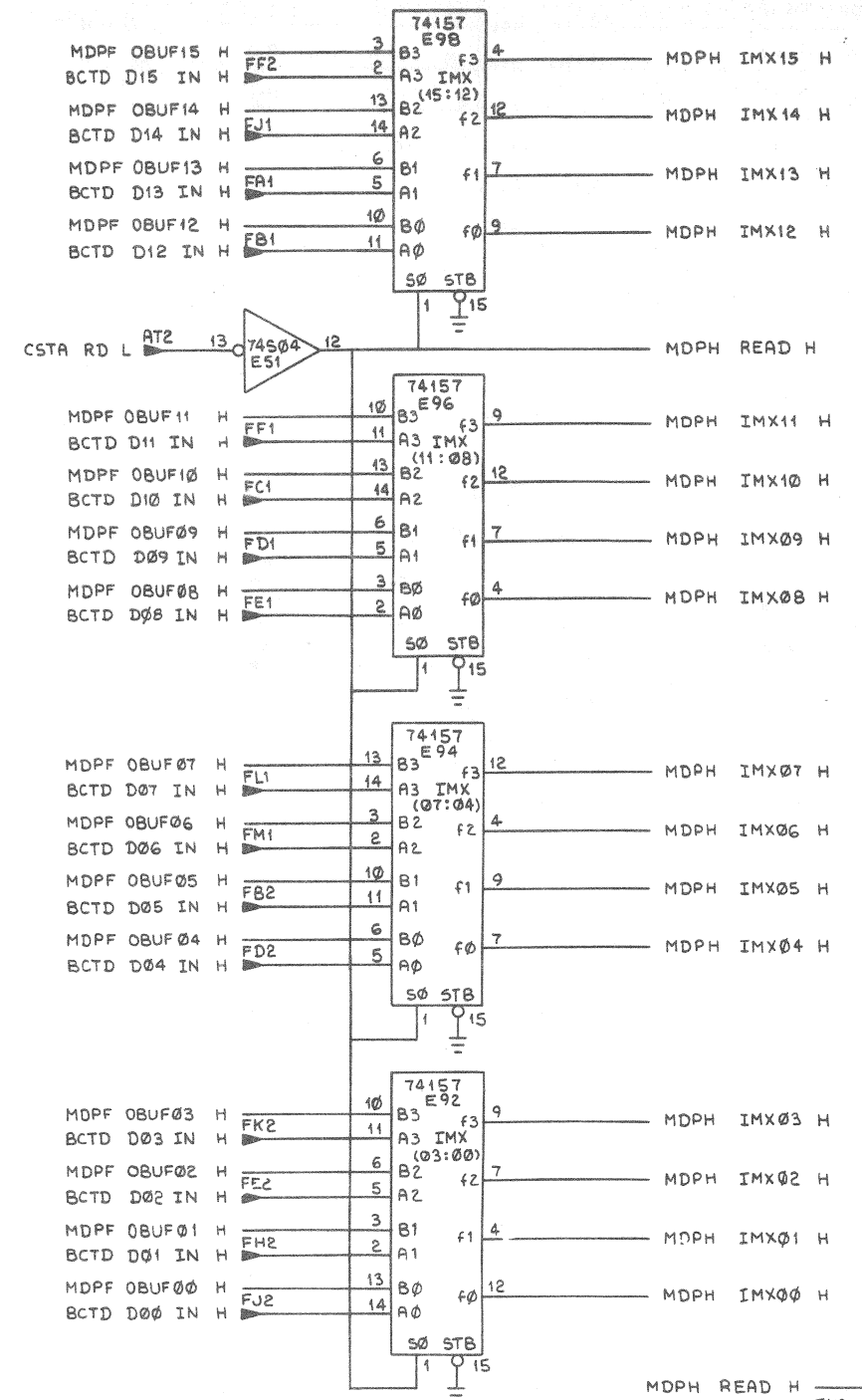
TITLE	MASSBUS DATA PATH (MDPF)	SIZE CODE	D	CS	NUMBER	M8150-0-1	REV.	C
SCALE	1/8	SHEET	7	OF	9	DIST.		

REVISIONS		
CHK	CHANGE NO.	REV.
1		

DEC FORM NO. 000 130

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

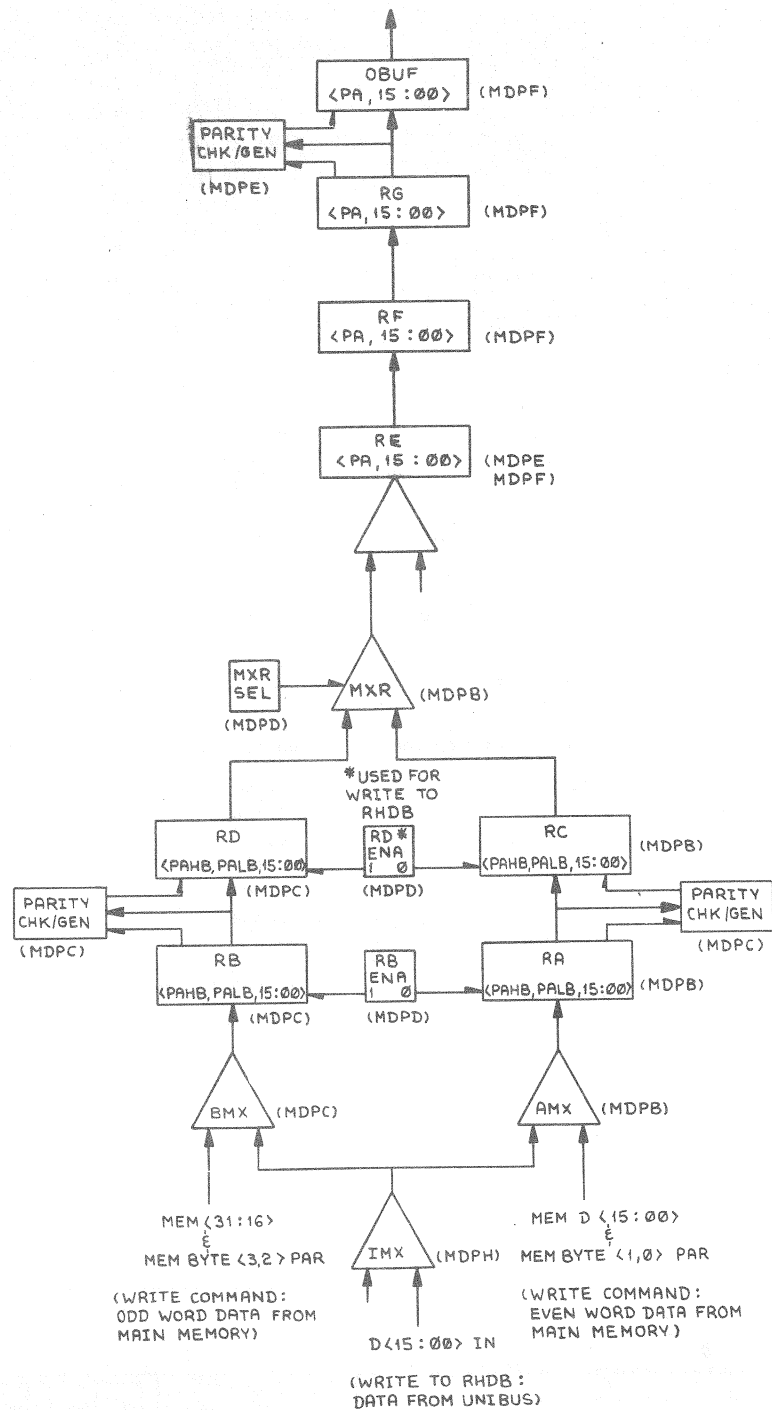


REVISIONS		
CHK	CHANGE NO.	REV.

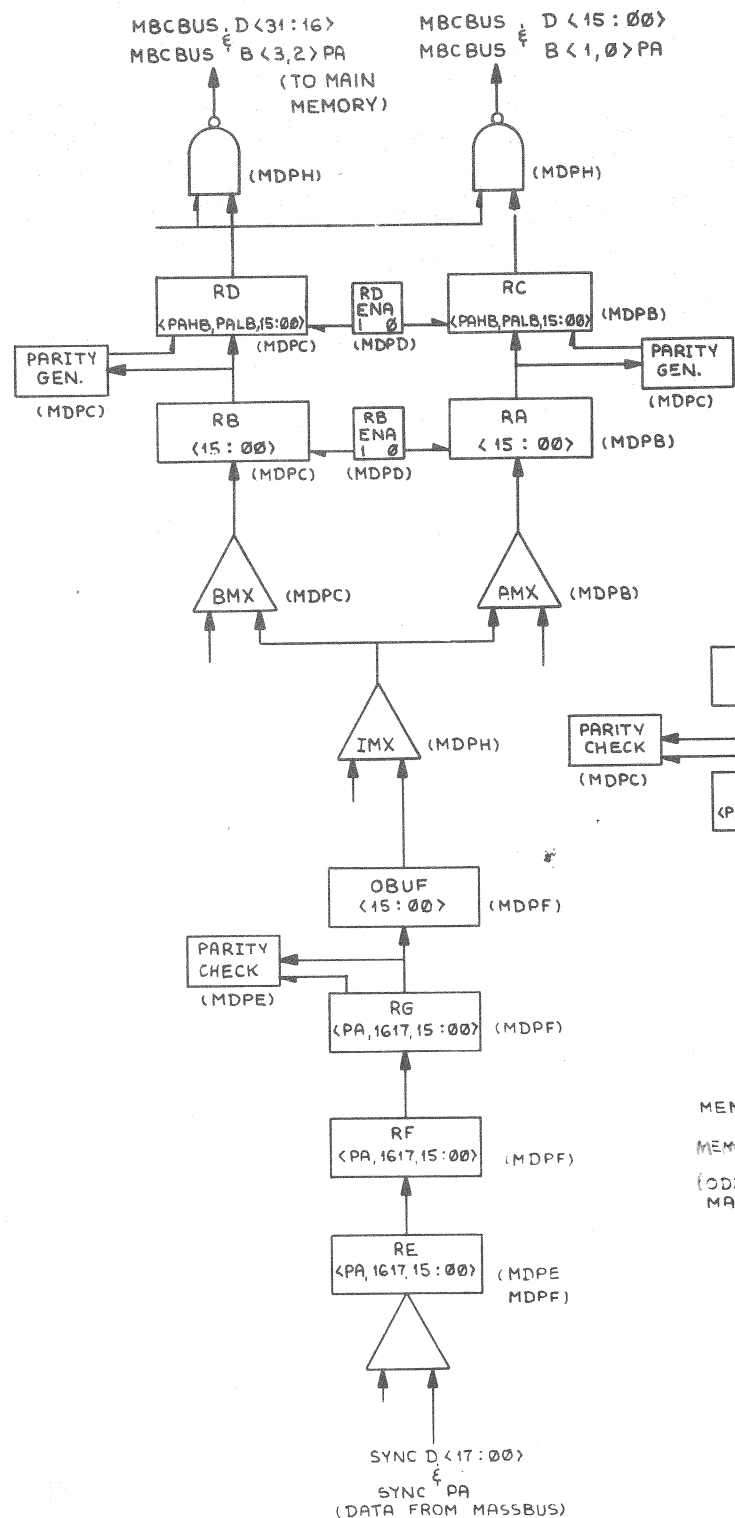
CONTROLLER	A	B	C	D
SLOT	A-F 24	A-F 28	A-F 32	A-F 36

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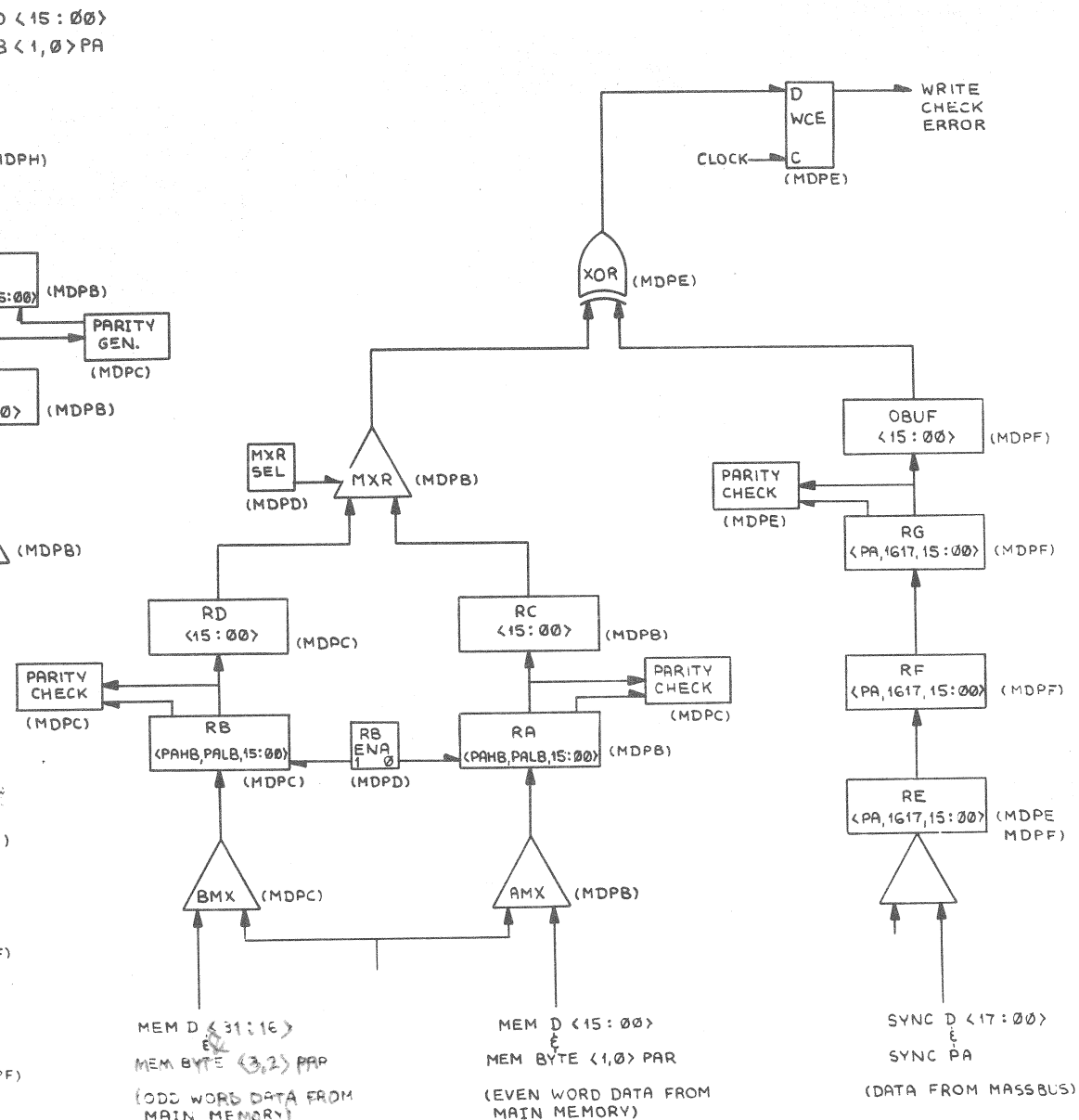
WRITE COMMAND
OR
READ-WRITE RHDB REGISTER
(READ FROM RHDB : TO UNIBUS)
(WRITE COMMAND : TO MASSBUS)



READ COMMAND



WRITE CHECK COMMAND



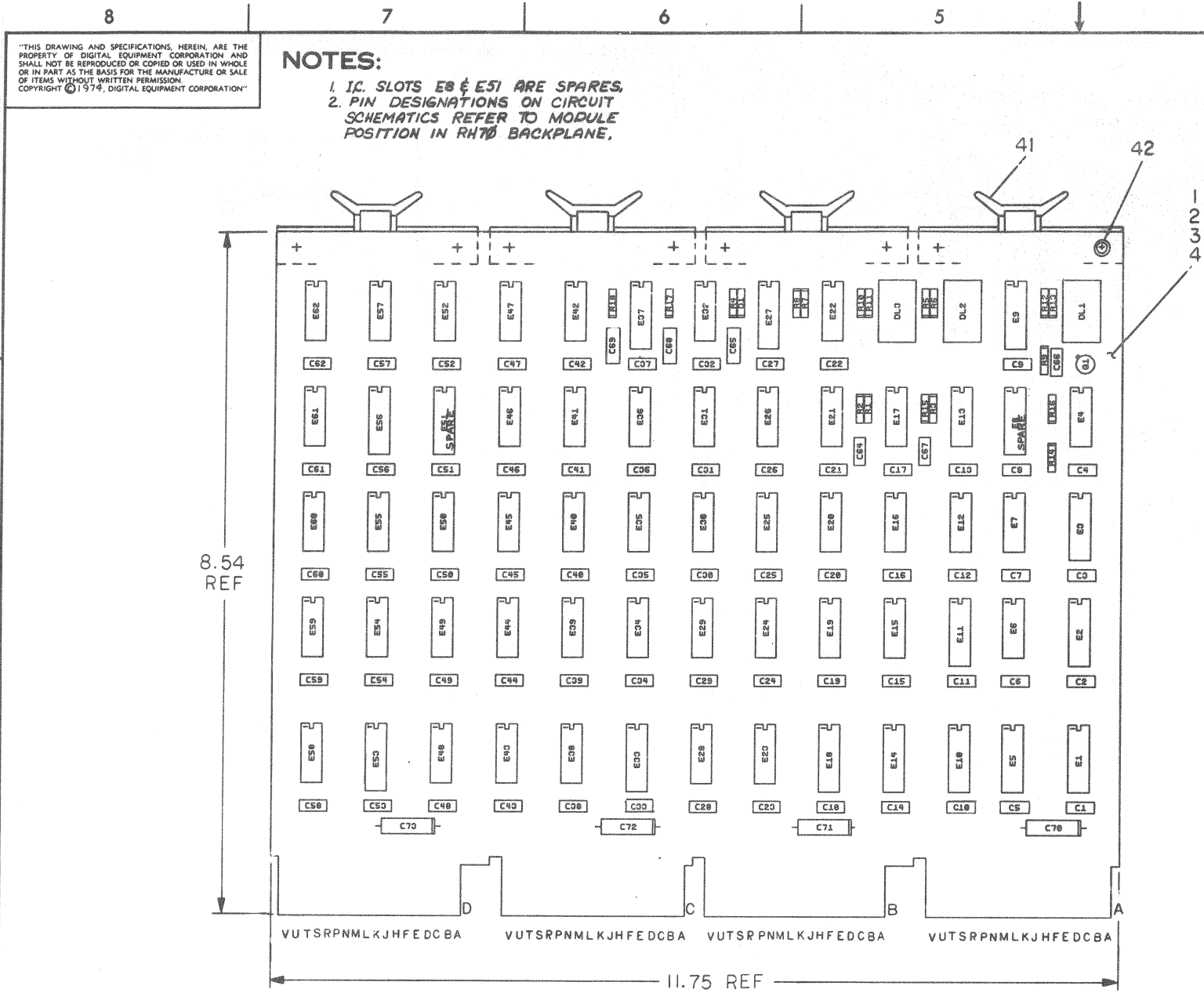
Same 8 reg's
used for different
functions.

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.

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

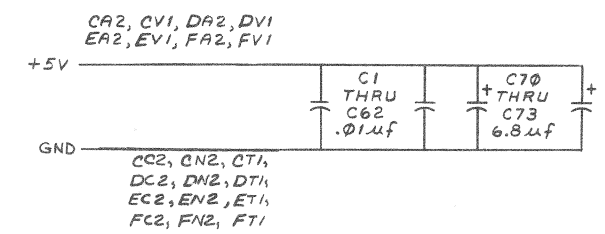


PIN NOMENCLATURE
MODULE PIN BACKPLANE PIN
A B C D C D E F

A		1-0-1918W		SCD		5		1	
REF		X-Y COORDINATE HOLE LOCATION				K-CD-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	
84	C1 THRU C82, C84, C86	CAPACITOR .01uf 100V, 20 %				1001610-01		5	
4	C70 THRU C73	CAPACITOR 6.8uf 10% 35V				1005306		6	
1	C85	CAPACITOR .47uf 20% 25V				1010279		7	
1	C87	CAPACITOR .47pf 5% 100V				1000011		8	
2	C88, C89	CAPACITOR 180pf 5% 100V				1000020		9	
1	D1	DIODE D864				1100114		10	
3	R5, R10, R12	RESISTOR 150 OHM, 1/4 W, 5 %				1300250		11	
3	R6, R11, R13	RESISTOR 300 OHM, 1/4 W, 5 %				1301425		12	
2	R1, R8	RESISTOR 330 OHM, 1/4 W, 5 %				1300295		13	
2	R2, R9	RESISTOR 680 OHM, 1/4 W, 5 %				1301424		14	
3	R3, R14, R15	RESISTOR 1K OHM, 1/4 W, 5 %				1300365		15	
4	R7, R17, R18, R4	RESISTOR 5.6K OHM, 1/4 W, 5 %				1301874		16	
1	R16	RESISTOR 6.8K OHM, 1/4 W, 5 %				1301423		17	
1	Q1	TRANSISTOR DEC 3009 B				1503100		18	
3	DL1, DL2, DL3	DELAY 50 NS				1609428		19	
2	E45, E48	IC DEC 7400				1905575		20	
3	E7, E12, E82	IC DEC 74H00				1909056		21	
2	E39, E48	IC DEC 74S00				1910532		22	
2	E34, E42	IC DEC 7402				1909004		23	
4	E6, E36, E43, E49	IC DEC 74H04				1909931		24	
4	E35, E41, E58, E59	IC DEC 7408				1910155		25	
3	E40, E44, E52	IC DEC 7410				1905576		26	
2	E24, E32	IC DEC 74H10				1909057		27	
5	E4, E25, E50, E54, E57	IC DEC 74H11				1909267		28	
2	E22, E31	IC DEC 7437				1910091		29	
1	E56	IC DEC 7442				1910046		30	
1	E20	IC DEC 74H30				1909059		31	
1	E28	IC DEC 74H50				1909060		32	
10	E13, E15, E16, E21, E26, E30, E47, E55, E60, E61	IC DEC 74H74				1909667		33	
3	E19, E23, E29	IC DEC 74S74				1910544		34	
1	E38	IC DEC 74S84				1910542		35	
2	E27, E37	IC DEC 74123				1910436		36	
2	E33, E53	IC DEC 74175				1910651		37	
1	E9	IC DEC 74193				1910018		38	
8	E1, E2, E3, E5, E10, E11, E14, E18	IC DEC 8234				1911315		39	
1	E17	IC DEC 8640				1911469		40	
4		HANDLE, FLIP CHIP (MAGENTA)				9008337-6		41	
8		EYELET				9006732		42	
A/R		WIRE #30 AWG BUSS				9105740-55		43	

QTY	REF	DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST					
ETCH BOARD REV		A			

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

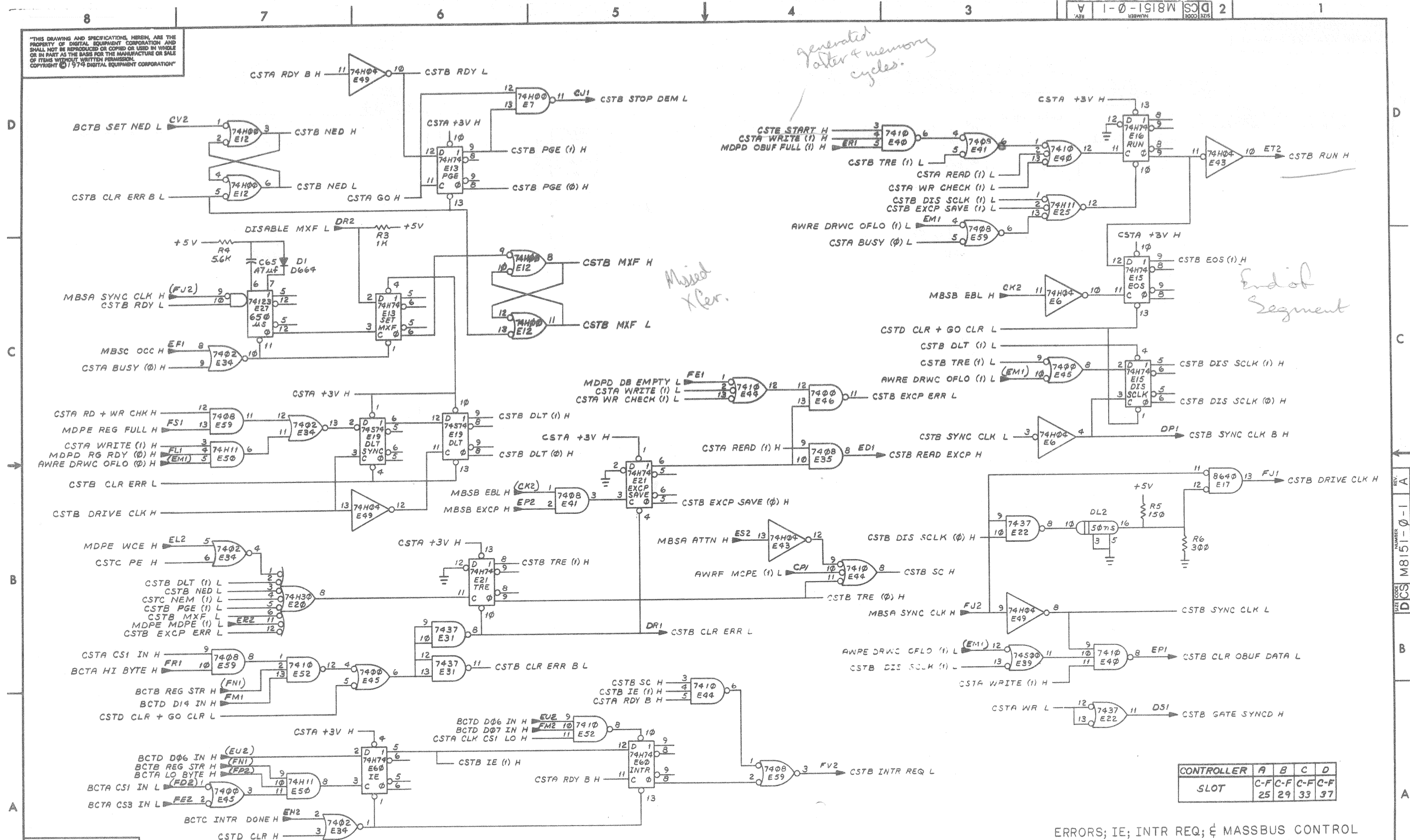


D

DA

DEC FORM NO
ORD 138

A



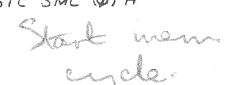
CONTROLLER	A	B	C	D
SLOT	C-F 25	C-F 29	C-F 33	C-F 37

ERRORS; IE; INTR REQ; & MASSBUS CONTROL

REVISIONS		
CHK	CHANGE NO.	REV.

	CHECK NO.	REV.						TITLE	SIZE CODE	NUMBER	REV.
								CONTROL AND STATUS (CSTB)	D CS	M8151-0-1	A-
								SCALE	SHEET	3 OF 6	DIST.

first LED



Non exist.
mem.

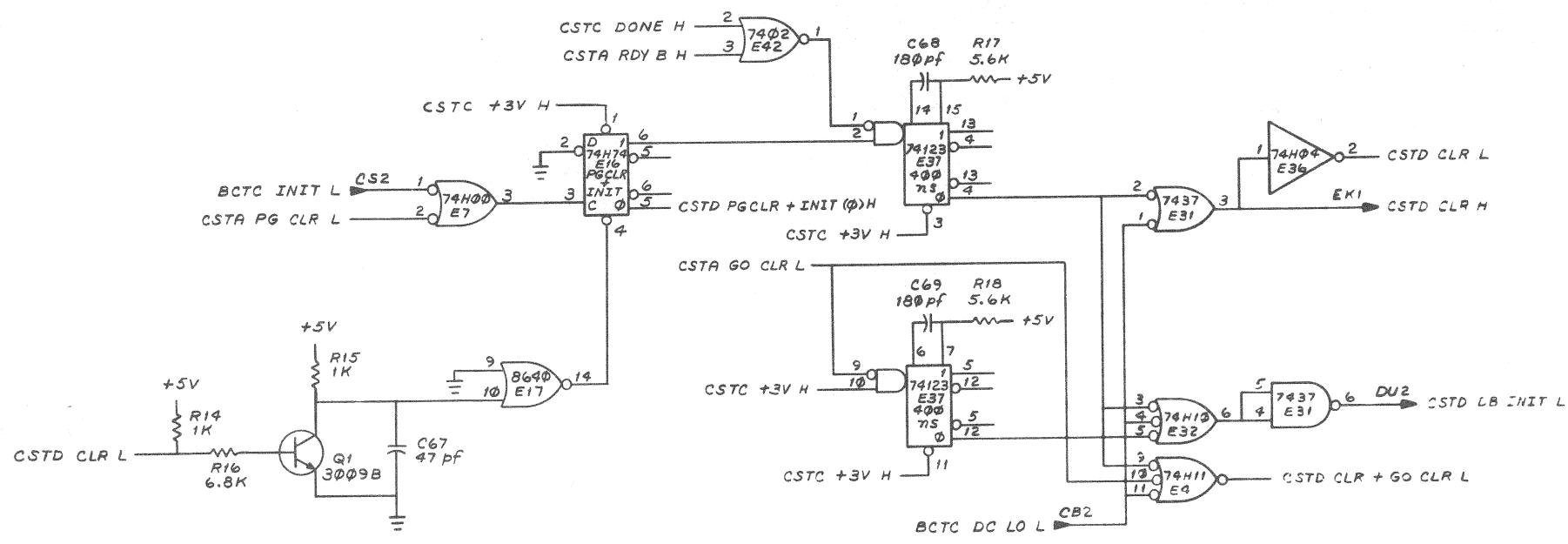
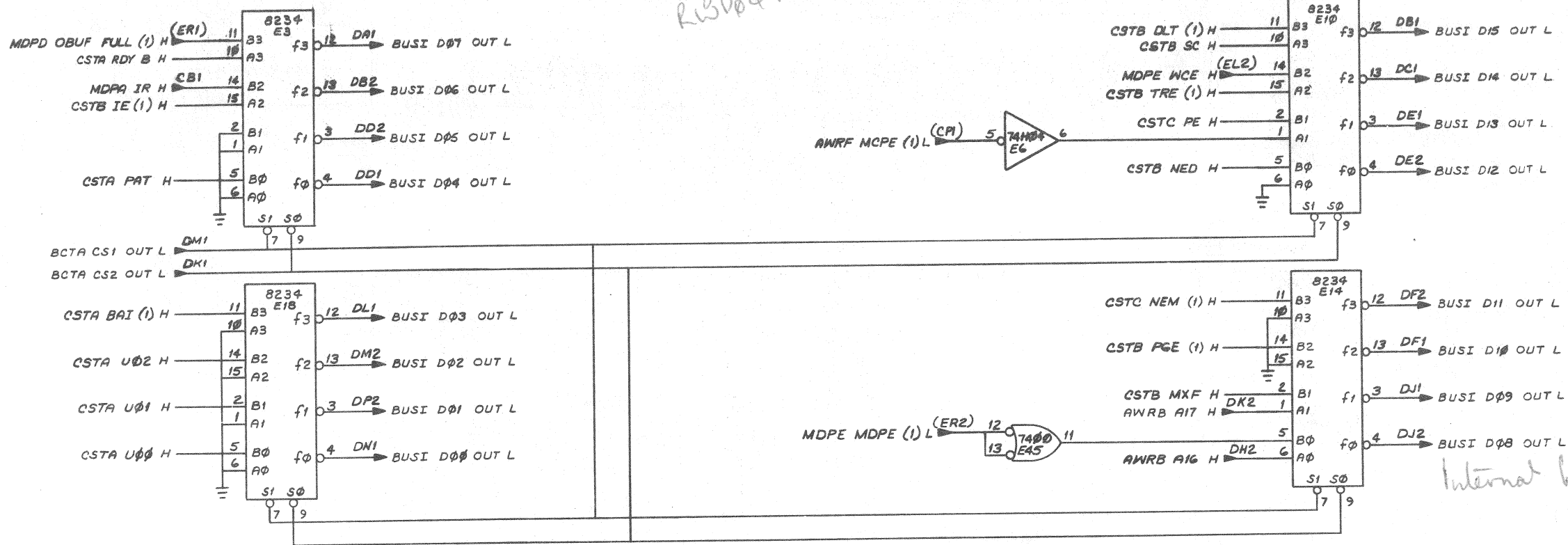
From cache
after arbitration.
clears request. C.

TITLE	CONTROL AND STATUS (CSTC)	SIZE	CODE	NUMBER	REV.
SCALE	1/4"	SHEET	4 OF 6	DIST.	

DSC FORM 100
DSD 13B

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Page 5-2
LWDP4 Manual



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

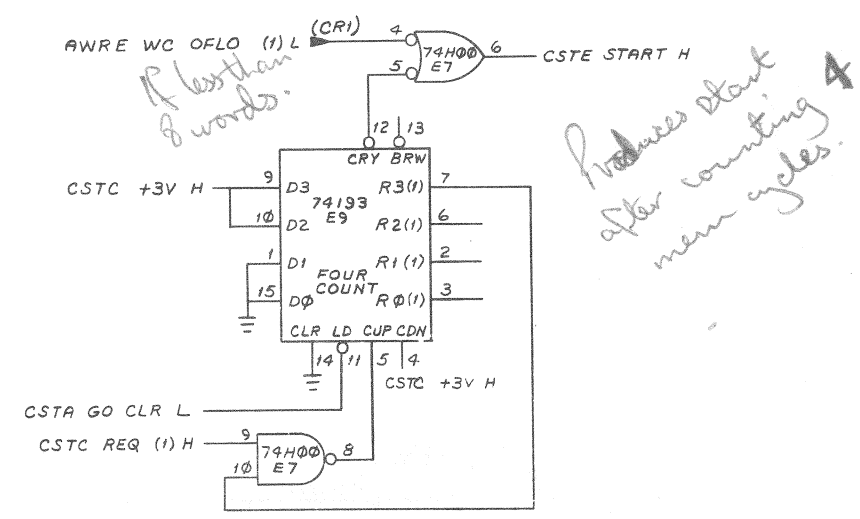
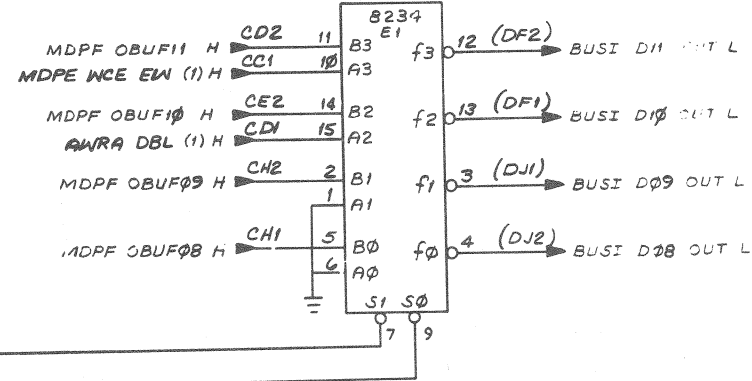
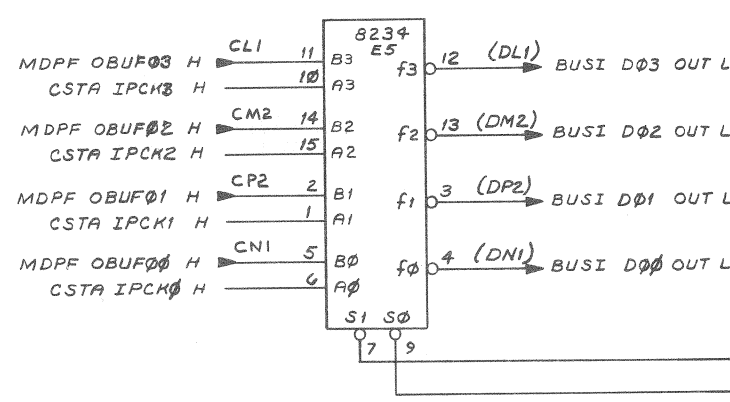
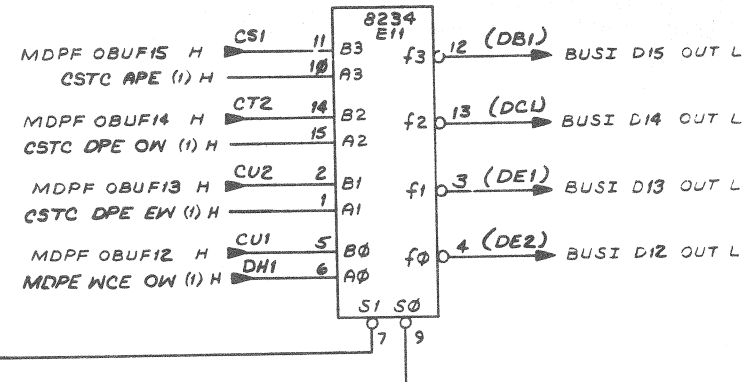
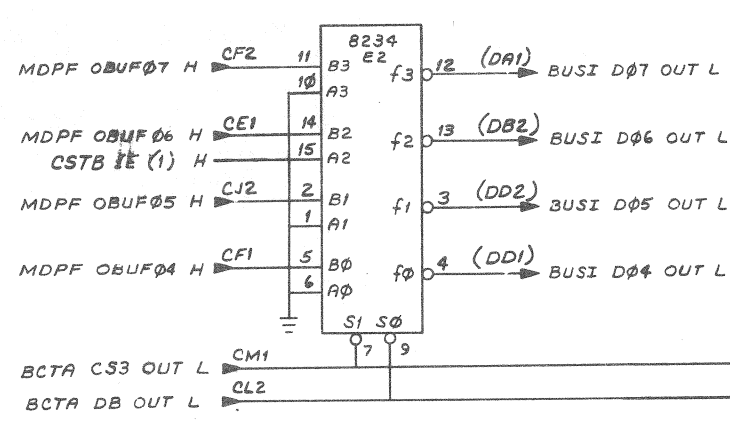
CONTROLLER	A	B	C	D
SLOT	C-F	C-F	C-F	C-F
	25	29	33	37

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

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE/CODE	NUMBER	REV.
CONTROL AND STATUS (CSTD)	DCS	M8151-0-1	A
SCALE	SHEET	DIST.	
	5 OF 6		

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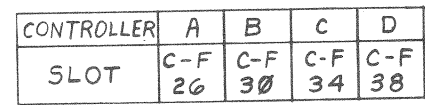
8234 OPEN COLLECTOR MULTIPLEXOR		
S0	S1	OUTPUT
L	L	B→f (NOT USED)
L	H	B→f
H	L	A→f
H	H	OFF

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

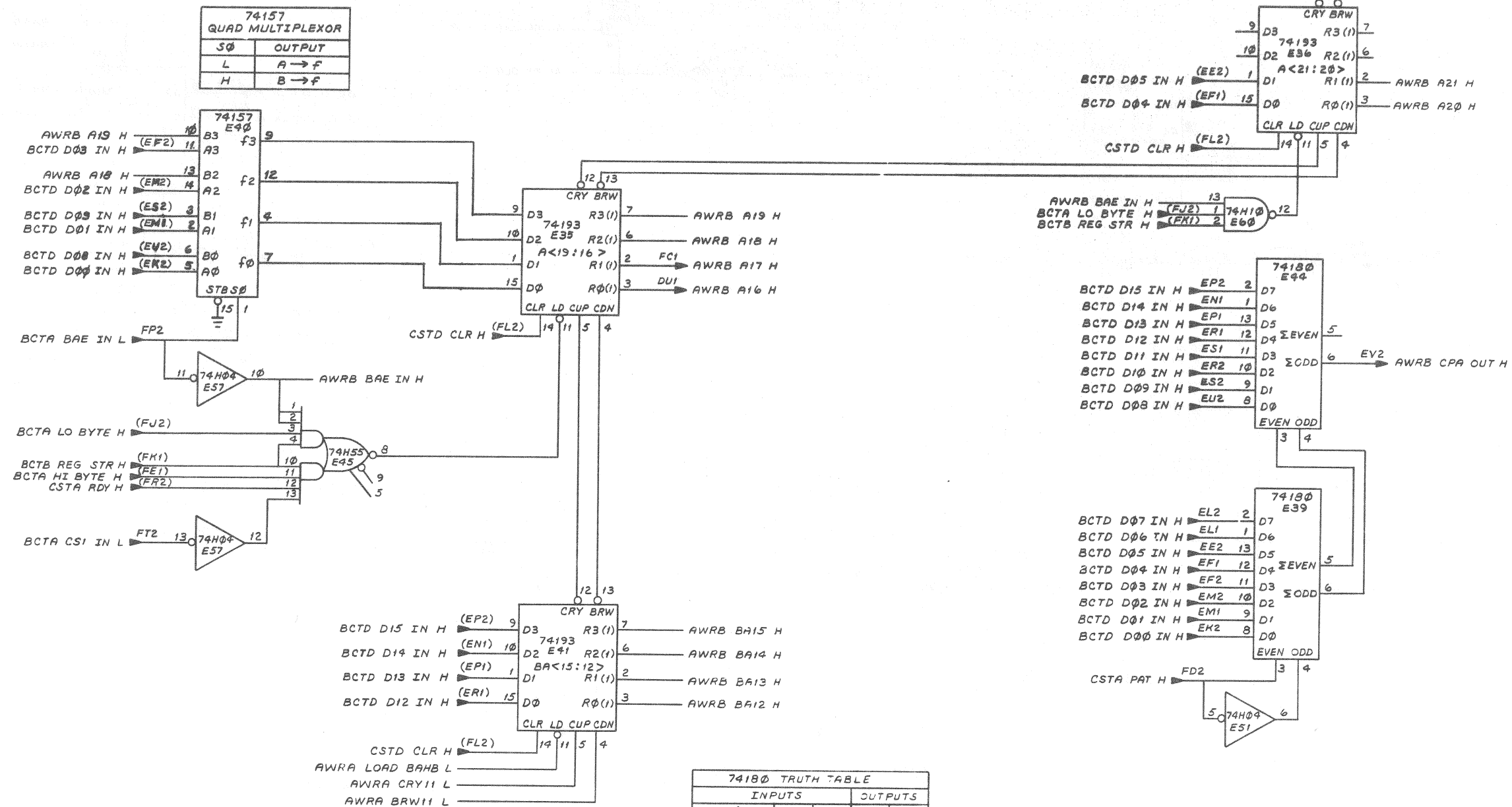
BUSI MUXS. <DB & CS3 REGS.> & START

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE	SIZE CODE	NUMBER	REV.
CONTROL AND STATUS (CSTE)	DCS	M8151-0-1	A
SCALE	SHEET	DIST.	
11	6 OF 6		

DEC FORM NO
DD FORM 136

2	SIZE CODE	DCS	NUMBER	1-01	*
---	-----------	-----	--------	------	---



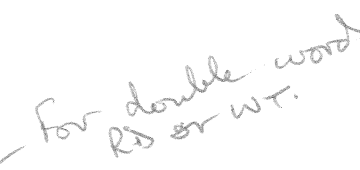
74180 TRUTH TABLE				
INPUTS			OUTPUTS	
Σ OF H'S AT D0 - D7	EVEN	ODD	Σ EVN	Σ ODD
EVEN	L	H	L	H
ODD	L	H	H	L
EVEN	H	L	H	L
ODD	H	L	L	H

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

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

TITLE	ADDR. & WORD COUNT REGS. (AWRB)	SIZE	CODE	NUMBER	REV.
SCALE	3 OF 7	D	CS	M8152-0-1	*

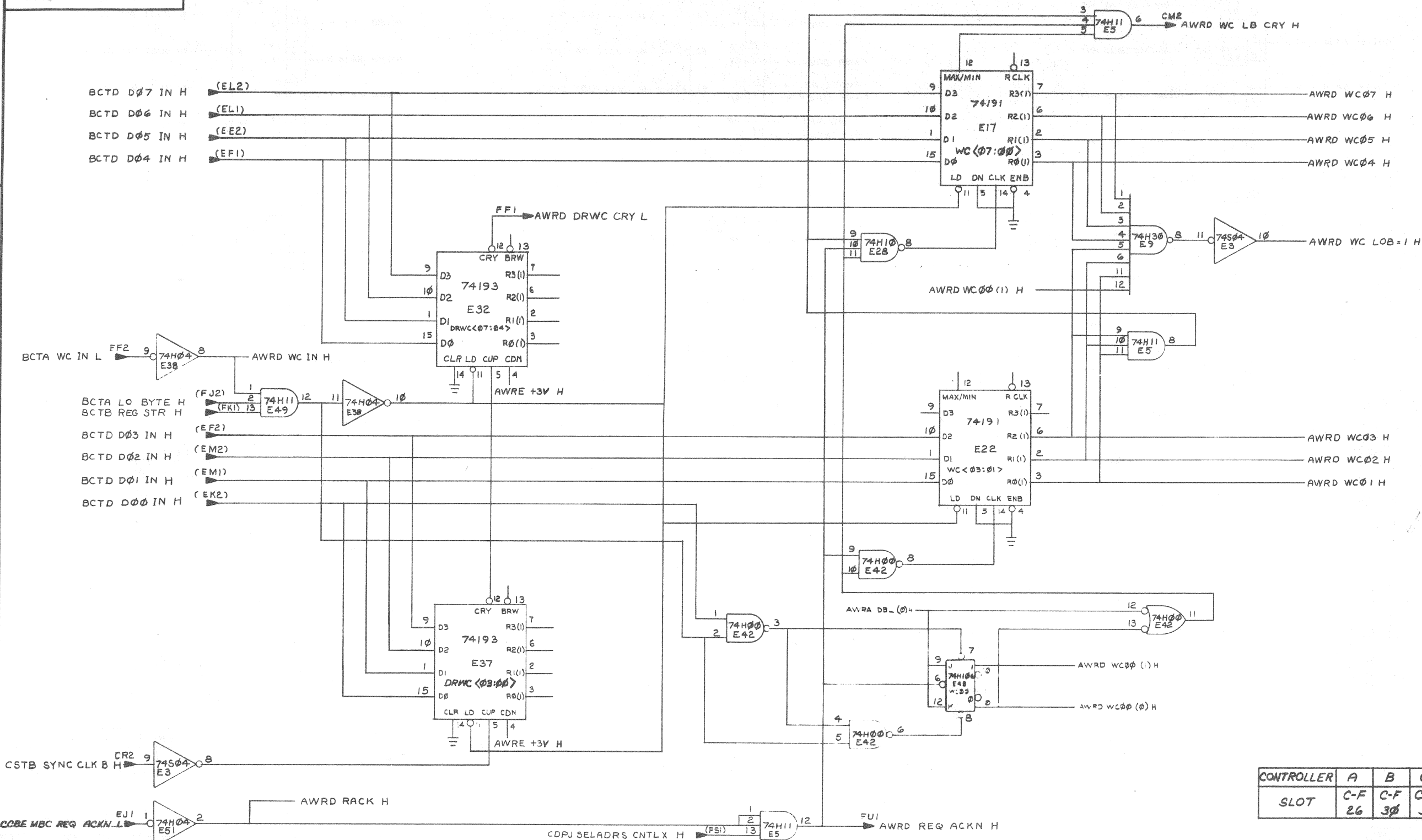
REVISIONS		
CHK	CHANGE NO.	REV.



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

	SIZE	CODE	NUMBER			
C)	D	CS	M8152-Ø-1			
	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. <07:00>)

REVISIONS	CHK	CHANGE NO.	REV.

DEC FORM NO. 090 120

8 7 6 5 4 3 2 1

TITLE ADDR. & WORD COUNT REGS. (AWRD) DCS M8152-0-1

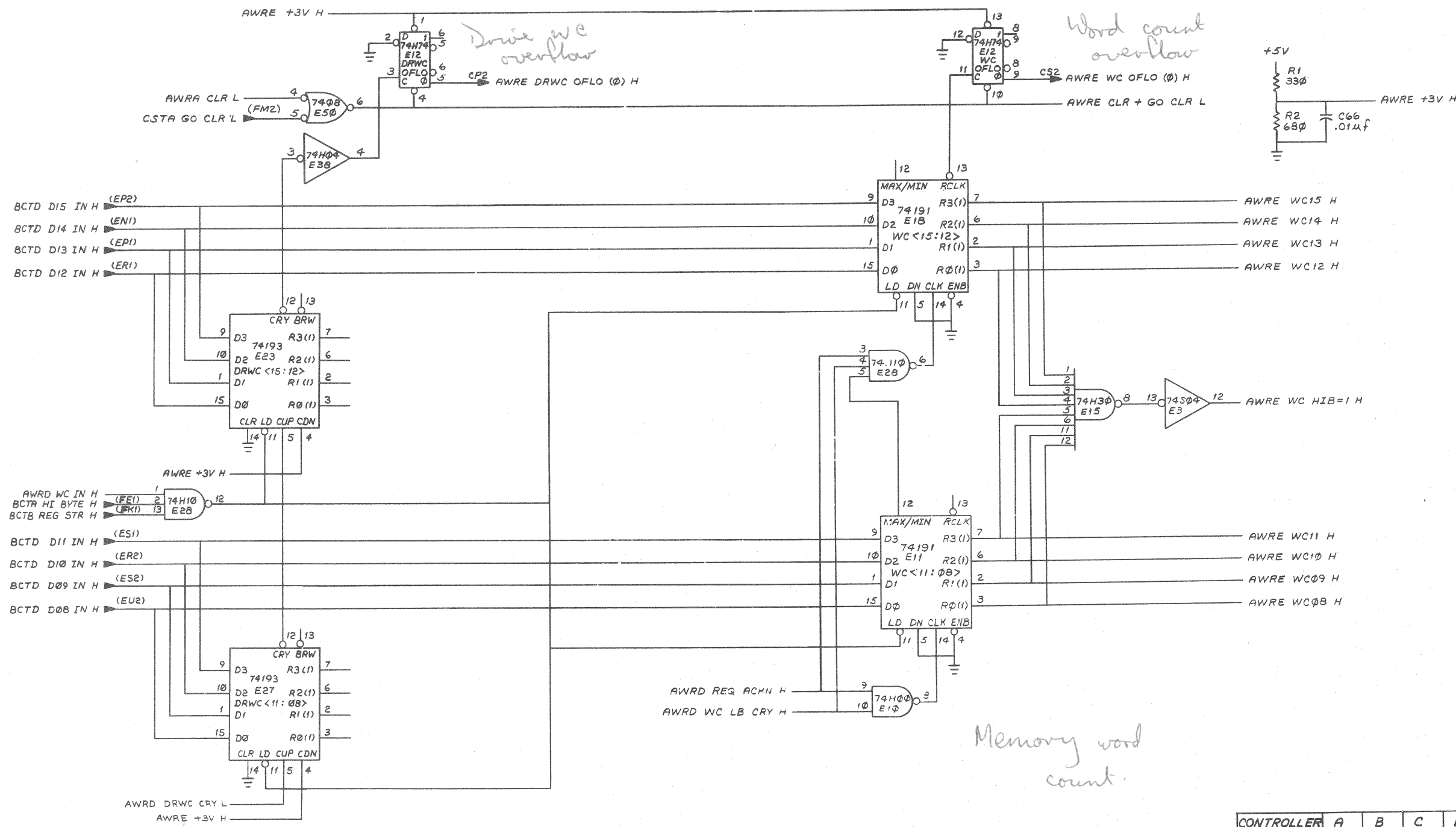
SCALE ---#

SHEET 5 OF 7

DIST.

REV. *

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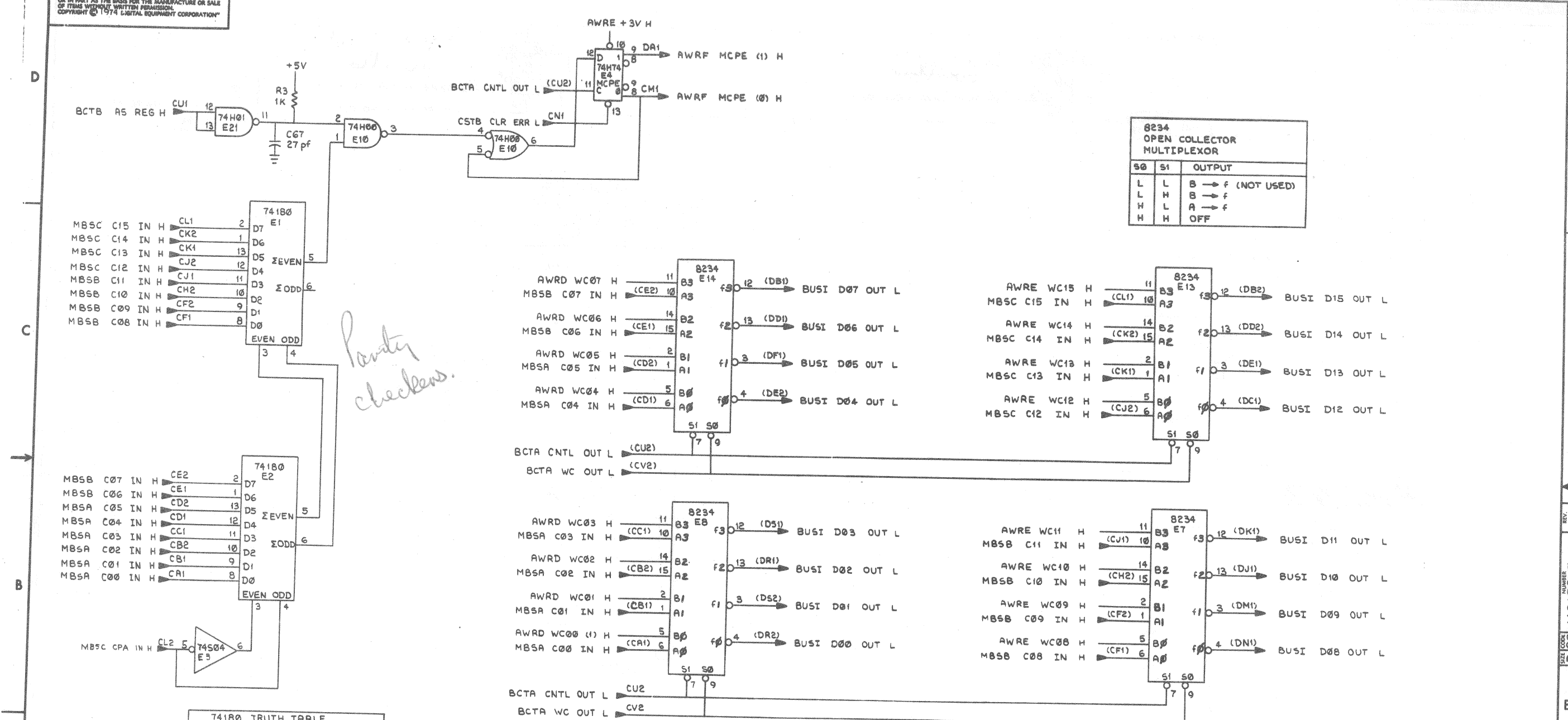


CONTROLLER	A	B	C	D
SLOT	C-F 26	C-F 30	C-F 34	C-F 38

REVISIONS		
CHK	CHANGE NO.	REV.

TITLE		(WORD COUNT REGS <15:08> WC OFLO)		SIZE CODE		NUMBER		REV.	
ADDR. & WORD COUNT REGS. (AWRE)		D CS		M8152-0-1					
SCALE		SHEET 6 OF 7		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

74180 TRUTH TABLE				
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.

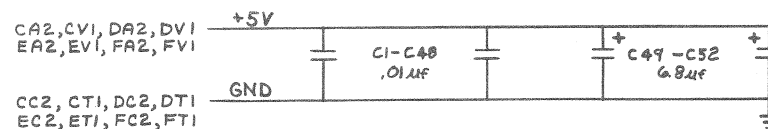
(BUSI MUXS. <WC & REMOTE REGS.> & MCPE)

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

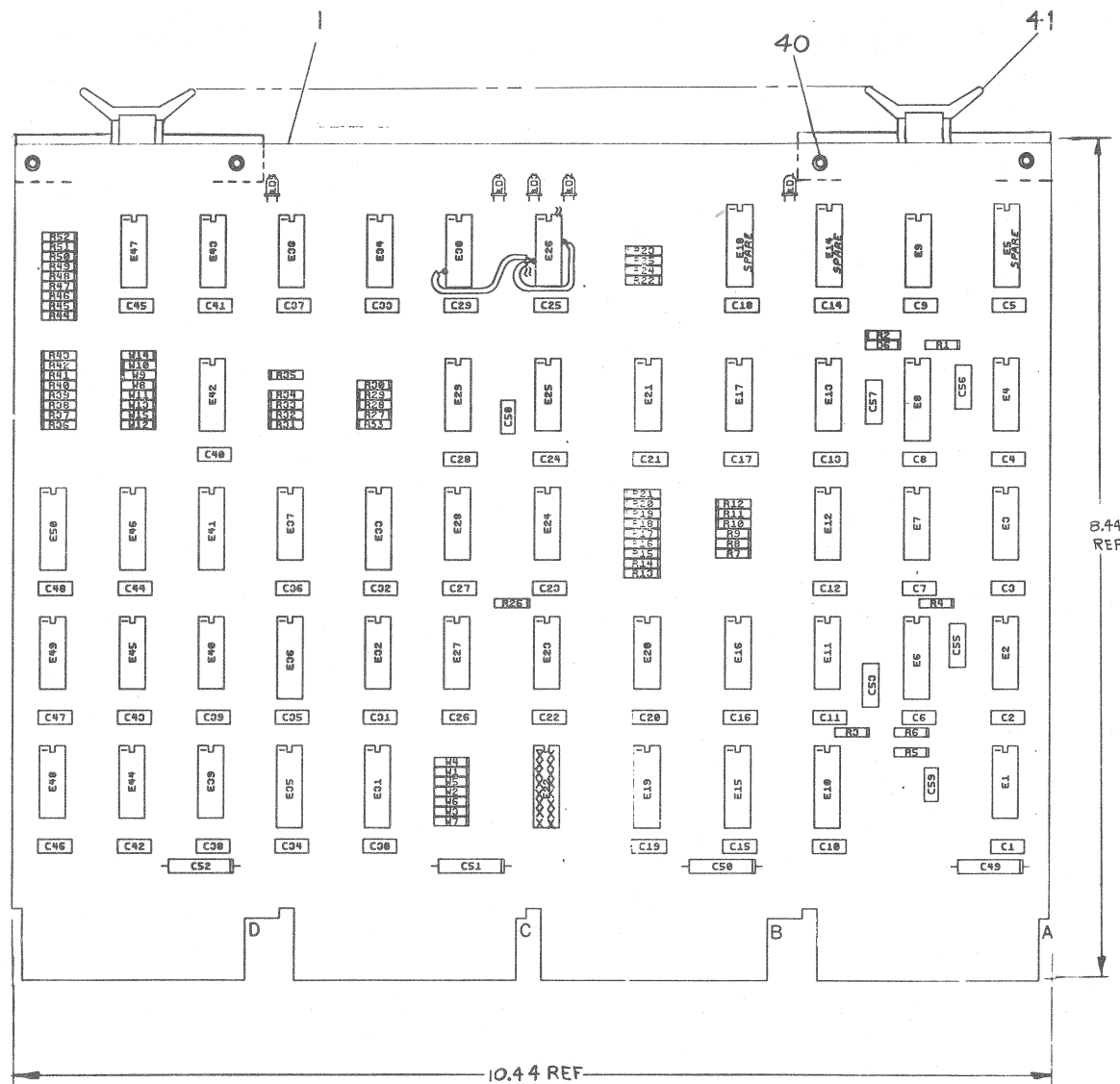
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NOTES:

1. IC SLOTS E5, E14, AND E18 ARE SPARES.
2. PIN DESIGNATIONS ON CIRCUIT SCHEMATICS REFER TO MODULE POSITION IN RH70 BACKPLANE.



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

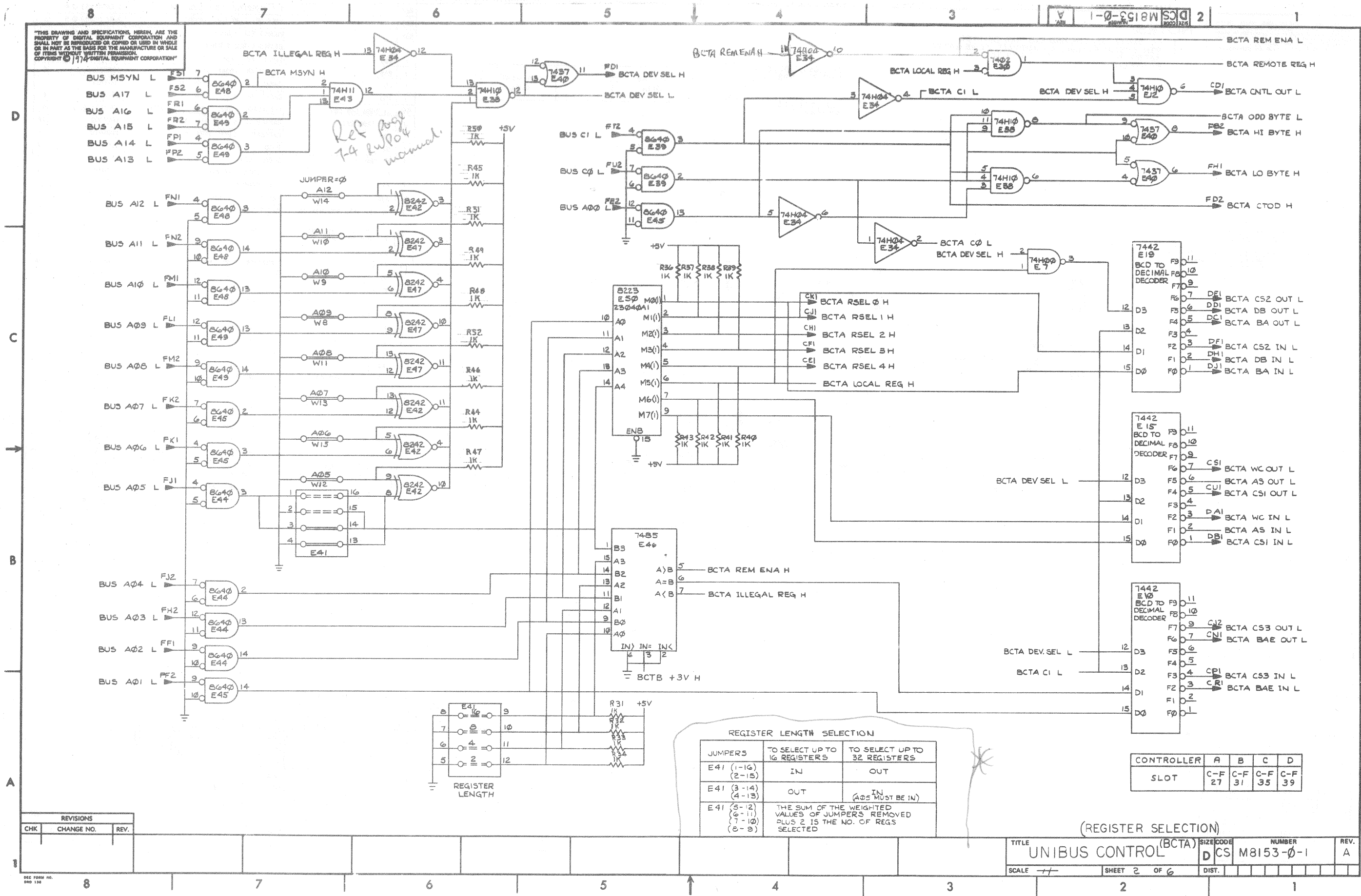


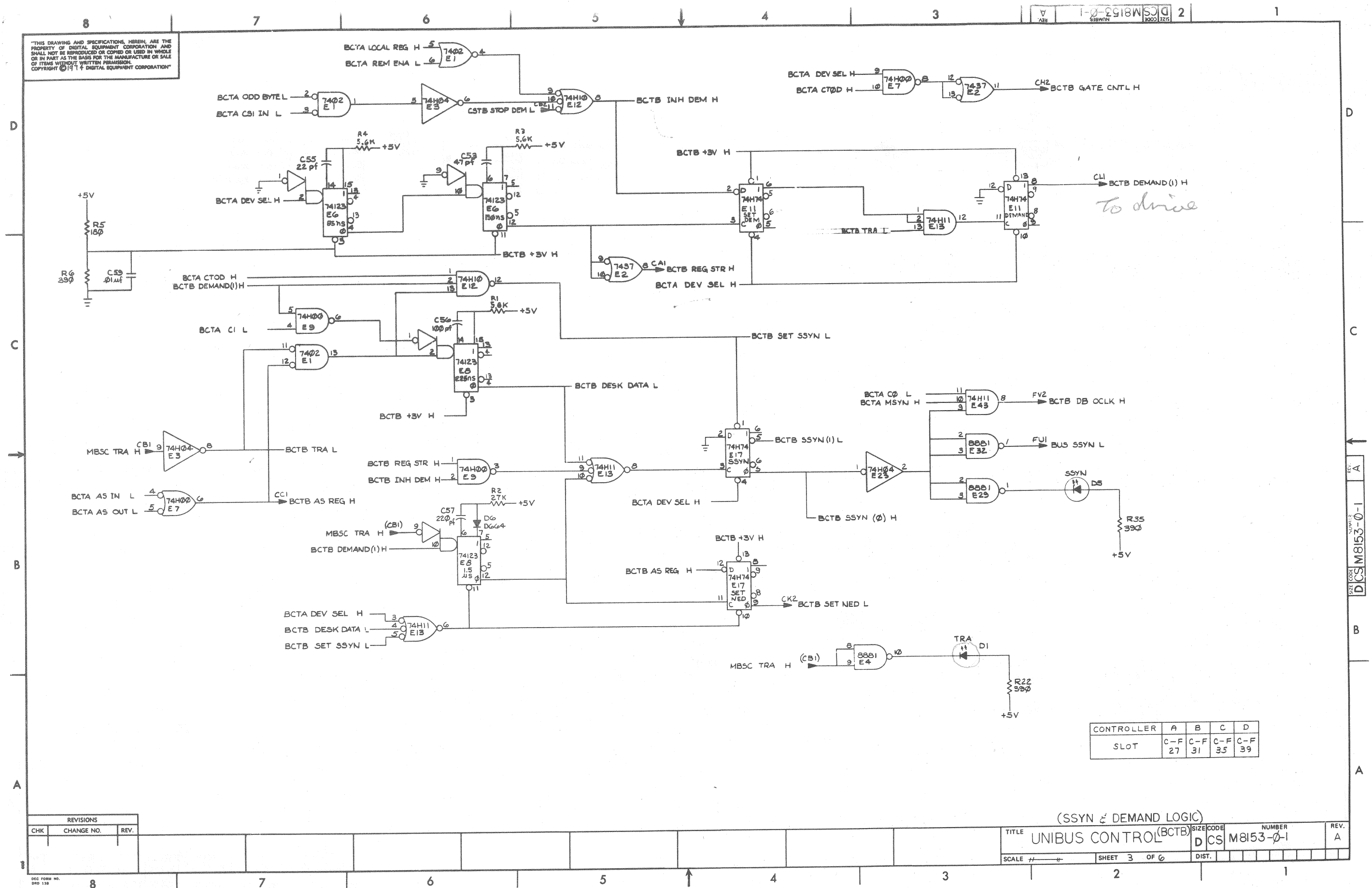
REF	X-Y COORDINATE HOLE LOCATION	K-CO-M8153-0-4	1
REF	ASSY/DRILLING HOLE LAYOUT	D-AH-M8153-0-5	2
REF	MODULE ECO HISTORY	B-MH-M8153-0-6	3
1	ETCHED CIRCUIT BOARD	5011271	4
1 C53	CAPACITOR, 47pf, 100V, 5%	1000011	5
1 C56	CAPACITOR, 100pf, 100V, 5%	1000016	6
1 C57	CAPACITOR, 220pf, 100V, 5%	1000021	7
1 C58	CAPACITOR, 330pf, 100V, 5%	1000023	8
49 C1 THRU C40, C59	CAPACITOR, .01uF, 100V, 20% DISC	1001610-01	9
4 C49 THRU C52	CAPACITOR, 6.8uF, 35V, 10%	1005306	10
1 C55	CAPACITOR, 22pf, 100V, 5%	1005820	11
1 D6	DIODE, D6F4	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, R28, 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	9008732	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)	9007580-01	43
2"	WIRE #30 AWG BUS (RETROFIT)	9105740-55	44

QTY	REF DESIGNATION	DESCRIPTION	PART NO.	ITEM NO.
PARTS LIST				
FIRST USED ON OPTION MODEL RH70				
ETCH BOARD REV B				
DRN	DATE	11/21/74	 TITLE UNIBUS CONTROL (BCT)	
CHKD	DATE	1/20/75		
ENG	DATE	1/14/75		
PROL ENG	DATE	1/14/75		
PROD	DATE	1/14/75		
NEXT HIGHER ASSY			SIZE/CODE	NUMBER
B-DD-RH70-0			DCS	M8153-0-1
SCALE			DIST.	REV. A
SEMICONDUCTOR CONVERSION CHART				
DEC NO.	EIA NO.	DEC NO.	EIA NO.	
SHEET 1 OF 6				

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

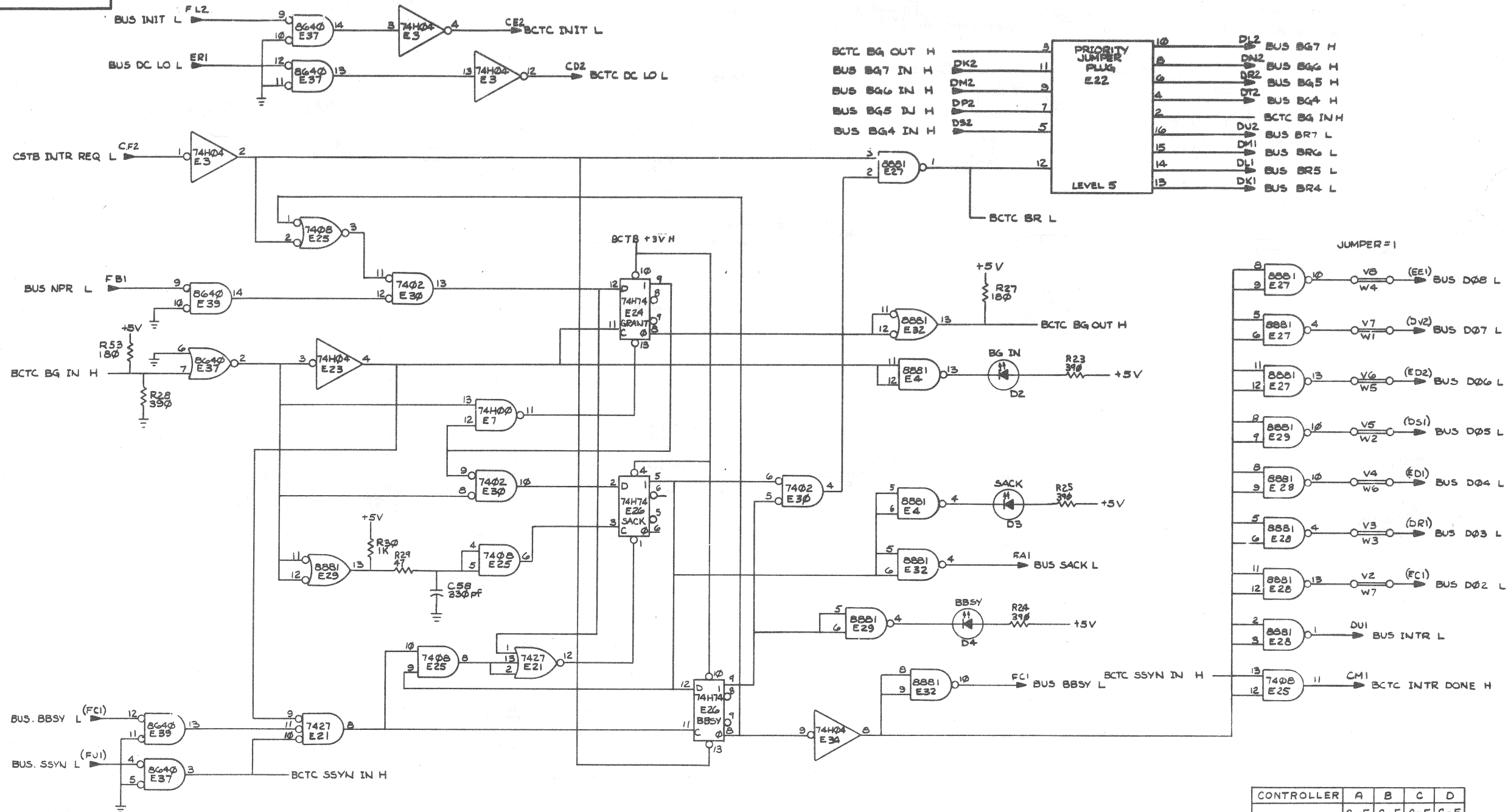
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DCS M8153-0-1



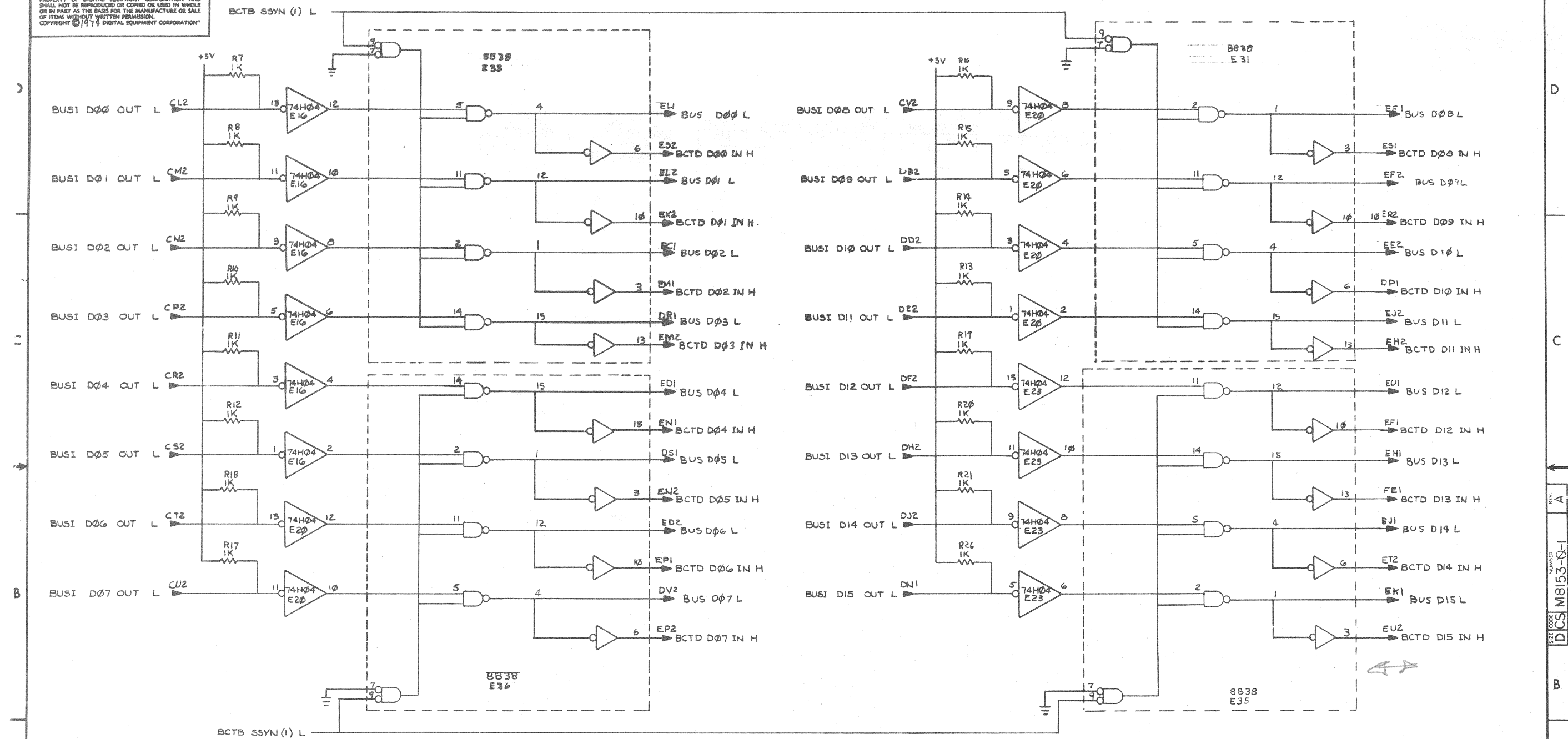
CONTROLLER	A	B	C	D
SLOT	C-F 27	C-F 31	C-F 35	C-F 39

(UNIBUS INTERRUPT LOGIC)

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

CHK	CHANGE NO.	REV.

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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.

TITLE		UNIBUS CONTROL (BCTD)		SIZE CODE	D CS	NUMBER	M8153-0-1	REV.	A
SCALE	1:1	SHEET	5	OF	6	DIST.			

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NOTES:
1. THE RHBAE & RHCS3 REGISTERS 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 - 23040A1 (0223)								
OCTAL ADDR	M7	M6	LOCAL REG M5	RSEL 4 M4	RSEL 3 M3	RSEL 2 M2	RSEL 1 M1	RSEL 0 M0
00	L	L	L	L	L	L	L	L
01	H	L	H	L	L	L	H	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 ADDR5
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

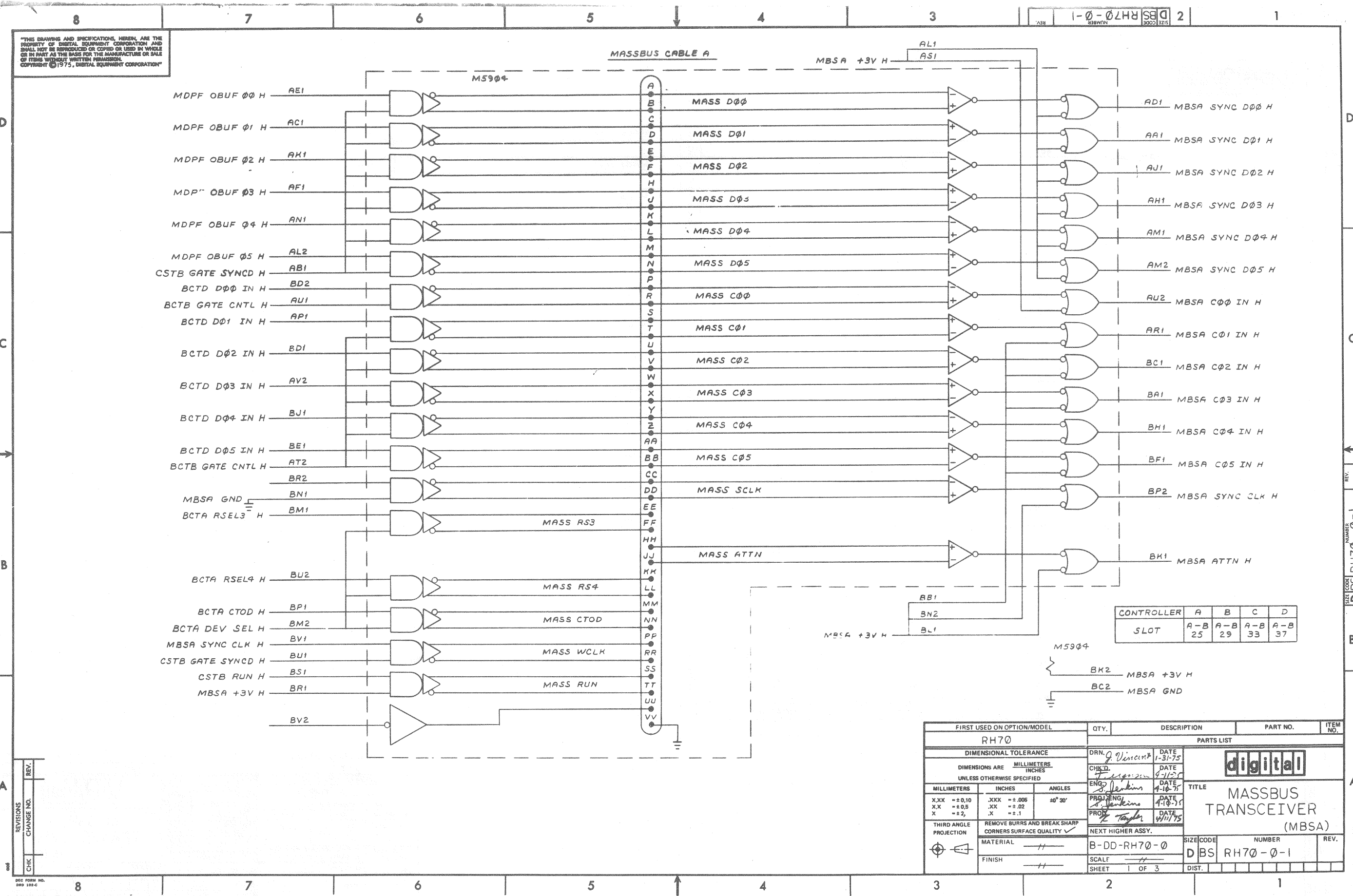
RHBAE, RHCS3

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.

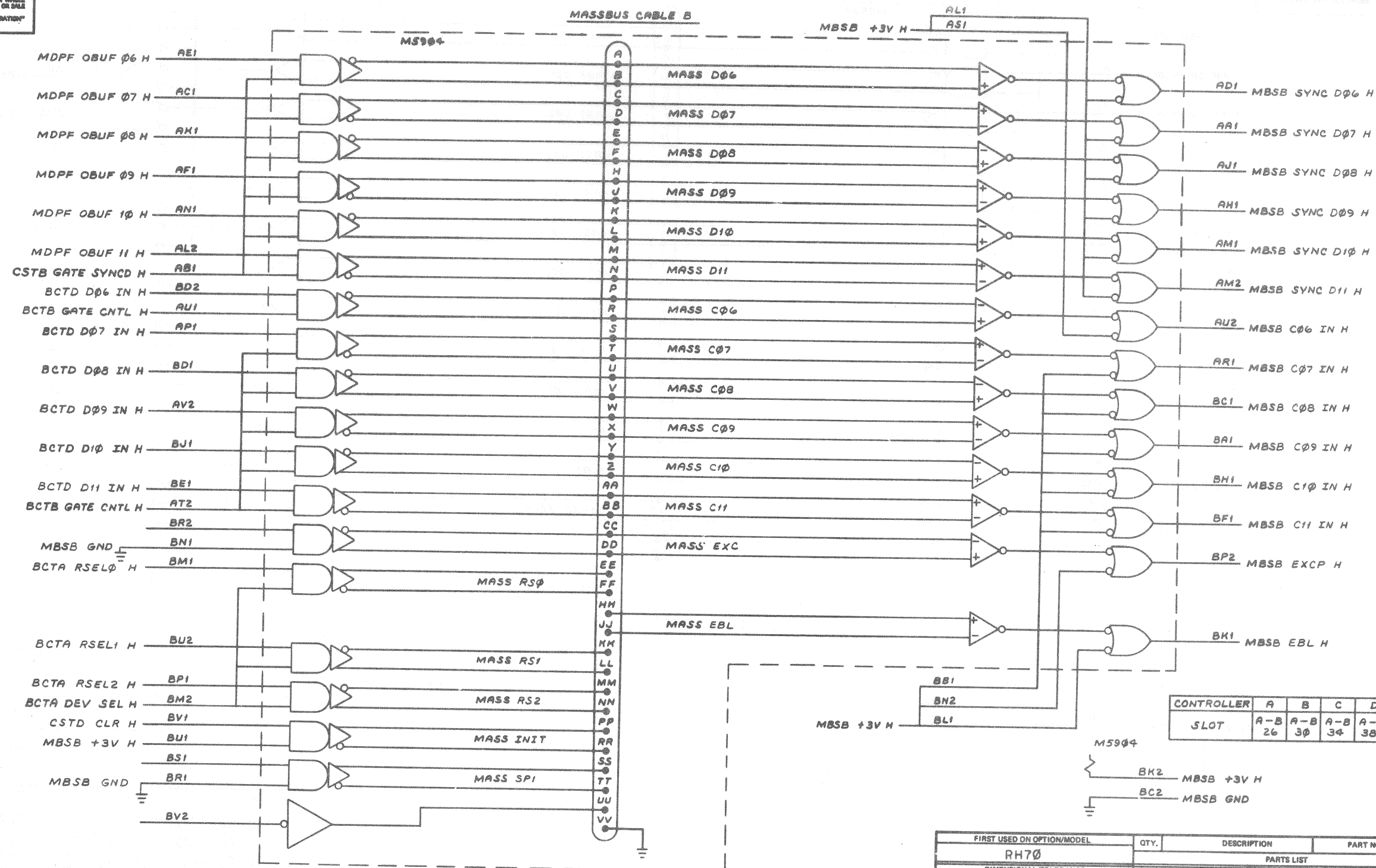
TITLE	UNIBUS CONTROL (BCTE)	SIZE CODE	D CS	NUMBER	M8153-0-1	REV.	A
SCALE	# - #	SHEET	6	OF	6	DIST.	



REV. NO. 1
DIBS RH70-0-1

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
RH70					
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE		DRN.	DATE	digital	
MILLIMETERS		CHK'D.	DATE		
INCHES		ENG'D.	DATE		
UNLESS OTHERWISE SPECIFIED		PROJ'NG.	DATE		
XXX = ±0.10	JXX = ±.005	20° 30'		TITLE MASSBUS TRANSCEIVER (MBSA)	
XX = ±0.5	.XX = ±.02	.X = ±.1			
X = ±2					
THIRD ANGLE PROJECTION		REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓		NEXT HIGHER ASSY.	
MATERIAL		FINISH		SCALE	
				SHEET 1 OF 3	
				DIST.	

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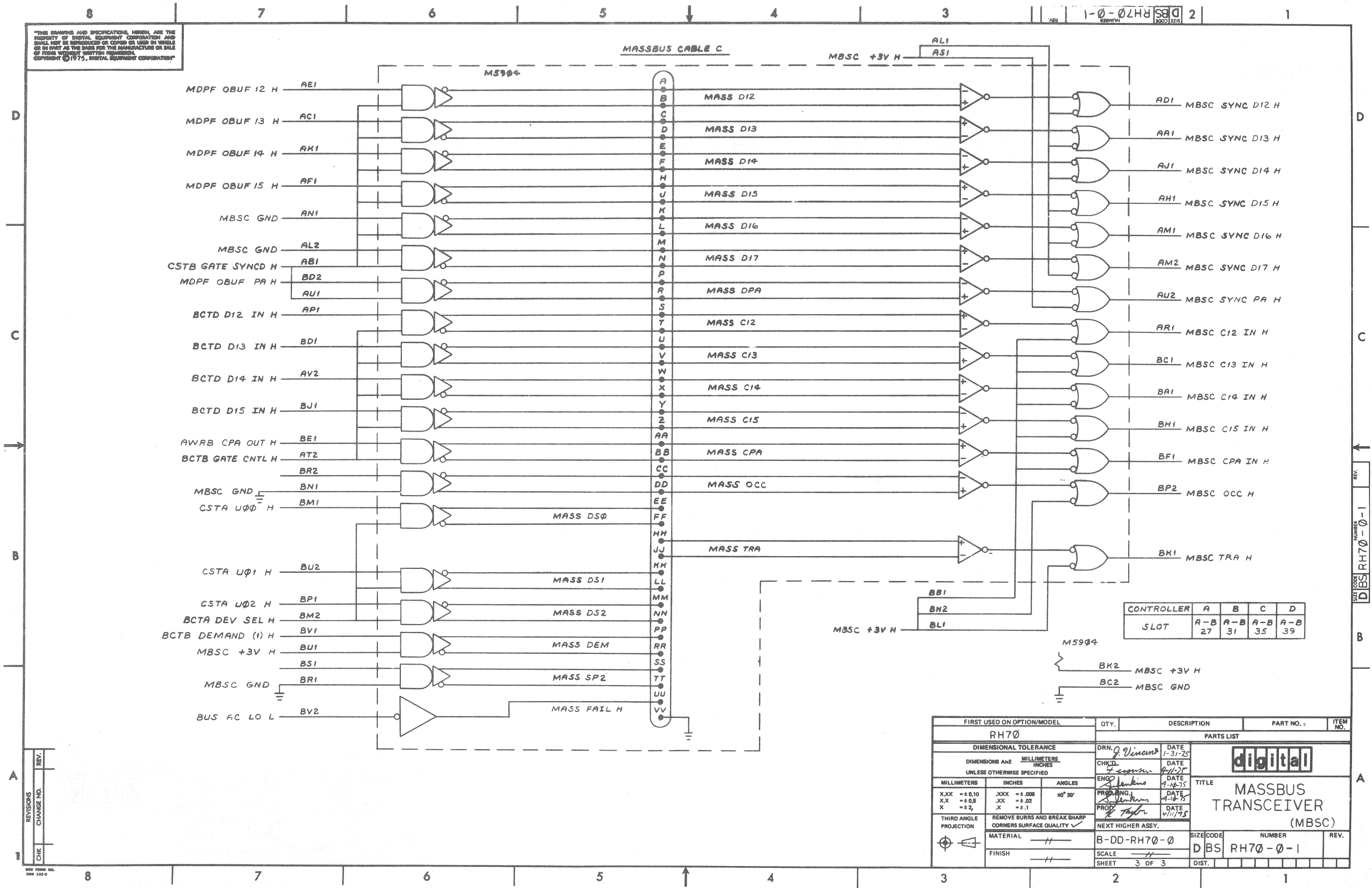


CONTROLLER	A	B	C	D
SLOT	A-B	A-B	A-B	A-B
	26	30	34	38

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
RH70					
DIMENSIONAL TOLERANCE		PARTS LIST			
DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED		digital			
MILLIMETERS		TITLE			
X.XX ±0.10		MASSBUS TRANSCEIVER (MBSB)			
X.X ±0.5		SIZE CODE			
X ±2		NUMBER			
THIRD ANGLE PROJECTION		REV.			
MATERIAL		B-DD-RH70-0			
FINISH		SCALE			
		SHEET 2 OF 3			
		DIST.			

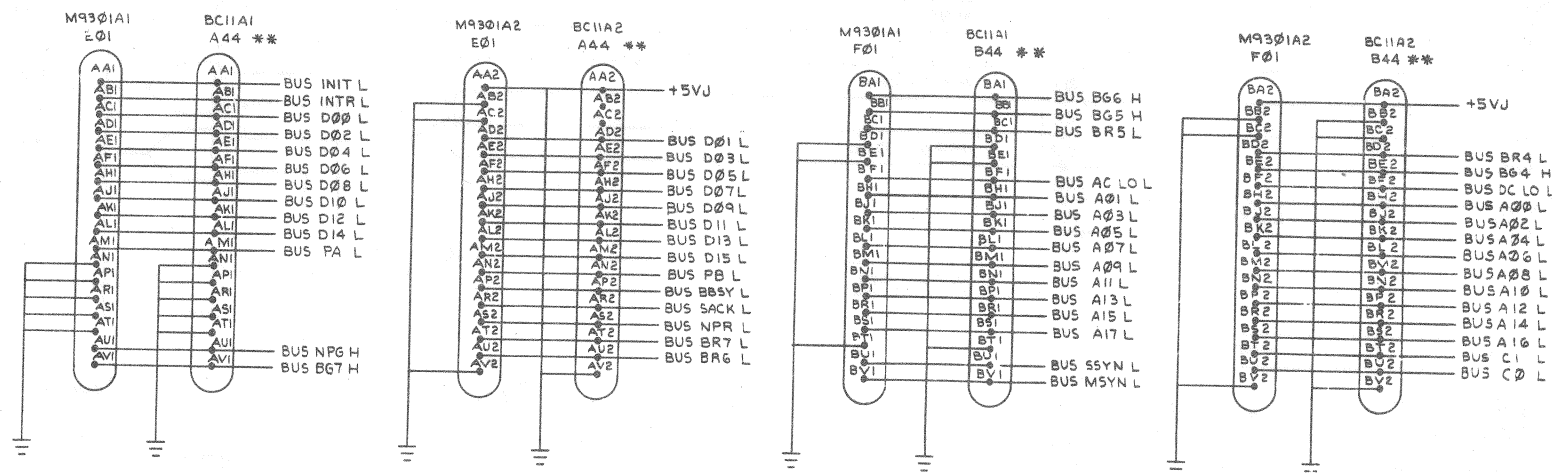
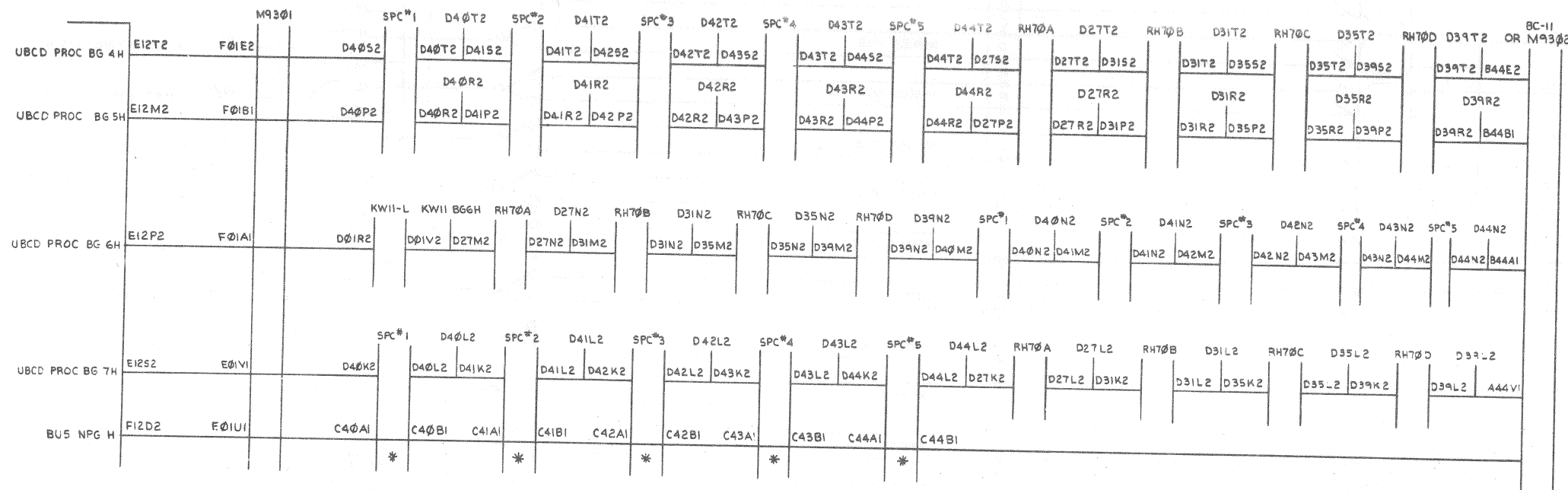
35

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2-8-118X D 2



- * 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.

FIRST USED ON OPTION/MODEL		QTY.	DESCRIPTION	PART NO.	ITEM NO.
KB11					
PARTS LIST					
DIMENSIONAL TOLERANCE		DATE 3/1/75			
DIMENSIONS ARE UNLESS OTHERWISE SPECIFIED		DATE 3/1/75			
INCHES		DATE 3/1/75			
ANGLES		DATE 3/1/75			
THIRD ANGLE PROJECTION		DATE 3/1/75			
REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY		DATE 3/1/75			
MATERIAL		DATE 3/1/75			
FINISH		DATE 3/1/75			
B-DD-KB11-B		DATE 3/1/75			
SCALE NONE		DATE 3/1/75			
SHEET 1 OF 1		DATE 3/1/75			
DIST.		DATE 3/1/75			

digital

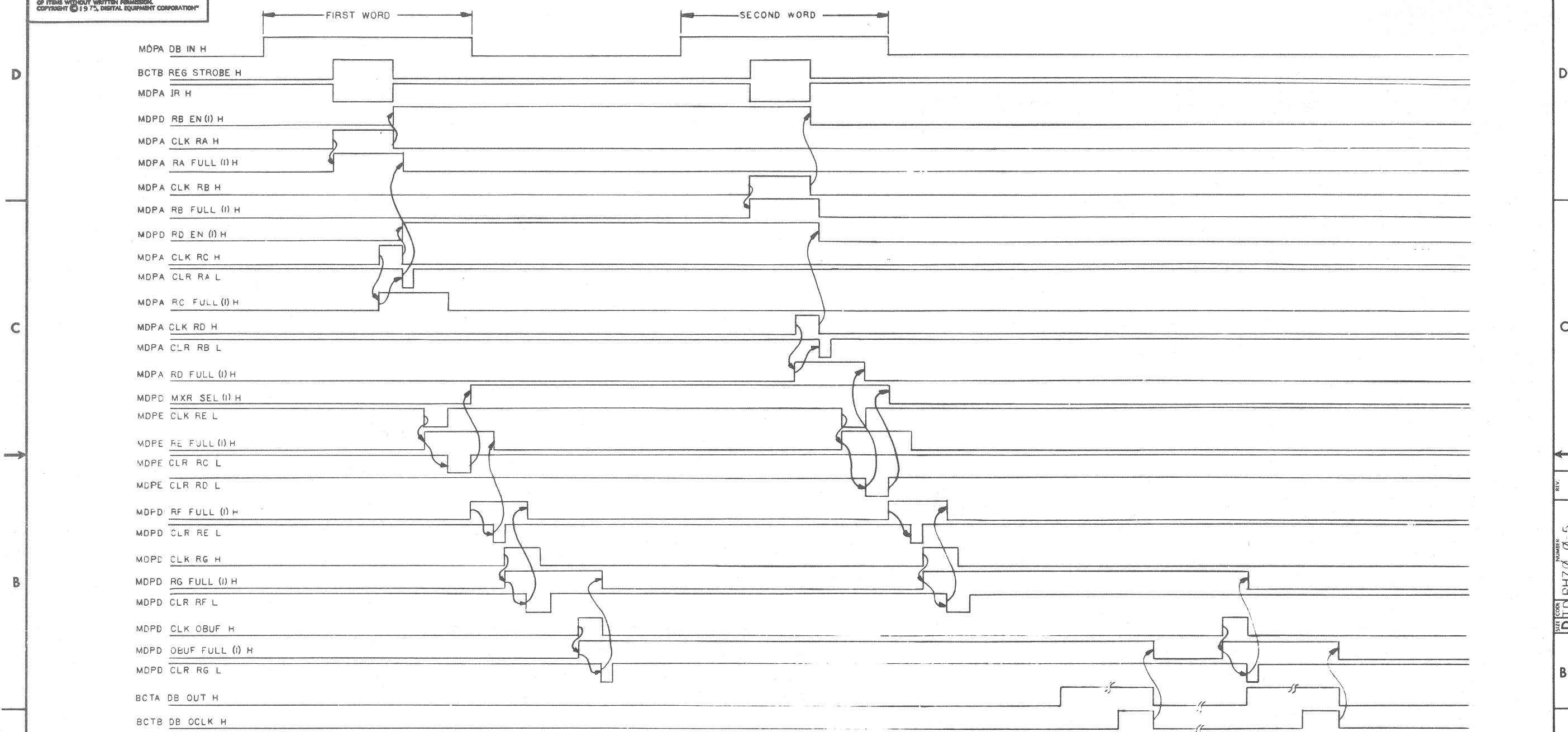
UNIBUS CABLE AND CABLE CHAIN

SIZE CODE NUMBER REV.

DIC KB11-B-7

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



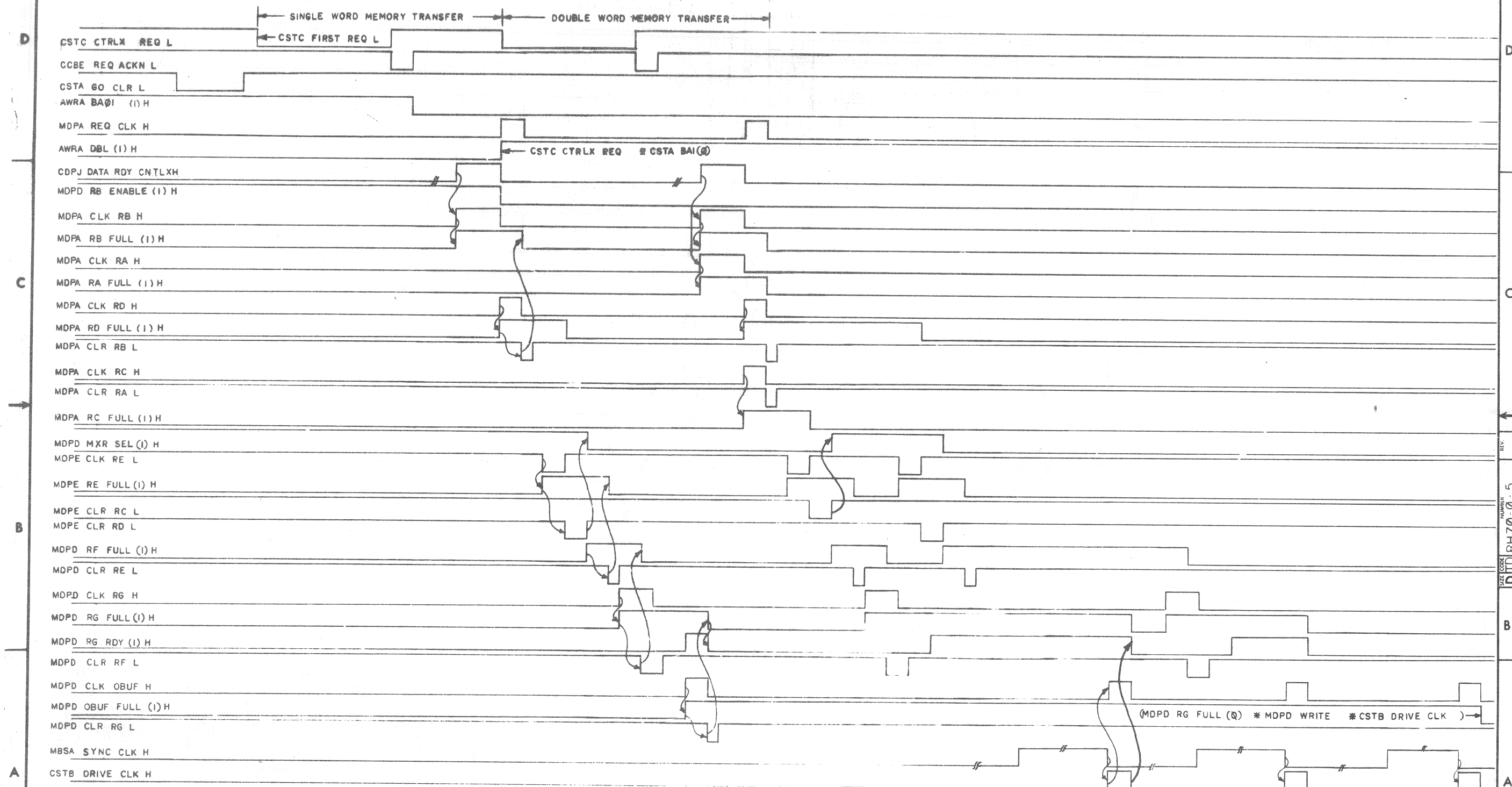
(WRITE-READ MAINTENANCE OPERATION)

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

REV.	CHANGE NO.	REVISIONS

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



REVISIONS		
CHK	CHANGE NO.	REV.

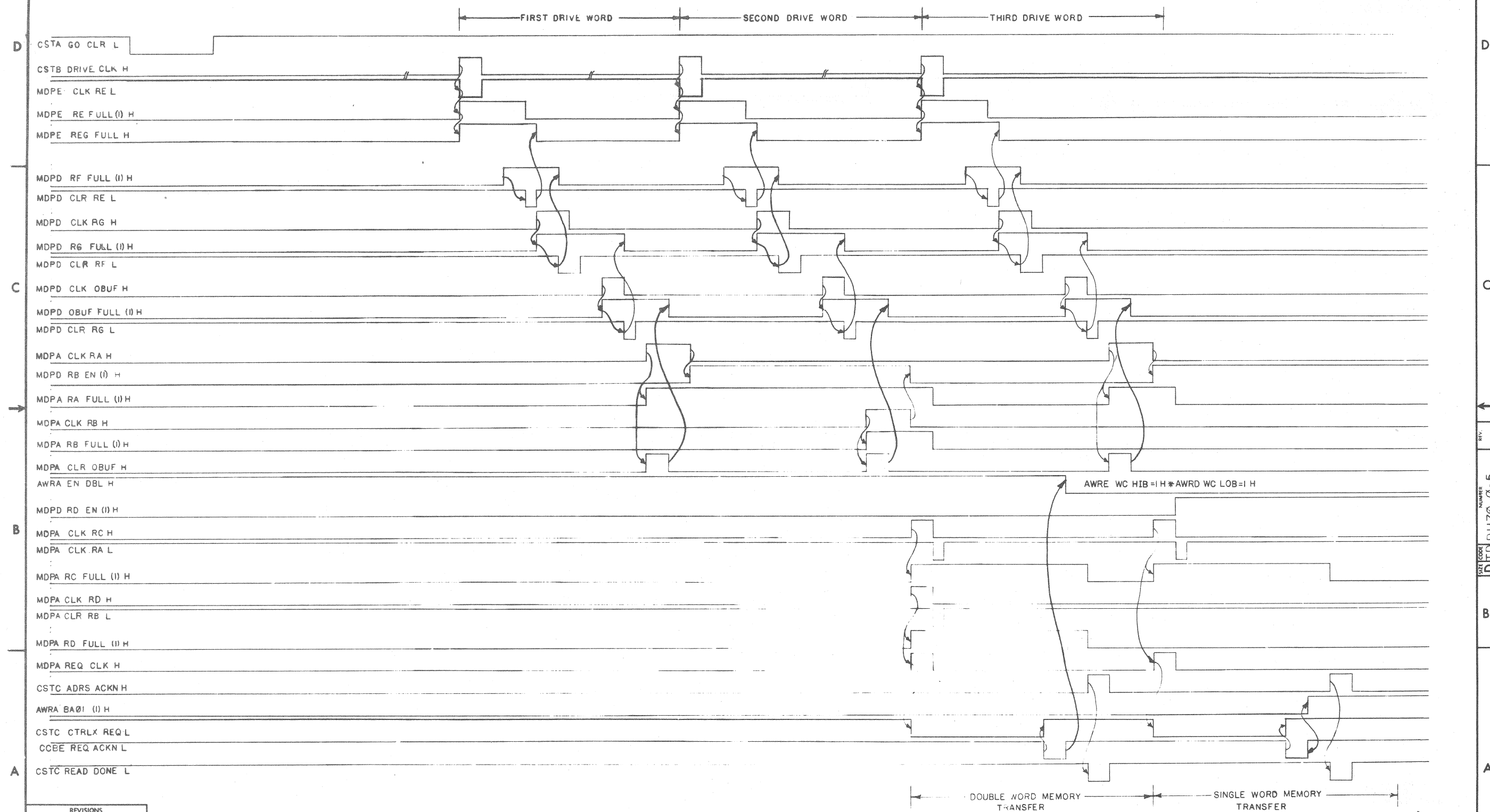
(WRITE COMMAND)

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

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READ COMMAND DATA BUFFER TIMING

3 WORDS STARTING ON AN EVEN WORD BOUNDRY (BAŞI BIT=0)
A DOUBLE WORD FOLLOWED BY A SINGLE WORD



REVISIONS		
CHK	CHANGE NO.	REV.

DEC FORM NO
DBD 138

8

7

6

5

4

3

2

1

TITLE	RH70 DATA BUFFER TIMING DIAG.
-------	----------------------------------

SCALE SHEET 3 OF 4

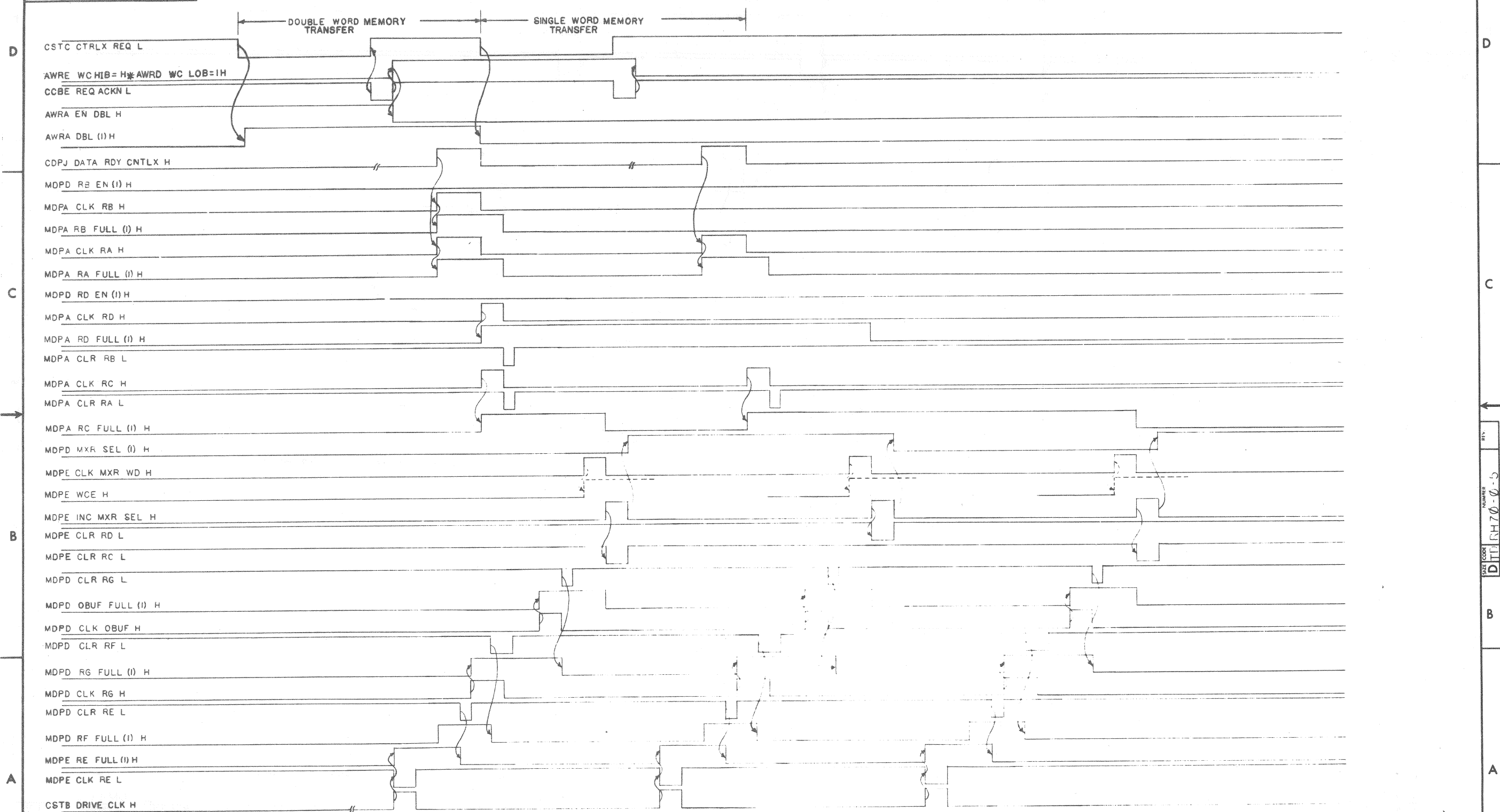
(READ COMMAND)

SIZE	CODE	NUMBER
D	TD	RH70-0-5

RE

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



REVISIONS		
CHK	CHANGE NO.	REV.

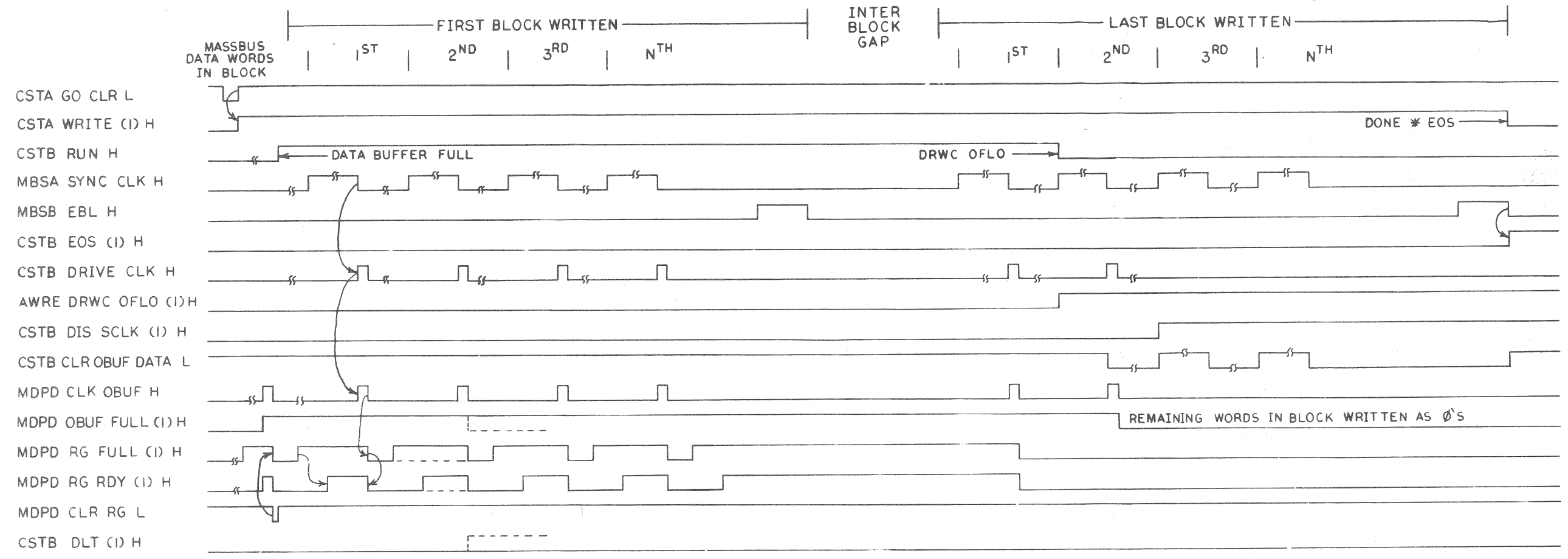
(WRITE CHECK COMMAND)

TITLE	RH70 DATA BUFFER TIMING DIAG	SIZE CODE	D TD	NUMBER	RH70-0-5	REV.	
SCALE	1/4	SHEET	4 OF 4	DIST.			

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SIZE CODE D TD RH70-0-6
NUMBER 2225

WRITE MASSBUS TIMING DIAGRAM



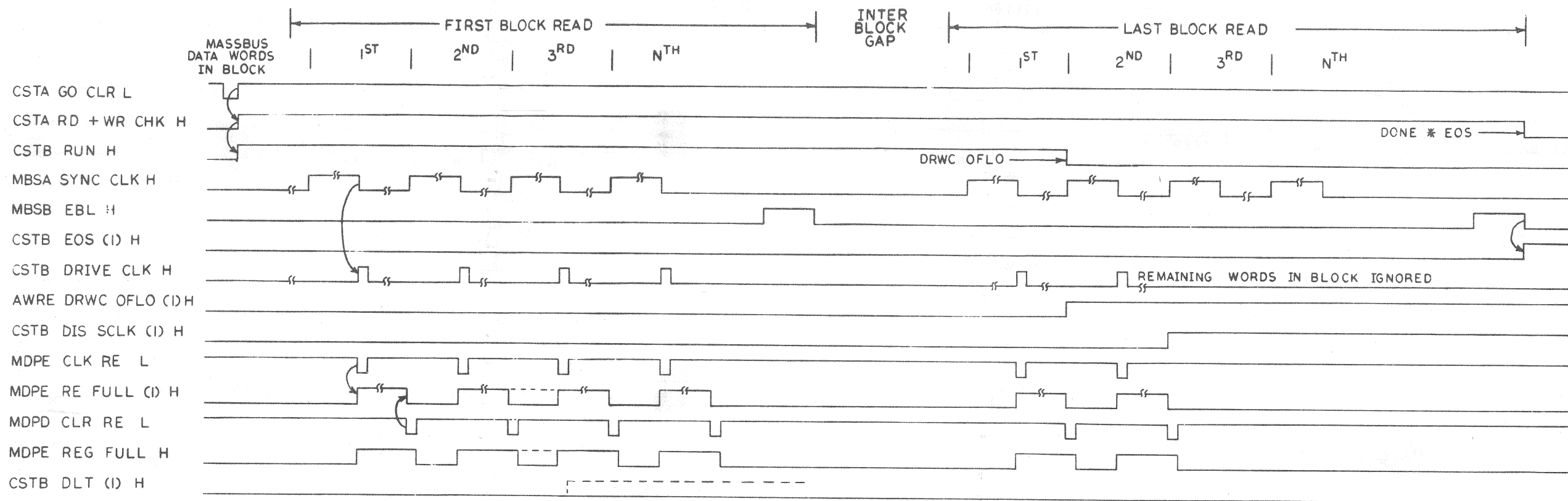
REV.	CHANGE NO.	DATE
1	1	11/11/75

DEC FORM NO. DRD 100-C

THIRD ANGLE PROJECTION	DRN. 4/11/75	FIRST USED ON	digital
REMOVE BURRS AND BREAK SHARP CORNERS	CHK'D 4/11/75	TITLE	WRITE MASSBUS TIMING DIAGRAM
DO NOT SCALE DWG	PROJ. ENG. 4/11/75	SIZE CODE	D TD RH70-0-6
MATERIAL	PROD. 4/11/75	NUMBER	2
FINISH	B-DD-RH70-0	SCALE	
	SHEET 1 OF 1	DIST.	

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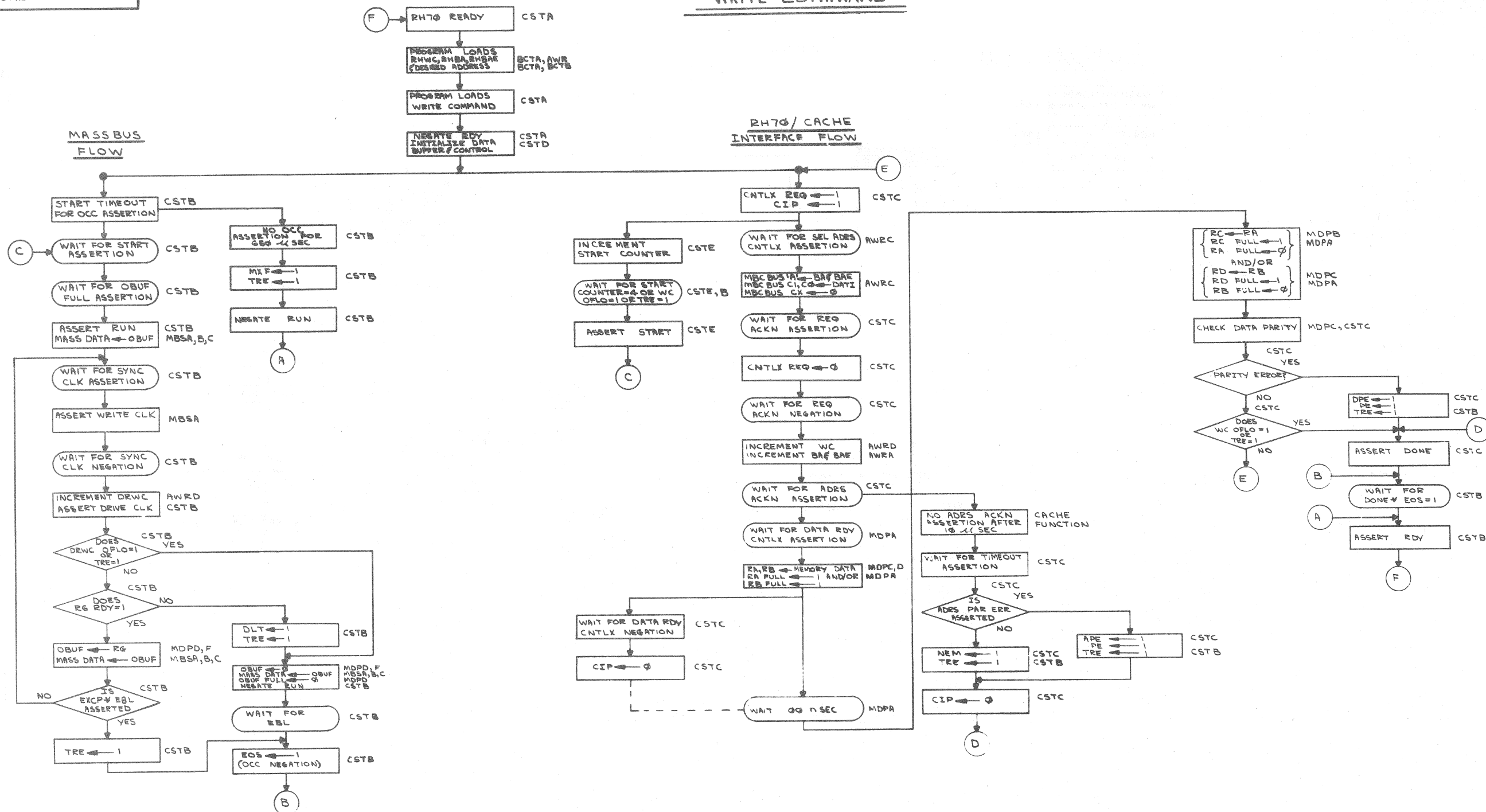
READ OR WRITE CHECK MASSBUS TIMING DIAGRAM



THIRD ANGLE PROJECTION		DRN. 11-10-75		FIRST USED ON	
REMOVE BURRS AND BREAK SHARP CORNERS		CHK'D. [Signature]		TITLE	
DO NOT SCALE DWG		ENG. [Signature]		MASSBUS TIMING DIAGRAM	
MATERIAL		NEXT HIGHER ASSY.		SIZE CODE	
FINISH		B-DD-RH70-0		D TD	
		SCALE		NUMBER	
		SHEET		RH70-0-7	
		OF 1		REV.	

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WRITE COMMAND

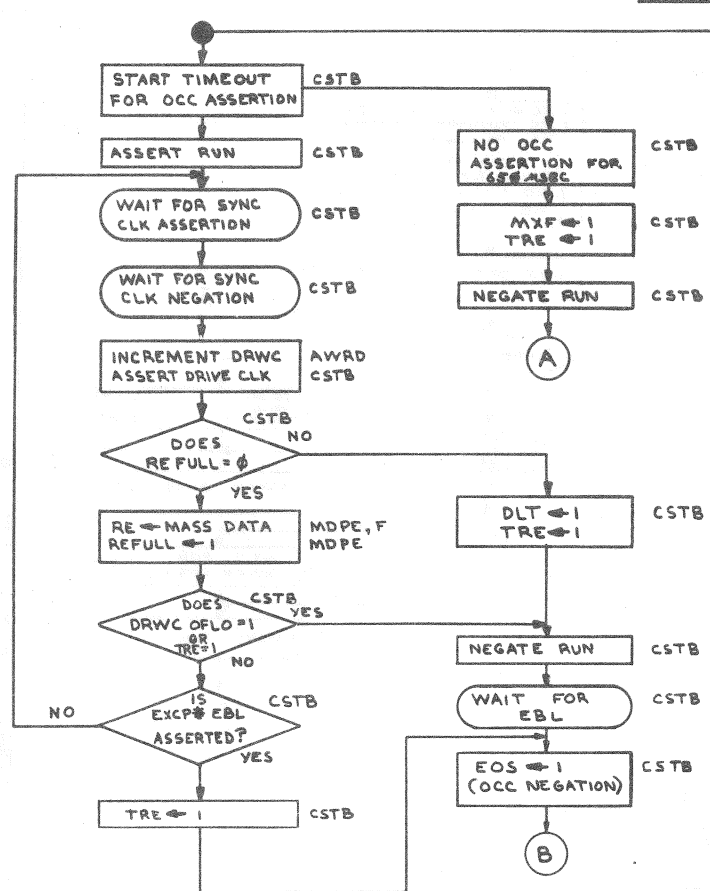


THIRD ANGLE PROJECTION	DRN. <i>K. R. B.</i>	2-28-75	FIRST USED ON	RH70
REMOVE BURRS AND BREAK SHARP CORNERS	CHK. <i>[Signature]</i>	4-1-75	TITLE	WRITE COMMAND FLOW DIAGRAM
DO NOT SCALE DWG	ENG. <i>[Signature]</i>	4-18-75	SIZE	CODE
MATERIAL	PROJ. ENG. <i>[Signature]</i>	4-18-75	NUMBER	REV
FINISH	PROD. <i>[Signature]</i>	4/11/75	3-DD-RH70-0	D FDRH70-0-2
	NEXT HIGHER ASSY.		SCALE	
			SHEET	OF
			DIST.	

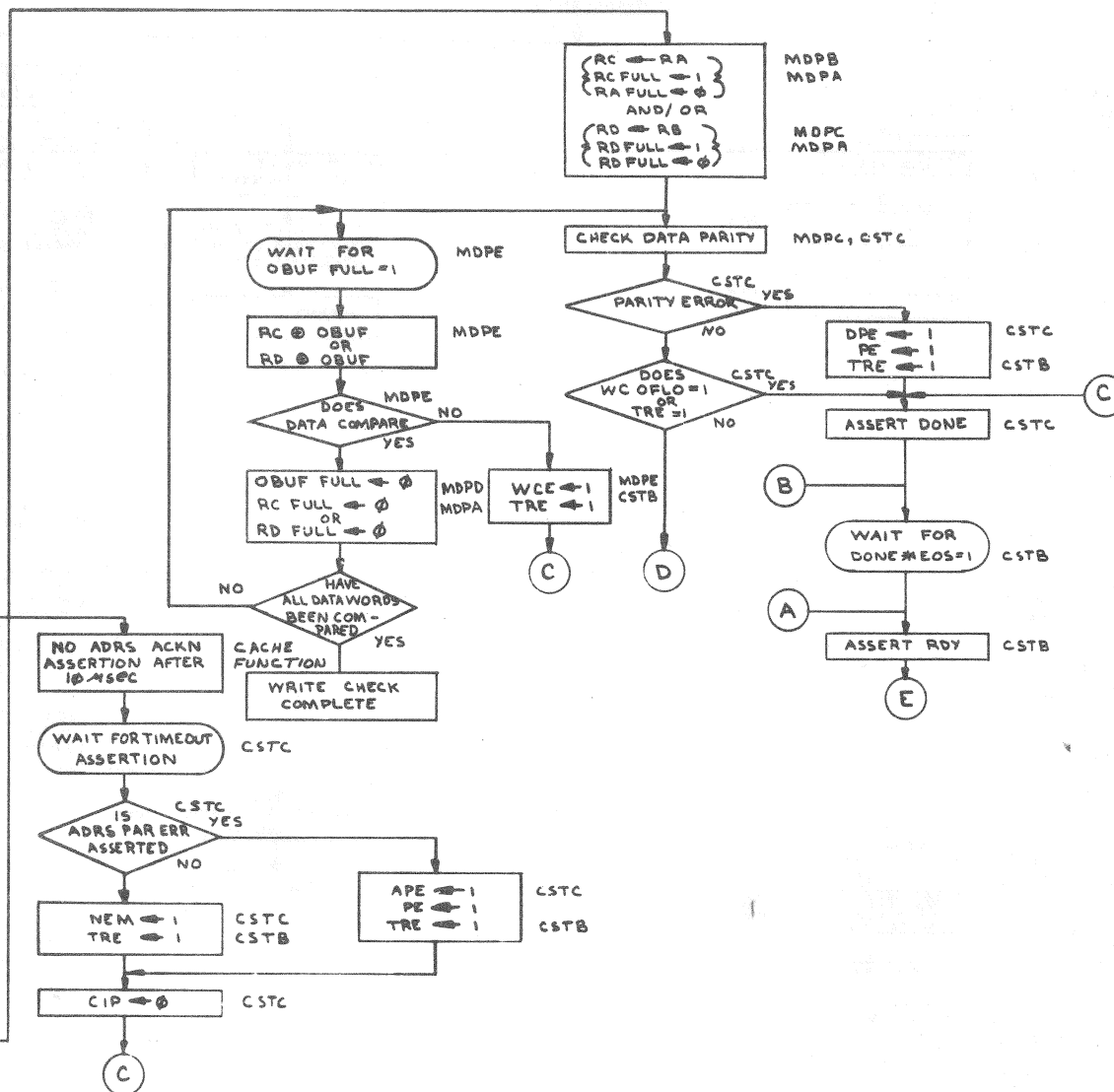
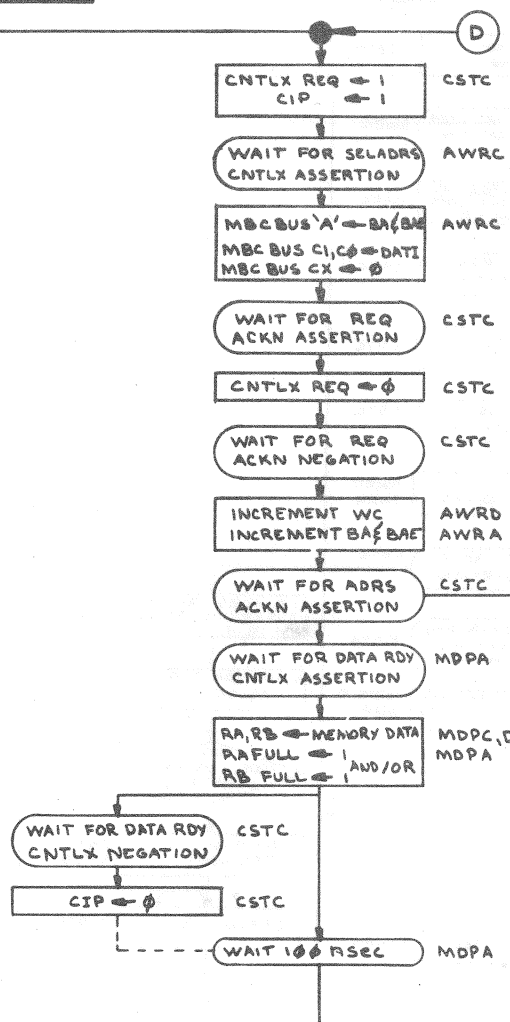
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WRITE CHECK COMMAND

MASS BUS FLOW



RH70/CACHE INTERFACE FLOW



REV.	CHANGE NO.
1	1

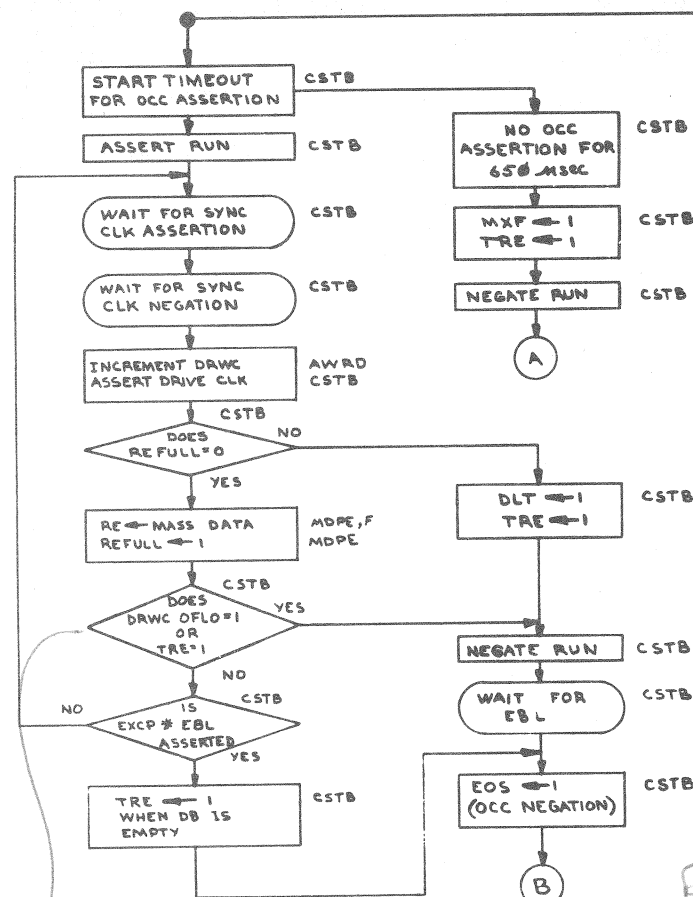
DEC FORM NO. DRD 100-C

THIRD ANGLE PROJECTION	DRN. 4-12	FIRST USED ON	digital
REMOVE BURRS AND BREAK SHARP CORNERS	CHK'D 4-12	TITLE	WRITE CHECK COMMAND FLOW DIAGRAM
DO NOT SCALE DWG	ENG. 4-12	PROJ. ENG. 4-12	
MATERIAL	PROD. 4-12	NEXT HIGHER ASSY.	
FINISH	B DD-RH70-0	SCALE	
	SHEET OF 1	SIZE D	CODE FD
		NUMBER	RH70-0-3
		DIST.	
		REV.	

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READ COMMAND

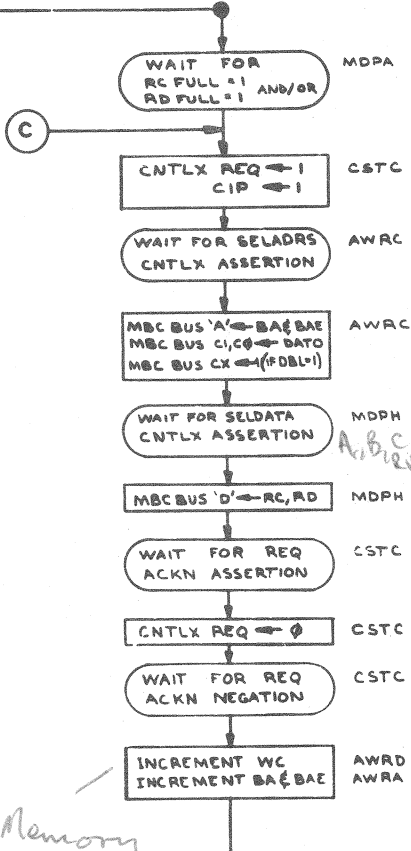
MASS BUS FLOW



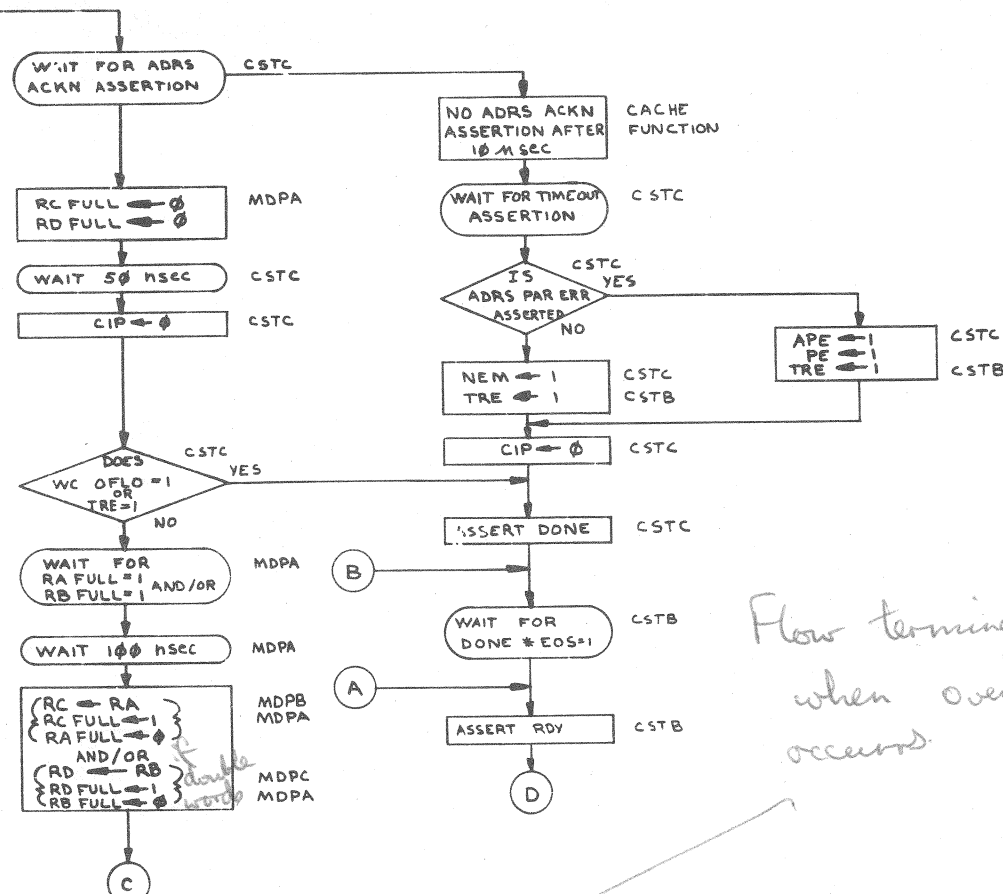
Drive word count & RH70 word count different by what's in buffer

Flow terminals when overflow occurs i.e. when buffer empties.

RH70 / CACHE INTERFACE FLOW



Memory WC.



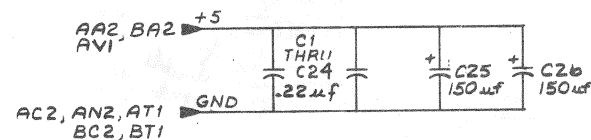
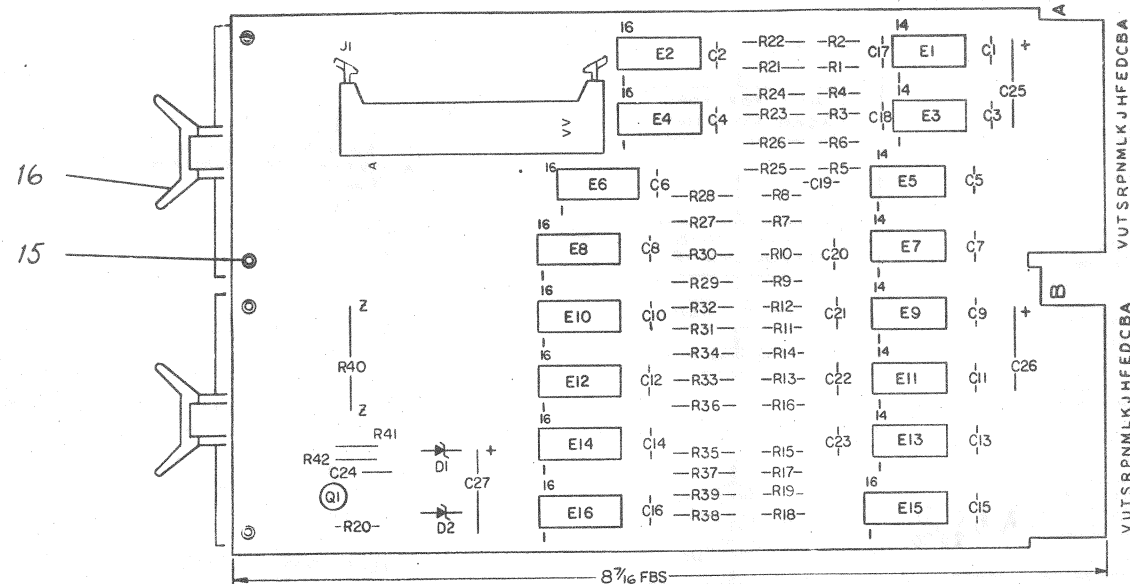
Flow terminals when overflow occurs

happens before RH70 wc terminals on a read

THIRD ANGLE PROJECTION		DRN. 10/1/75	FIRST USED ON		digital	
REMOVE BURRS AND BREAK SHARP CORNERS		CHK'D 10/1/75	TITLE		READ COMMAND FLOW DIAGRAM	
DO NOT SCALE		ENG. S. J. 10/1/75	PROJ. ENG. S. J. 10/1/75		PROD. 2 10/1/75	
MATERIAL		NEXT HIGHER ASSY.		B-DD-RH70-0		
FINISH		SCALE		SHEET 1 OF 1		
REV.		SIZE		CODE		
D		FD		RH70-0-4		
REV.		NUMBER		REV.		
1		1		1		

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NOTES:



IC TYPE	-5V	GND	+5V
IC 75107B	13	7	14
IC 7511B	-	8	16

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

IC PIN LOCATIONS

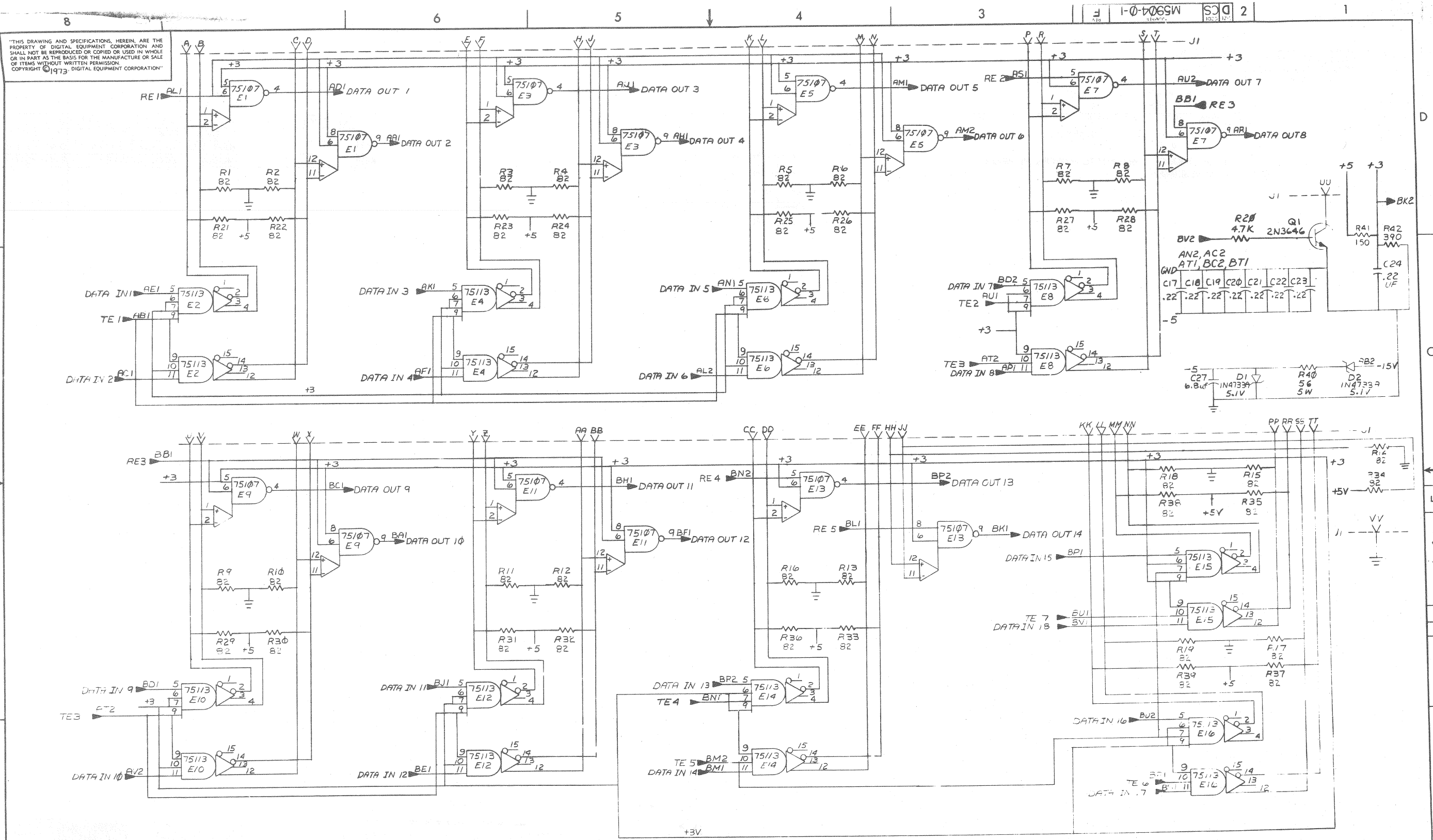
REV	CHG	CHANGE NO.	REV
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
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FIRST USED ON OPTION MODEL
RH11

REV	CHG	CHANGE NO.	REV
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
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REV	CHG	CHANGE NO.	REV
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digital		EQUIPMENT CORPORATION	
		MAYNARD, MASSACHUSETTS	
TITLE			
CONTROLLER			
TRANSCEIVER			
SIZE		NUMBER	
CODE		REV.	
D	CS	M5904-0-1	F
DIST.			
		1	



REVISIONS		
CHK	CHANGE NO	REV

TITLE		SIZE	CODE	NUMBER	REV.
CONTROLLER TRANSCEIVER		D	CS	M5904-0-1	F
SCALE		SHEET 2 OF 2		DIST	

6-45 to 47
RWP04 man.

