

digital

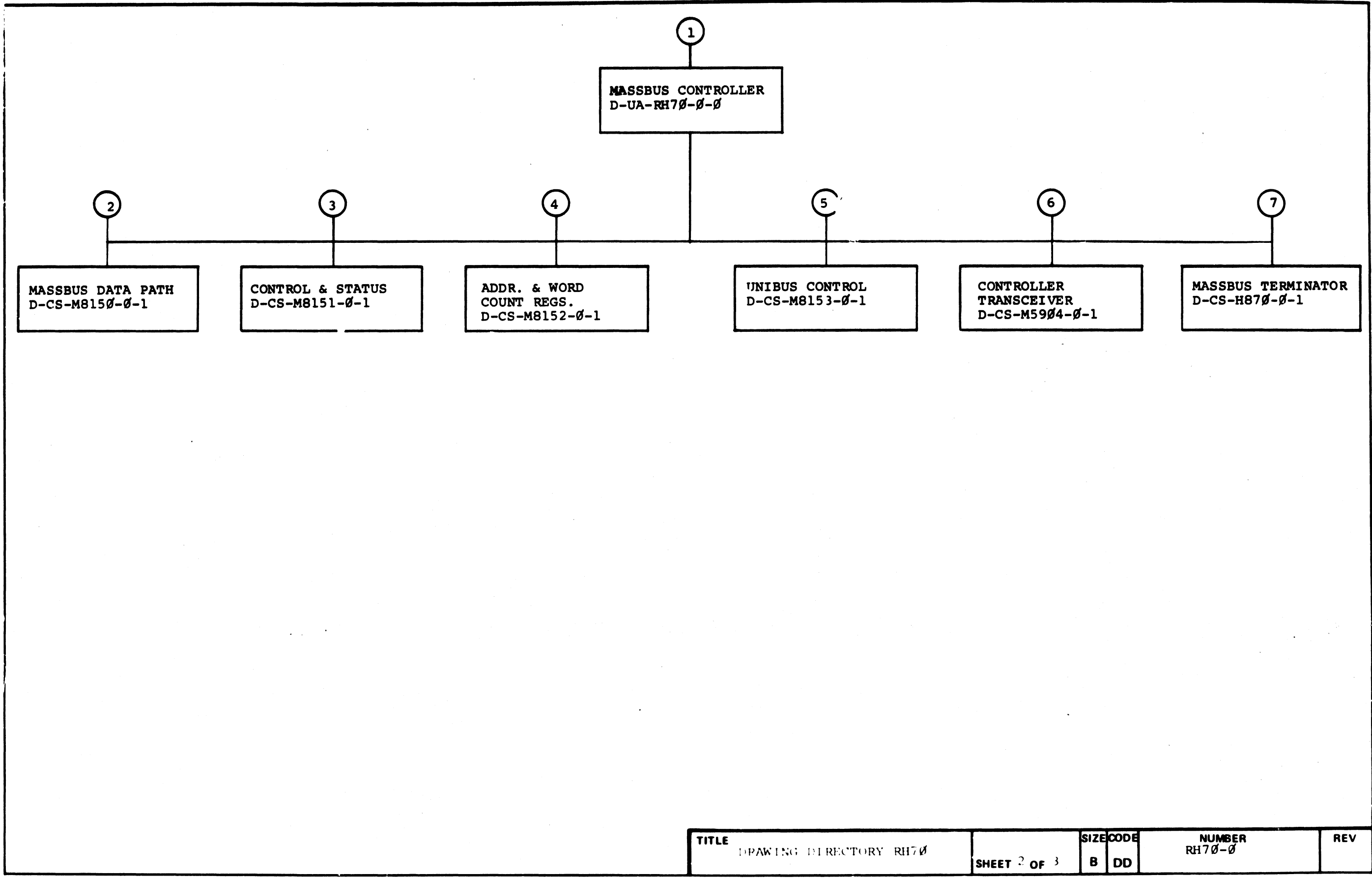
RH70

Engineering Drawings

Digital Equipment Corporation

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| | | | | | |
|--------------|------------------------|------|------|--------|-----|
| TITLE | DRAWING DIRECTORY RH70 | SIZE | CODE | NUMBER | REV |
| | | B | DD | RH70-0 | |
| SHEET 2 OF 3 | | | | | |

| ELECTRICAL | | | | | ELECTRICAL | | | | | | | | |
|--------------------|---------|----------|-----|-----------|------------------------------|----------------------|--------------------|---------|----------------|-----|-----------|---------------------------|----------------------|
| CUSTOMER PRINT SET | MPG SET | FIND NO. | REV | NO OF SHT | DESCRIPTION | OPTION NO./FILE DATE | CUSTOMER PRINT SET | MPG SET | FIND NO. | REV | NO OF SHT | DESCRIPTION | OPTION NO./FILE DATE |
| X | | 1 | | 1 | MASSBUS CONTROLLER | | | | B-MH-M8152-0-6 | | 1 | MODULE ECO HISTORY | |
| | | | | 1 | MODULE HOLDER | | | | | | | | |
| X | | | | 3 | MASSBUS TRANSCEIVER | | | | | | | | |
| X | | | | 1 | WRITE COMMAND FLOW DIAG. | | | | | | | | |
| X | | | | 1 | WRITE CHECK COMM. FLOW DIAG. | | | | | | | | |
| X | | | | 1 | READ COMMAND FLOW DIAG. | | | | | | | | |
| X | | | | 4 | RH70 DATA BUFFER TIM. DIAG. | | | | | | | | |
| X | | | | 1 | WRITE MASSBUS TIMING DIAG. | | | | | | | | |
| X | | | | 1 | MASSBUS TIMING DIAG. | | X | | 5 | | 6 | UNIBUS CONTROL | |
| | | | | | RH70 ENGIN. SPEC. | | | | | | 1 | X-Y COOR. HOLE LOCATION | |
| | | | | | RH70 MANUF. CHECK. PROC. | | | | | | 1 | ASSY/DRILLING HOLE LAYOUT | |
| X | | | | 1 | UNIBUS CABLE & GRANT CHAIN | | | | | | 1 | MODULE ECO HISTORY | |
| | | | | 4 | 11/70 UNIT ASSY (REF) | | | | | | | | |
| | | | | | KB11-B WIRELIST (REF) | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| X | | 2 | | 9 | MASSBUS DATA PATH | | X | | 6 | | 2 | CONTROLLER TRANSCEIVER | |
| | | | | 1 | X-Y COOR. HOLE LOCATION | | | | | | 1 | X-Y COOR. HOLE LOCATION | |
| | | | | 1 | ASSY/DRILLING HOLE LAYOUT | | | | | | 1 | ASSY/DRILLING HOLE LAYOUT | |
| | | | | 1 | MODULE ECO HISTORY | | | | | | 1 | MODULE ECO HISTORY | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| X | | 3 | | 6 | CONTROL & STATUS | | X | | 7 | | 1 | MASSBUS TERMINATOR | |
| | | | | 1 | X-Y COOR. HOLE LOCATION | | | | | | 1 | X-Y COOR. HOLE LOCATION | |
| | | | | 1 | ASSY/DRILLING HOLE LAYOUT | | | | | | 1 | ASSY/DRILLING HOLE LAYOUT | |
| | | | | 1 | MODULE ECO HISTORY | | | | | | 1 | MODULE ECO HISTORY | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| X | | 4 | | 7 | ADDR. & WORD COUNT REGS. | | | | | | | | |
| | | | | 1 | X-Y COOR. HOLE LOCATION | | | | | | | | |
| | | | | 1 | ASSY/DRILLING HOLE LAYOUT | | | | | | | | |

DPB 108
DEC 16-1325-1062-2B-R972

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 RH70

SHEET 3 OF 3

SIZE CODE
B DD

NUMBER
RH70-0

REV

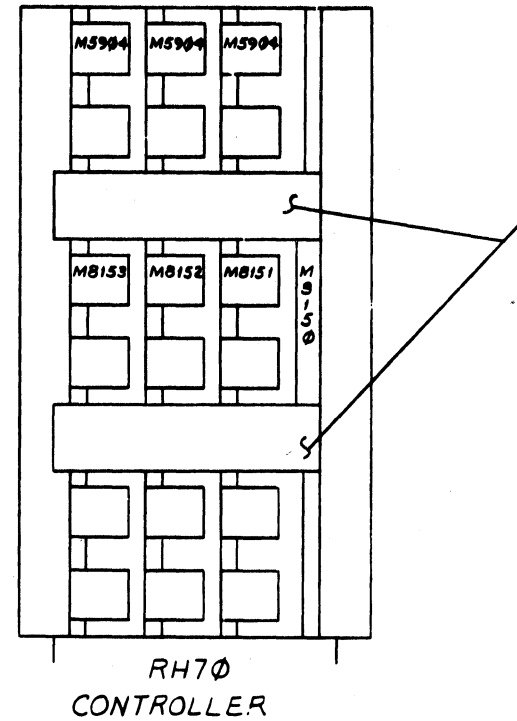
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NOTES:

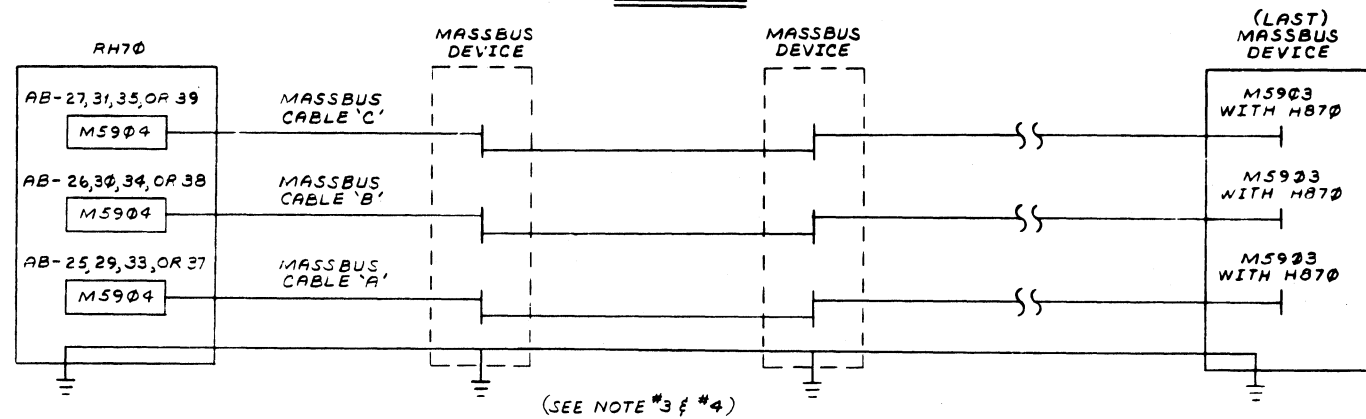
- VIEW OF LOGIC IS FROM MODULE SIDE.
- SELECT PROPER JUMPER SETTINGS FOR UNIBUS ADDRESS, REGISTER LENGTH FIELD, AND VECTOR ADDRESS AS PER MASSBUS DEVICE USED.
- INSERT ONE H870 MASSBUS TERMINATOR MODULE IN J2 (ETCH SIDE OF H870 TO COMPONENT SIDE OF M5903) OF EACH OF THE M5903 MASSBUS TRANSCIEVER MODULES 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 |
| A | M5904 | M5904 | M5904 | MB150 | M5904 | M5904 | M5904 | MB150 | M5904 | M5904 | M5904 | MB150 | M5904 | M5904 | M5904 | MB150 |
| B | CONTROL- LER TRANS (MBSA) | CONTROL- LER TRANS (MBSB) | CONTROL- LER TRANS (MBSA) | | CONTROL- LER TRANS (MBSA) | CONTROL- LER TRANS (MBSB) | CONTROL- LER TRANS (MBSA) | | CONTROL- LER TRANS (MBSA) | CONTROL- LER TRANS (MBSB) | CONTROL- LER TRANS (MBSA) | | CONTROL- LER TRANS (MBSA) | CONTROL- LER TRANS (MBSB) | CONTROL- LER TRANS (MBSA) | |
| C | 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 | |
| D | UNIBUS CNTRL (BCT) | ADDR & WC REGS (AWR) | CONTROL & STATUS (CST) | MASSBUS DATA PATH (MDP) | UNIBUS CNTRL (BCT) | ADDR & WC REGS (AWR) | CONTROL & STATUS (CST) | MASSBUS DATA PATH (MDP) | UNIBUS CNTRL (BCT) | ADDR & WC REGS (AWR) | CONTROL & STATUS (CST) | MASSBUS DATA PATH (MDP) | UNIBUS CNTRL (BCT) | ADDR & WC REGS (AWR) | CONTROL & STATUS (CST) | MASSBUS DATA PATH (MDP) |
| 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-LA-11/70-0-0 | REF |
| 1 | MB11-B WIRELIST | K-WL-7010329-0-1 | PEF |
| 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 |

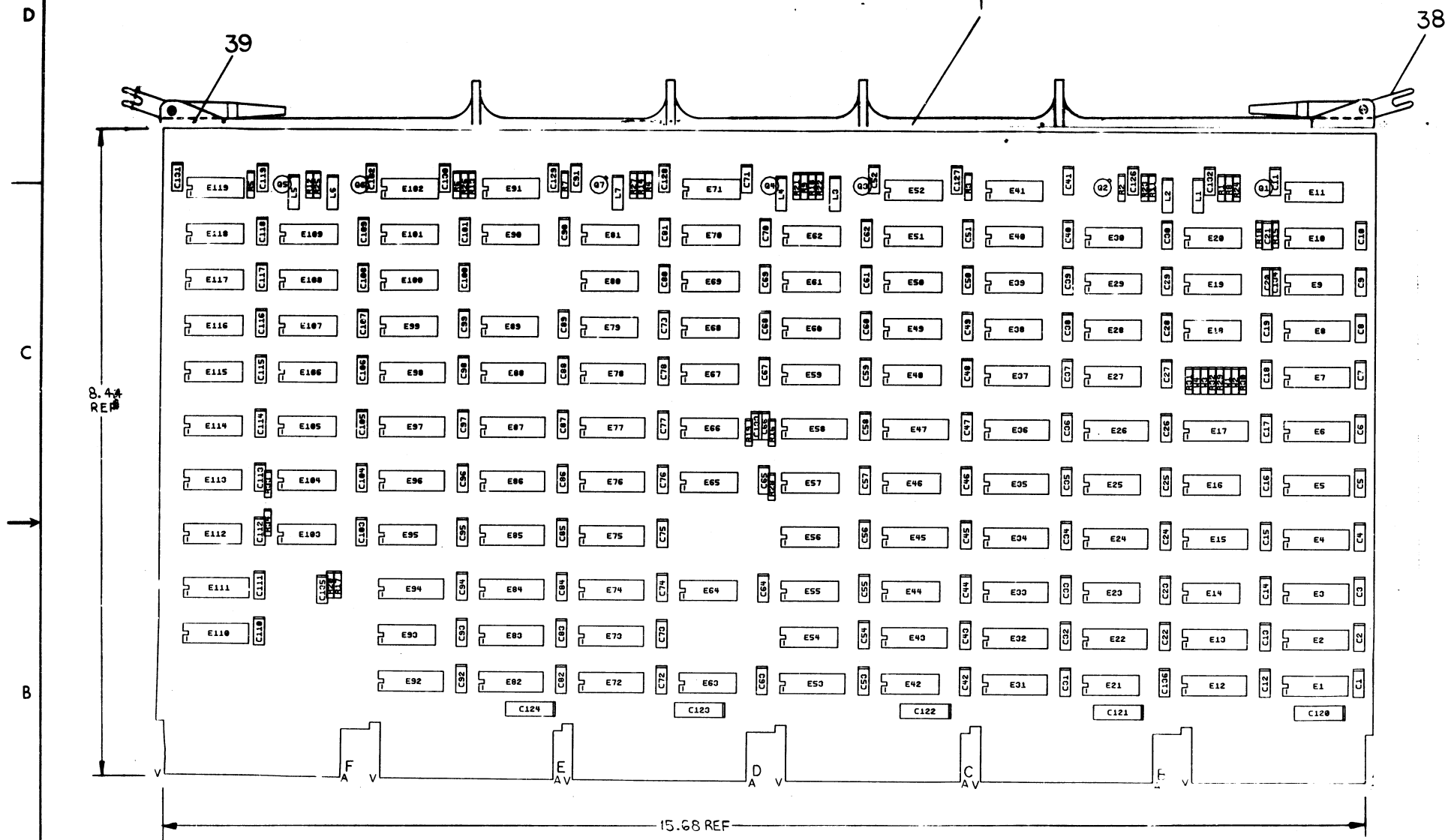
| FIRST USED ON OPTION/MODEL | | PARTS LIST | |
|-----------------------------------|--|-------------------|---------------------------------|
| RH70 | | QTY. | DESCRIPTION |
| DIMENSIONAL TOLERANCE | | DRN. J. Viner | DATE 3-7-75 |
| DIMENSIONS ARE MILLIMETERS | | CHK'D. J. Viner | DATE 4-1-75 |
| INCHES UNLESS OTHERWISE SPECIFIED | | ENG. J. Viner | DATE 4-10-75 |
| MILLIMETERS | INCHES | PROG. J. Viner | DATE 4-10-75 |
| X,XX = ±0.10 | .XXX = ±0.005 | PROB. J. Taylor | DATE 6/1/75 |
| X,X = ±0.5 | .XX = ±0.02 | | |
| X = ±2 | .X = ±0.1 | | |
| THIRD ANGLE PROJECTION | REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY | NEXT HIGHER ASSY. | TITLE MASSBUS CONTROLLER (RH70) |
| MATERIAL | FINISH | B-DD-RH70-0 | SIZE CODE DUA |
| | | SCALE | NUMBER RH70-0-0 |
| | | SHEET 1 OF 1 | REV. |

| REV. | CHANGE NO. |
|------|------------|
| | |
| | |

DEC FORM NO. 980 102-C

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

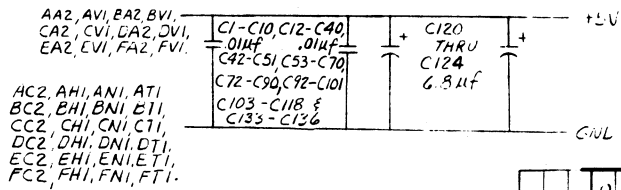


| REF | X-Y COORDINATE HOLE LOCATION | K-CD-8150-0-4 | 1 |
|-----|--|------------------------------|----|
| REF | ASSY/DRILLING HOLE LAYOUT | D-AM-8150-0-5 | 2 |
| REF | MODULE ECO HISTORY | B-MK-8150-0-6 | 3 |
| 1 | ETCHED CIRCUIT BOARD | 501127C | 4 |
| 110 | C1 THRU C10, C12 THRU C40, C42 THRU C51, C53 THRU C70, C72 THRU C90, C92 THRU C101, C103 THRU C118, C133 THRU C136 | CAP .01uf 20% 100V DISC | 5 |
| 5 | C120 THRU C124 | CAP 0.0uf 10% 35V | 6 |
| 7 | C128 THRU C132 | CAP 82pf 5% 100V | 7 |
| 7 | C11, C41, C52, C71, C91, C102, C119 | CAP .22uf 50V CERAMIC | 8 |
| 7 | R1 THRU R7 | RES 100 OHM 5% 1/4W | 9 |
| 7 | R8 THRU R14 | RES 120 OHM 5% 1/4W | 10 |
| 3 | R15, R18, R17 | RES 330 OHM 5% 1/4W | 11 |
| 3 | R18, R19, R20 | RES 880 OHM 5% 1/4W | 12 |
| 8 | R21 THRU R28 | RES 1K 5% 1/4W | 13 |
| 4 | R29 THRU R32 | RES 1.5K 5% 1/4W | 14 |
| 7 | Q1 THRU Q7 | TRANSISTOR DEC 3009B | 15 |
| 7 | L1 THRU L7 | INDUCTOR 100uh | 16 |
| 7 | E11, E41, E52, E71, E91, E102, E118 | DELAY - 10 TAP 250ns 100 OHM | 17 |
| 8 | E19, E38, E50, E59, E82, E80, E99, E100 | IC DEC 74S00 | 18 |
| 9 | E42, E55, E56, E57, E83 THRU E87 | IC DEC 74H01-1 | 19 |
| 1 | E115 | IC DEC 7402 | 20 |
| 6 | E20, E51, E70, E101, E112, E118 | IC DEC 74S04 | 21 |
| 2 | E40, E90 | IC DEC 74S10 | 22 |
| 8 | E10, E30, E60, E88, E107, E108, E114, E116 | IC DEC 74S11 | 23 |
| 1 | E49 | IC DEC 74H30 | 24 |
| 1 | E54 | IC DEC 74H40 | 25 |
| 2 | E39, E89 | IC DEC 74H50 | 26 |
| 8 | E28, E81, E104, E105, E106, E113 | IC DEC 74S64 | 27 |
| 8 | E9, E29, E89, E79, E109, E117, E48, E81 | IC DEC 74S74 | 28 |
| 2 | E18, E103 | IC DEC 7486 | 29 |
| 4 | E92, E94, E96, E98 | IC DEC 74157 | 30 |
| 14 | E31, E33, E35, E37, E72, E74, E76, E78, E58, E82, E84, E88, E89, E97 | IC DEC 74S157 | 31 |
| 3 | E22, E24, E26 | IC DEC 74174 | 32 |
| 18 | E2, E4, E6, E13, E15, E17, E32, E34, E36, E73, E75, E77, E83, E85, E87, E43, E45, E47 | IC DEC 74S174 | 33 |
| 5 | E1, E3, E5, E7, E8 | IC DEC 74298 | 34 |
| 4 | E21, E23, E25, E27 | IC DEC 8242 | 35 |
| 6 | E14, E16, E44, E46, E93, E95 | IC DEC 82S82 | 36 |
| 4 | W1 THRU W4 | INSULATED JUMPERS | 37 |
| 1 | | HANDLE | 38 |
| 12 | | EYELET | 39 |
| 1 | R33 | RES 270 OHM 5% 1/4 W | 40 |
| 1 | R34 | RES 560 OHM 5% 1/4 W | 41 |

| IC TYPE | GND | + 5V |
|---------------|-----|------|
| 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



| REV | CHG | NO | DATE |
|-----|-----|----|------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

| DEC NO. | EIA NO. | DEC NO. | EIA NO. |
|---------|---------|---------|---------|
| | | | |
| | | | |
| | | | |
| | | | |

FIRST USED ON OPTION MODEL
RH70

ETCH BOARD REV C

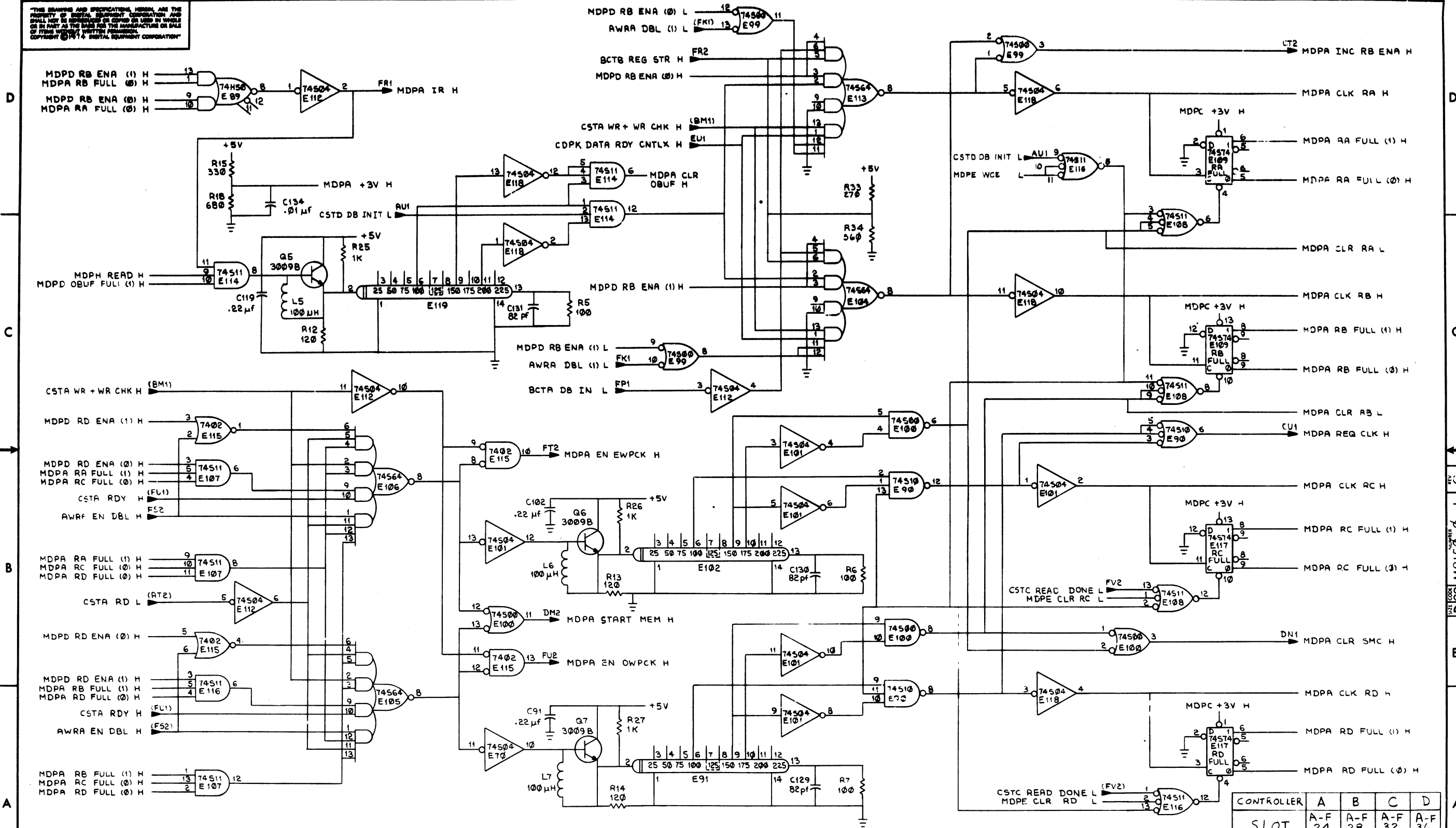
DRN: *E. Seabury* DATE: 9-15-74
 CHKD: *W. Quinn* DATE: 12-15-74
 ENG: *S. Jenkins* DATE: 1/29/75
 PRD: *S. Jenkins* DATE: 1/25/75
 DATE: 1/20/75

digital EQUIPMENT CORPORATION
 MASSBUS DATA PATH (MDP)

SIZE CODE: DCS M8150-0-1
 NUMBER: 1
 REV: C

SCALE: 1 OF 9
 SHEET: 1 OF 9

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REVISIONS table with columns: CHK, CHANGE NO., REV.

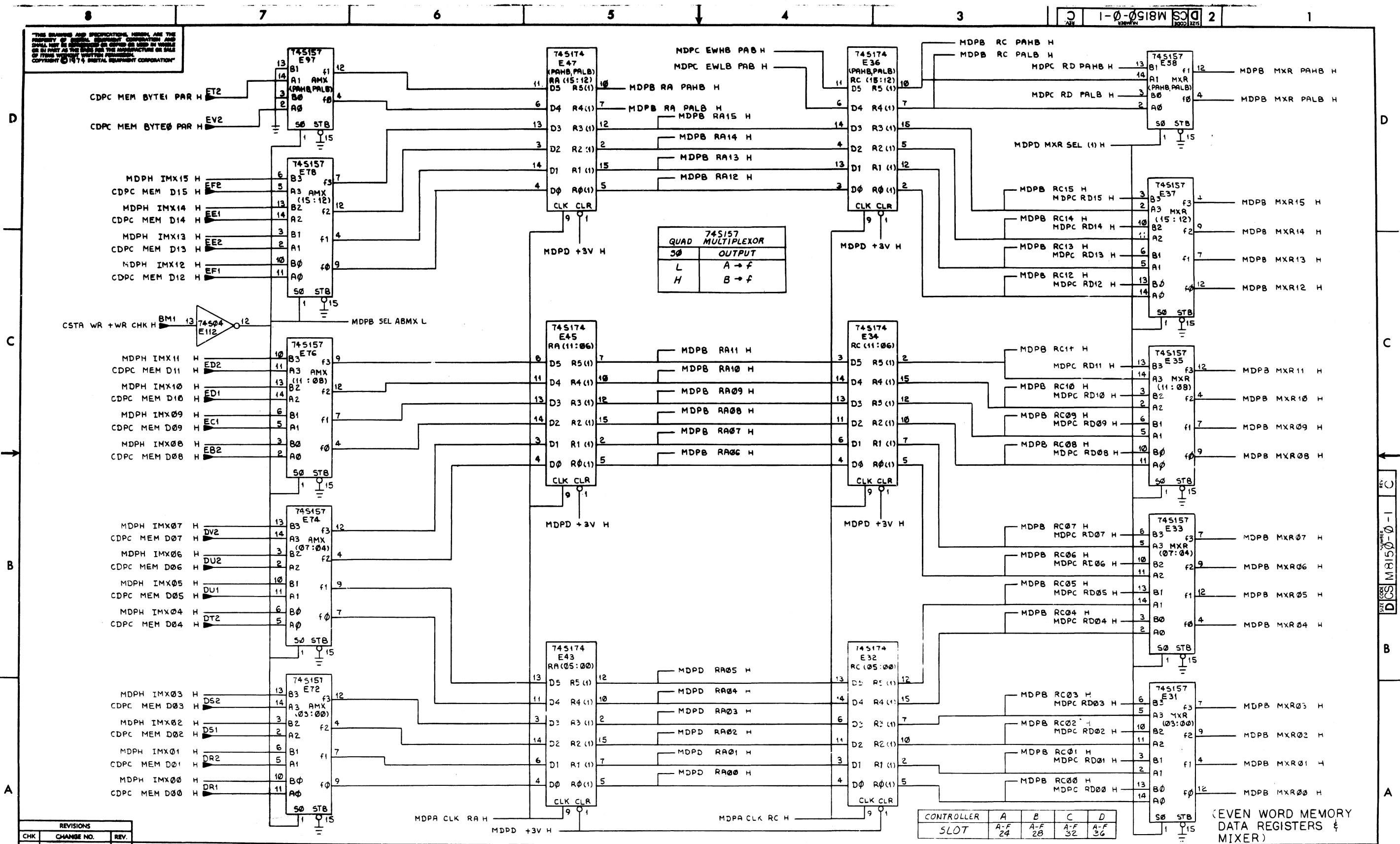
CONTROLLER SLOT table with columns: CONTROLLER, A, B, C, D and rows: SLOT, A-F, A-F, A-F, A-F

(MEMORY REGISTERS CONTROL)

TITLE MASSBUS DATA PATH (MDPA), SIZE CODE DCS, NUMBER M8150-0-1, REV. C, SCALE, SHEET 2 OF 9, DIST.

REV. C NUMBER M8150-0-1

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74S157 QUAD MULTIPLEXOR

| SELECT | OUTPUT |
|--------|--------|
| L | A → F |
| H | B → F |

CONTROLLER SLOT

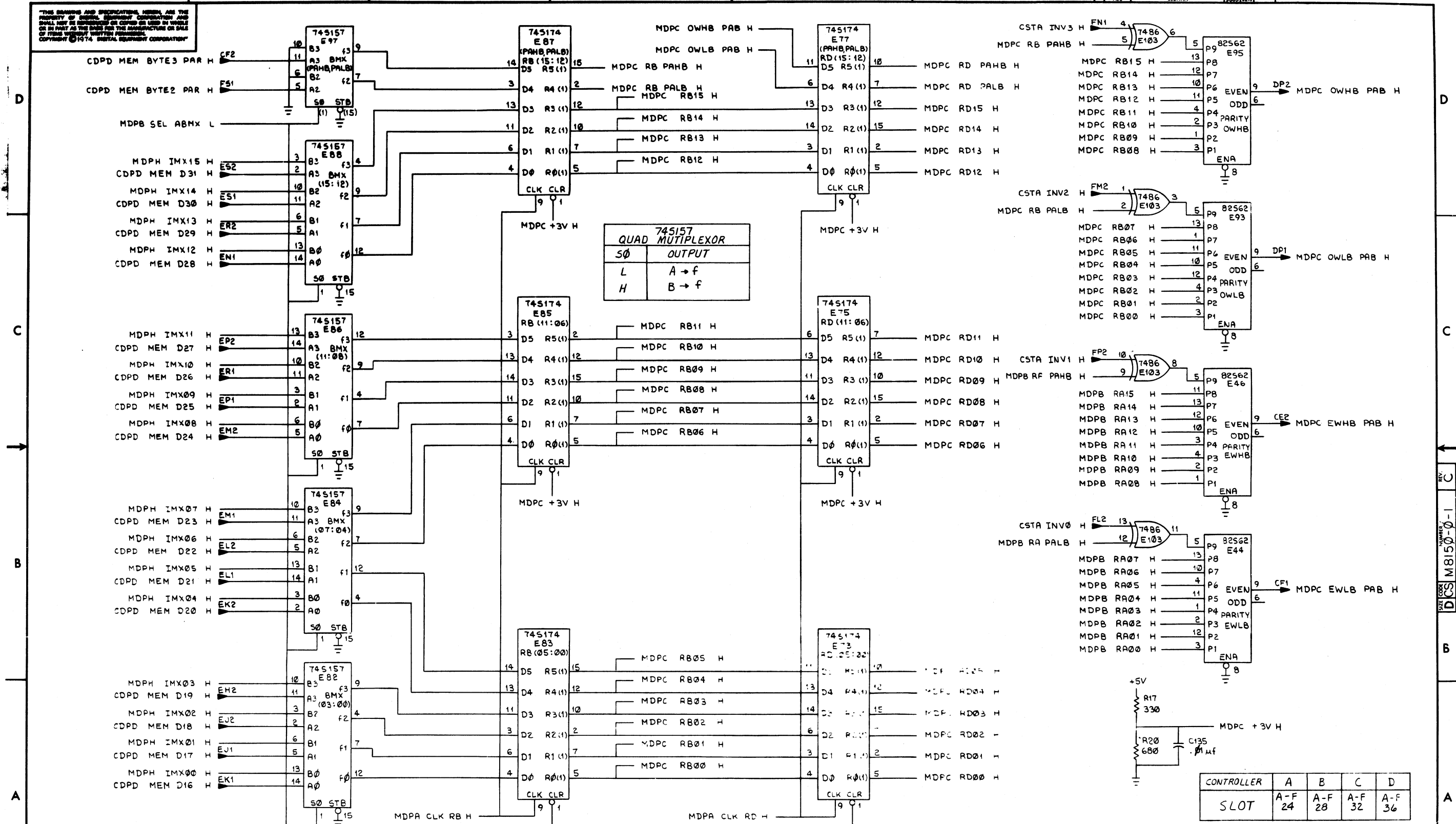
| A | B | C | D |
|-----|-----|-----|-----|
| A-F | A-F | A-F | A-F |
| 24 | 28 | 32 | 36 |

(EVEN WORD MEMORY DATA REGISTERS & MIXER)

REVISIONS

| CHK | CHANGE NO. | REV. |
|-----|------------|------|
| | | |

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| 74S157 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 |

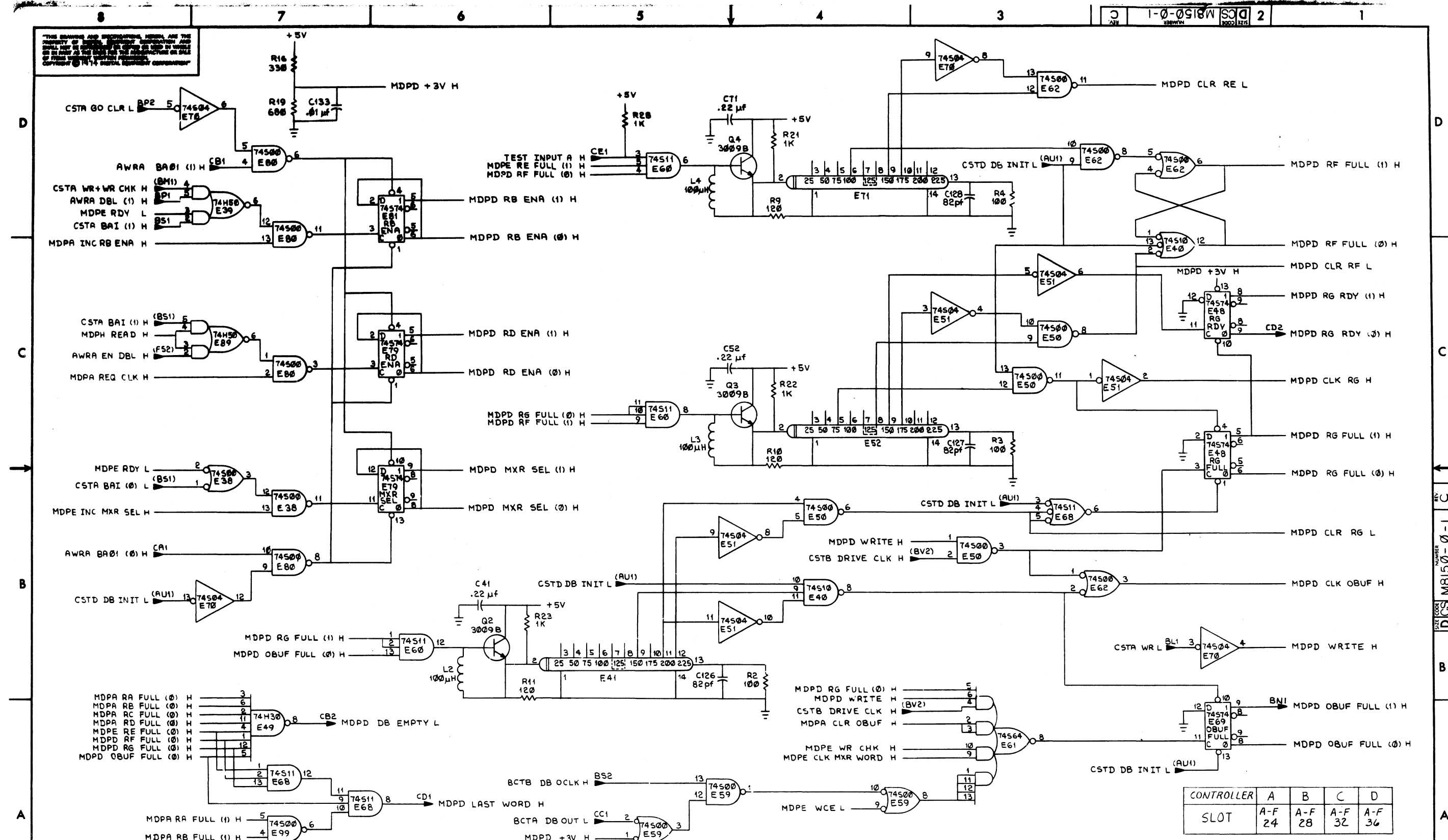
(ODD WORD MEMORY DATA REGISTERS & MEMORY PARITY GEN/CHECKERS)

| | | | | | | | |
|-------|--------------------------|-----------|--------|--------|-----------|------|---|
| TITLE | MASSBUS DATA PATH (MDPC) | SIZE CODE | D CS | NUMBER | M8150-0-1 | REV. | C |
| SCALE | | SHEET | 4 OF 9 | DIST. | | | |

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

REV. C
NUMBER M8150-0-1
SIZE CODE DCS

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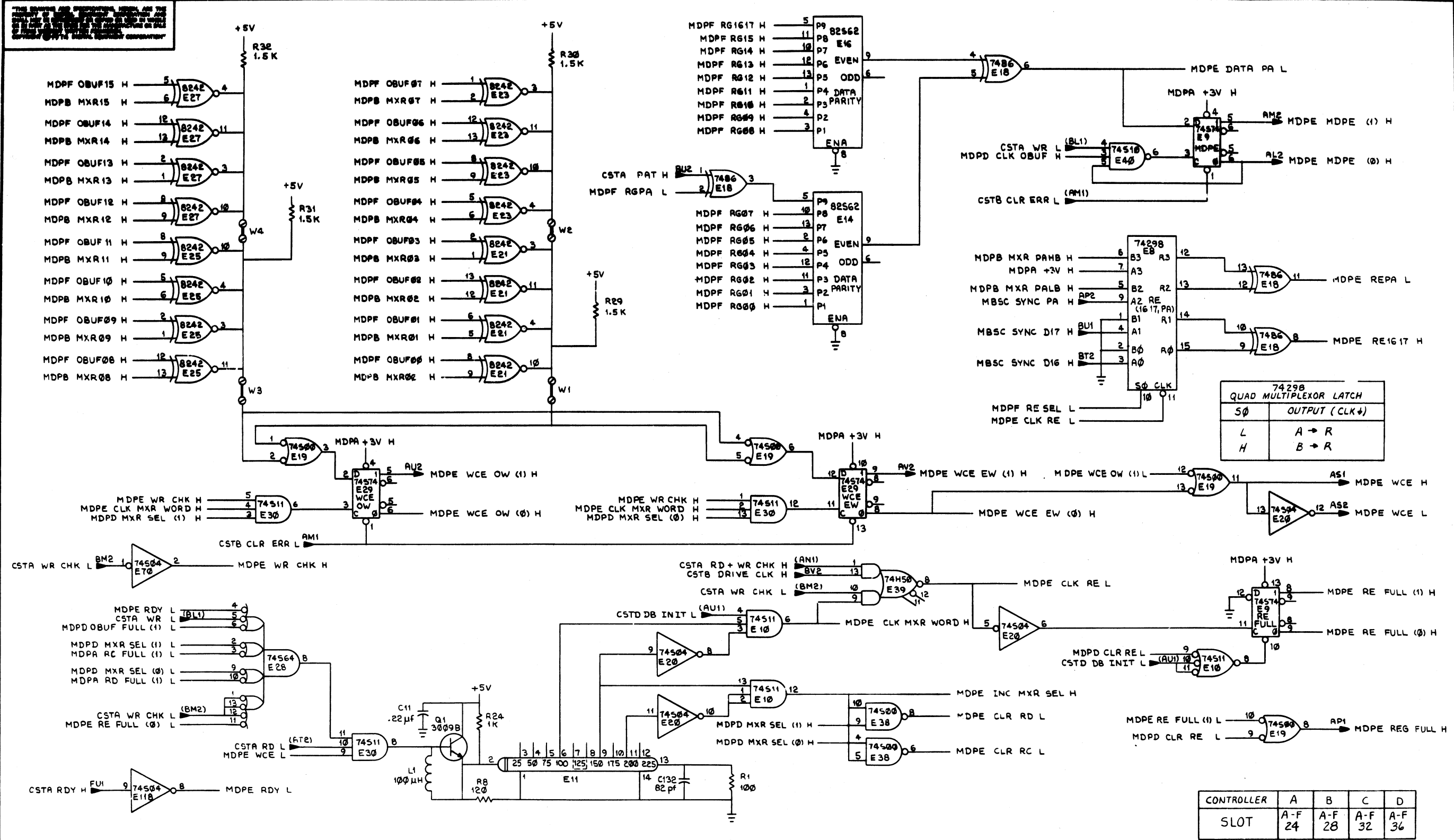
| CONTROLLER | A | B | C | D |
|------------|-----------|-----------|-----------|-----------|
| SLOT | A-F 24 | A-F 28 | A-F 32 | A-F 36 |

(DATA REGISTERS CONTROL)

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

REV. U
M8150-0-1
DCS

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |



| CONTROLLER | A | B | C | D |
|------------|-----|-----|-----|-----|
| SLOT | A-F | A-F | A-F | A-F |

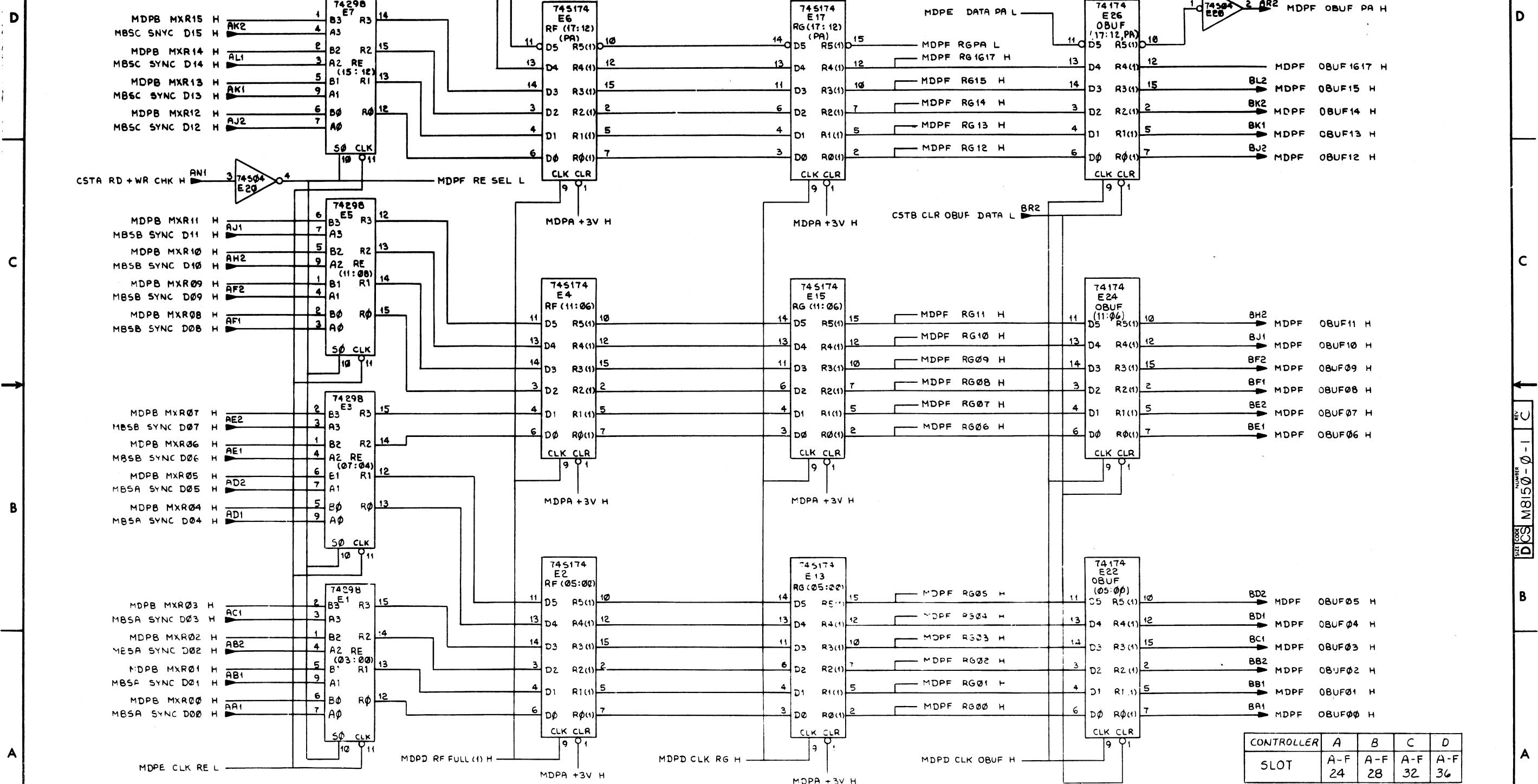
(WRITE CHECK LOGIC; CLOCK RE; & DATA PARITY)

| | | | | | | | |
|-------|--------------------------|-----------|--------|--------|-----------|------|---|
| TITLE | MASSBUS DATA PATH (MDPE) | SIZE CODE | D CS | NUMBER | M8150-0-1 | REV. | C |
| SCALE | 1/8" | SHEET | 6 OF 9 | DIST. | | | |

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

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| 74298 | |
|------------------------|----------------------------|
| QUAD MULTIPLEXOR LATCH | |
| S ϕ | OUTPUT (CLK \downarrow) |
| L | A \rightarrow R |
| H | B \rightarrow R |



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

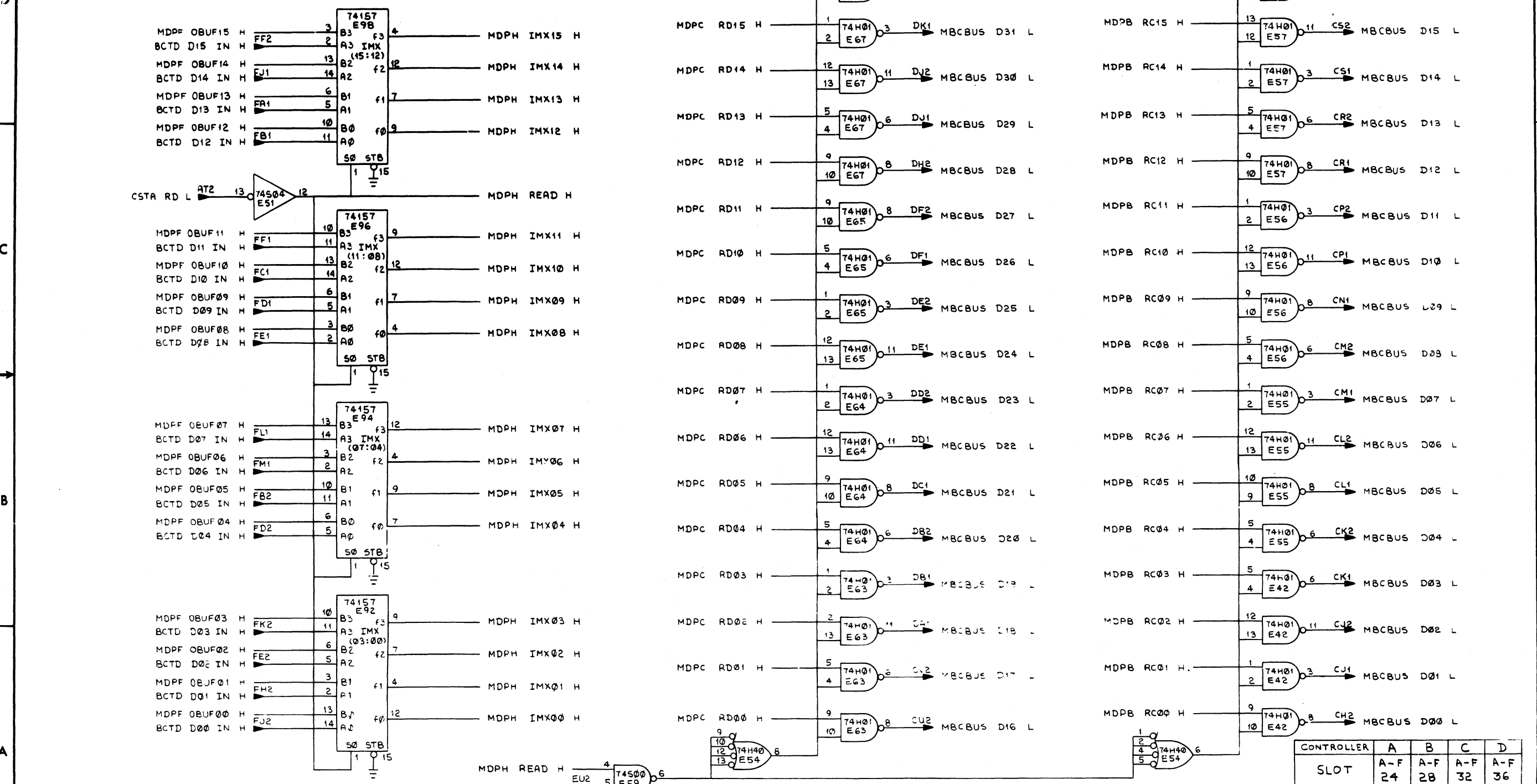
| | | | |
|-------------------------|--------------------------|-----------|-----------|
| (DATA BUFFER REGISTERS) | | | |
| TITLE | MASSBUS DATA PATH (MDPF) | SIZE CODE | NUMBER |
| | | D CS | M8150-0-1 |
| SCALE | # | SHEET | 7 OF 9 |
| DIST. | | | |

| REVISIONS | | |
|-----------|-----------|------|
| CHK | CHANGE NO | REV. |
| | | |

REV. C
NUMBER
D CS M8150-0-1

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| 74157 QUAD MULTIPLEXOR | |
|---------------------------|--------|
| S0 | 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 |

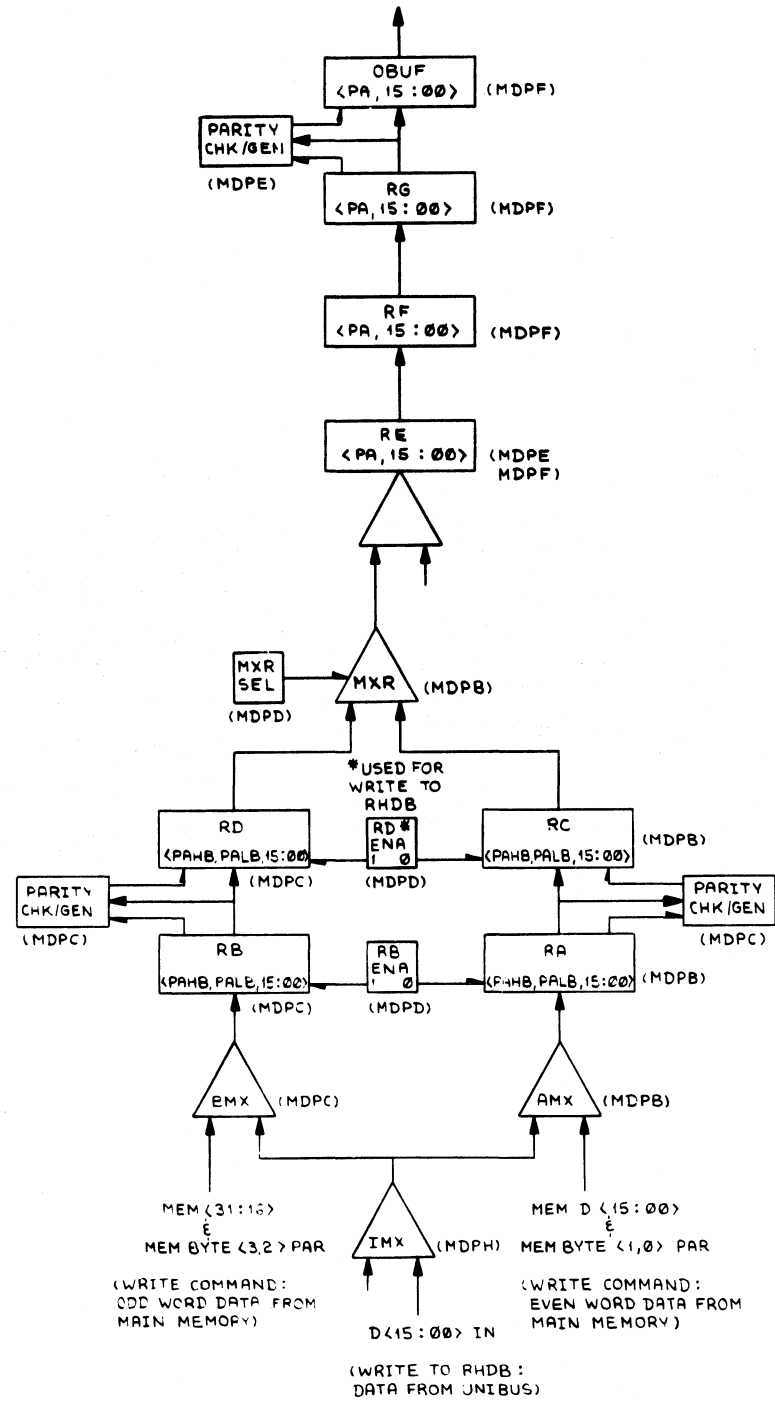
(IMX & DATA DRIVERS)

| | | | | | | | |
|-------|--------------------------|-----------|-----|--------|-----------|------|---|
| TITLE | MASSBUS DATA PATH (MDPH) | SIZE CODE | DCS | NUMBER | M8150-0-1 | REV. | C |
| SCALE | 1/8" | SHEET | 5 | OF 9 | DIST. | | |

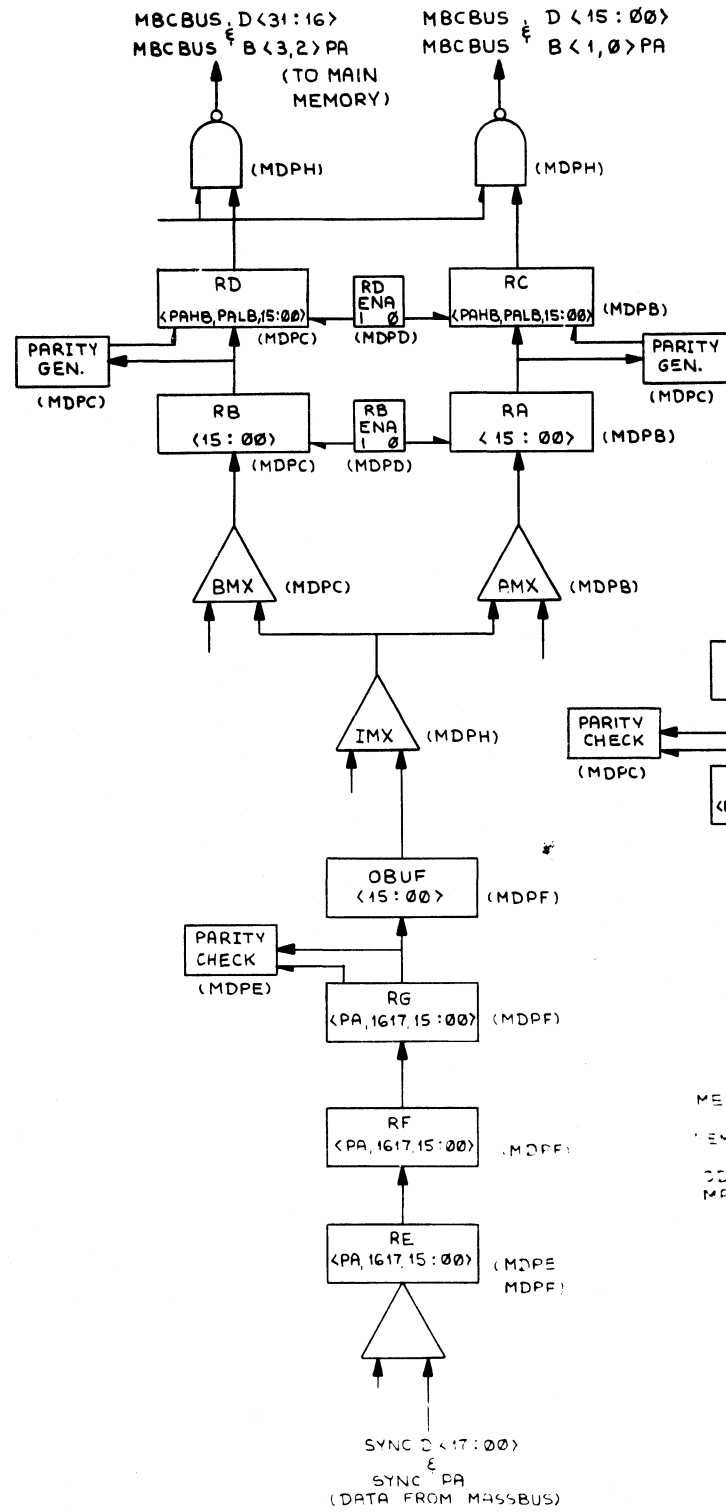
REV. C
NUMBER M8150-0-1
SIZE CODE DCS

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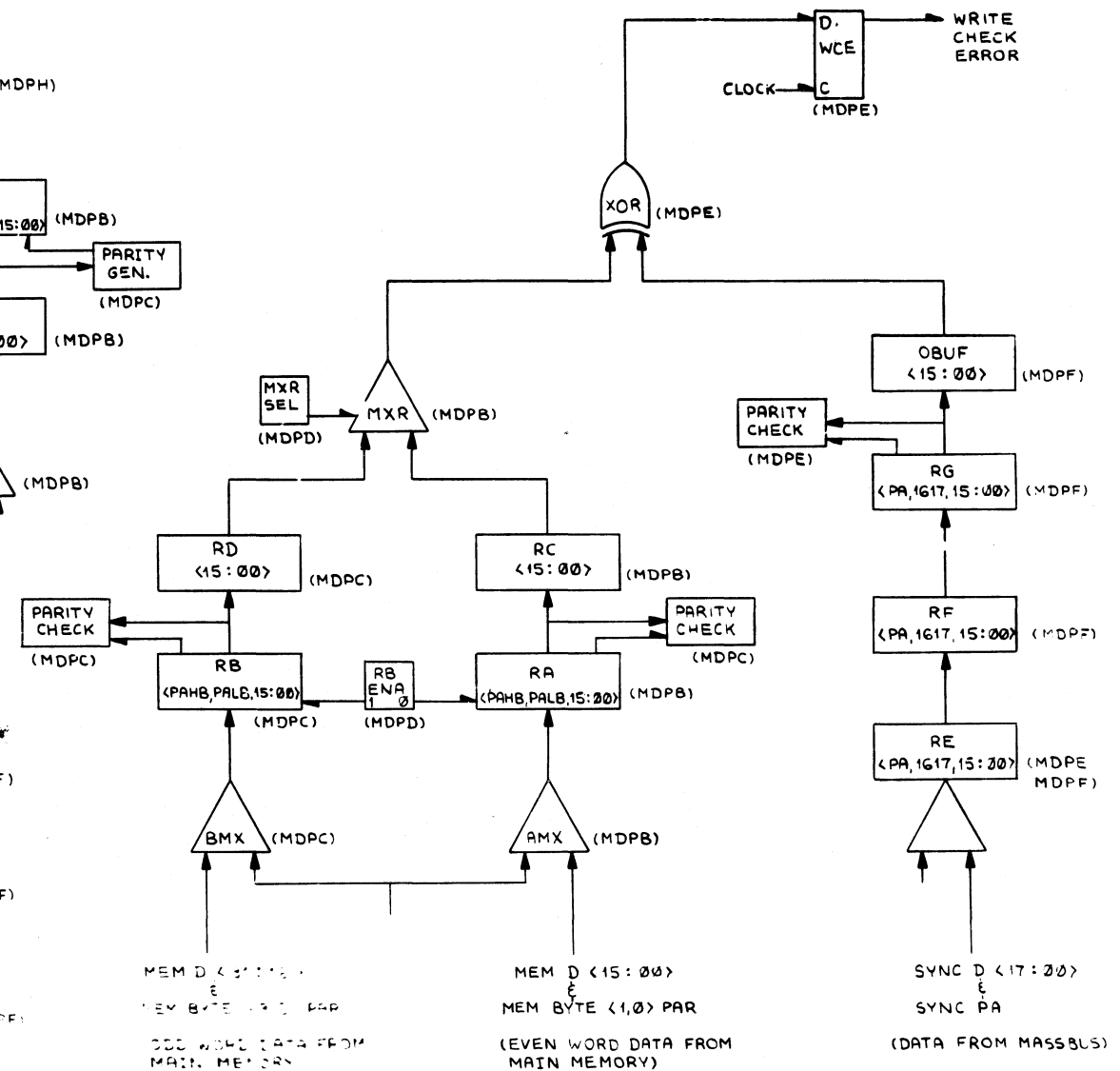
**WRITE COMMAND
OR
READ-WRITE RHDB REGISTER**
(READ FROM RHDB : TO UNIBUS)
(WRITE COMMAND : TO MASSBUS)



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)

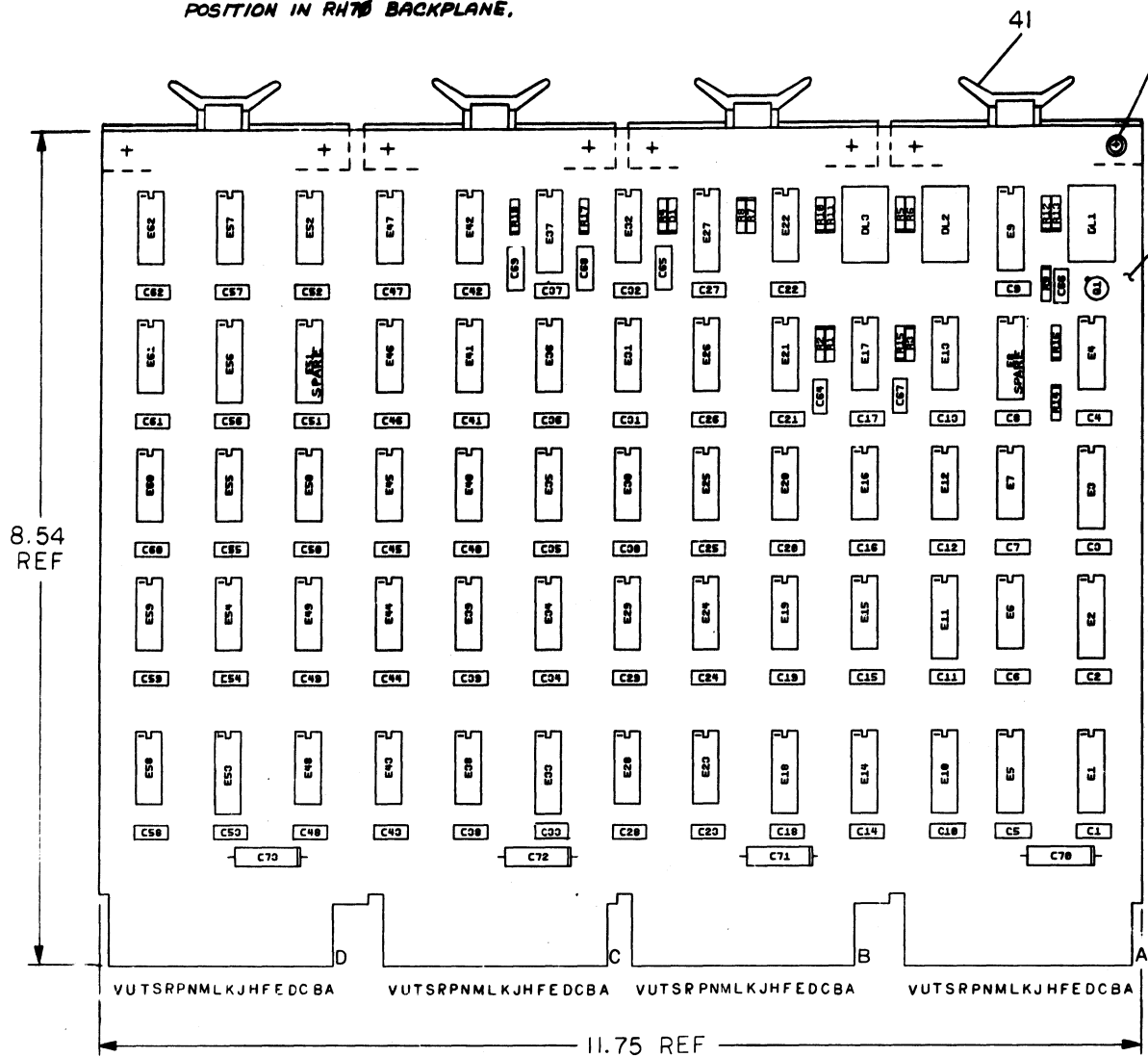
| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

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

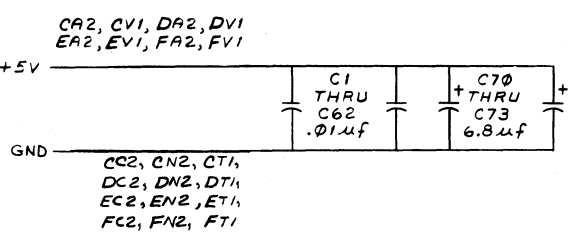
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NOTES:

1. IC SLOTS E0 & E1 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



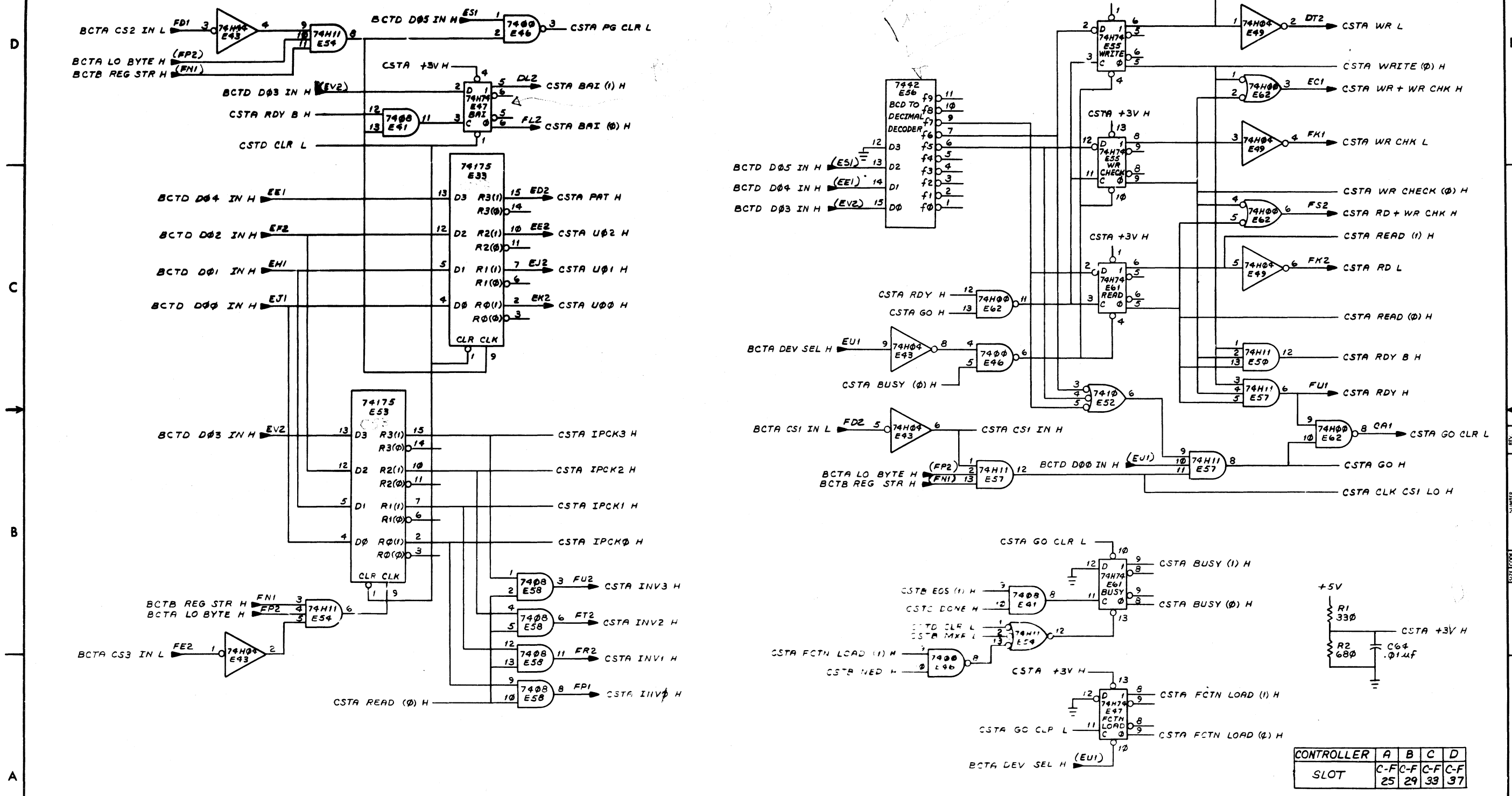
| IC TYPE | GND | +5V |
|--|-----|-----|
| I.C. DEC 74175 | 8 | 16 |
| I.C. DEC 74123 | 8 | 16 |
| I.C. DEC 8640 | 1 | 8 |
| I.C. DEC 8234 | 8 | 16 |
| I.C. DEC 7442 | 8 | 16 |
| I.C. DEC 74193 | 8 | 16 |
| GND AND 5V ARE USUALLY PIN 7 AND 14 RESPECTIVELY. EXCEPTIONS ARE STATED ABOVE. | | |
| IC PIN LOCATIONS | | |

| REF | X-Y COORDINATE HOLE LOCATION | K-CO-M8151-0-4 | 1 |
|-----|--|------------------------------|----|
| REF | ASSY/DRILLING HOLE LAYOUT | D-AH-M8151-0-5 | 2 |
| R | MODULE ECO HISTORY | B-MH-M8151-0-6 | 3 |
| 1 | ETCHED CIRCUIT BOARD | 5011358 | 4 |
| 04 | C1 THRU C02, C04, C06 | CAPACITOR .01µf 100V, 20% | 5 |
| 4 | C70 THRU C73 | CAPACITOR 6.8µf 10% 35V | 6 |
| 1 | C05 | CAPACITOR .07µf 20% 25V | 7 |
| 1 | C07 | CAPACITOR 47pf 5% 100V | 8 |
| 2 | C08, C09 | CAPACITOR 100pf 5% 100V | 9 |
| 1 | D1 | DIODE D084 | 10 |
| 3 | R5, R10, R12 | RESISTOR 150 OHM, 1/4 W, 5% | 11 |
| 3 | R6, R11, R13 | RESISTOR 300 OHM, 1/4 W, 5% | 12 |
| 2 | R1, R0 | RESISTOR 330 OHM, 1/4 W, 5% | 13 |
| 2 | R2, R0 | RESISTOR 680 OHM, 1/4 W, 5% | 14 |
| 3 | R3, R14, R15 | RESISTOR 1K OHM, 1/4 W, 5% | 15 |
| 4 | R7, R17, R10, R4 | RESISTOR 5.0K OHM, 1/4 W, 5% | 16 |
| 1 | R16 | RESISTOR 0.0K OHM, 1/4 W, 5% | 17 |
| 1 | Q1 | TRANSISTOR DEC 3000 B | 18 |
| 3 | DL1, DL2, DL3 | DELAY 50 NS | 19 |
| 2 | E45, E46 | IC DEC 7400 | 20 |
| 3 | E7, E12, E02 | IC DEC 7400 | 21 |
| 2 | E39, E40 | IC DEC 74800 | 22 |
| 2 | E34, E42 | IC DEC 7402 | 23 |
| 4 | E8, E30, E43, E49 | IC DEC 7404 | 24 |
| 4 | E35, E41, E50, E50 | IC DEC 7400 | 25 |
| 3 | E40, E44, E52 | IC DEC 7410 | 26 |
| 2 | E24, E32 | IC DEC 74H10 | 27 |
| 5 | E4, E25, E50, E54, E57 | IC DEC 74H11 | 28 |
| 2 | E22, E31 | IC DEC 7437 | 29 |
| 1 | E50 | IC DEC 7442 | 30 |
| 1 | E20 | IC DEC 74H30 | 31 |
| 1 | E20 | IC DEC 74H50 | 32 |
| 10 | E13, E15, E18, E21, E26, E30, E47, E55, E80, E81 | IC DEC 74H74 | 33 |
| 3 | E19, E23, E29 | IC DEC 74S74 | 34 |
| 1 | E30 | IC DEC 74S84 | 35 |
| 2 | E27, E37 | IC DEC 74123 | 36 |
| 2 | E33, E53 | IC DEC 74175 | 37 |
| 1 | E9 | IC DEC 74193 | 38 |
| 8 | E1, E2, E3, E5, E10, E11, E14, E18 | IC DEC 8234 | 39 |
| 1 | E17 | IC DEC 8640 | 40 |
| 4 | HANDLE, FLIP CHIP (MAGENTA) | 9008337-8 | 41 |
| 8 | EYELET | 9008732 | 42 |
| A/R | WIRE 30 AWG BUSS | 9105740-05 | |

| QTY | REF DESIGNATION | DESCRIPTION | PART NO | ITEM NO | | | | | | | | |
|---|-----------------|-------------|---------|---------|-----------|--------|--------|--------|-----------|---|--|--|
| PARTS LIST | | | | | | | | | | | | |
| RH70 | | | | | | | | | | | | |
| ETCH BOARD REV A | | | | | | | | | | | | |
| DRN: J. Vincent DATE: 11-7-74 | | | | | | | | | | | | |
| CHK'D: DATE: 12-2-74 | | | | | | | | | | | | |
| ENG: DATE: 1-15-75 | | | | | | | | | | | | |
| PRD: DATE: 1/17/75 | | | | | | | | | | | | |
| NEXT HIGHER ASSY: B-DD RH70-0 | | | | | | | | | | | | |
| SCALE: 1:1 | | | | | | | | | | | | |
| SHEET: 1 OF 6 | | | | | | | | | | | | |
| SEMICONDUCTOR CONVERSION CHART | | | | | | | | | | | | |
| <table border="1"> <tr> <th>DEC NO</th> <th>EIA NO</th> <th>DEC NO</th> <th>EIA NO</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table> | | | | | DEC NO | EIA NO | DEC NO | EIA NO | | | | |
| DEC NO | EIA NO | DEC NO | EIA NO | | | | | | | | | |
| | | | | | | | | | | | | |
| <table border="1"> <tr> <th>SIZE CODE</th> <th>NUMBER</th> <th>REV.</th> </tr> <tr> <td>DCS</td> <td>M8151-0-1</td> <td>A</td> </tr> </table> | | | | | SIZE CODE | NUMBER | REV. | DCS | M8151-0-1 | A | | |
| SIZE CODE | NUMBER | REV. | | | | | | | | | | |
| DCS | M8151-0-1 | A | | | | | | | | | | |

DCS M8151-0-1-A

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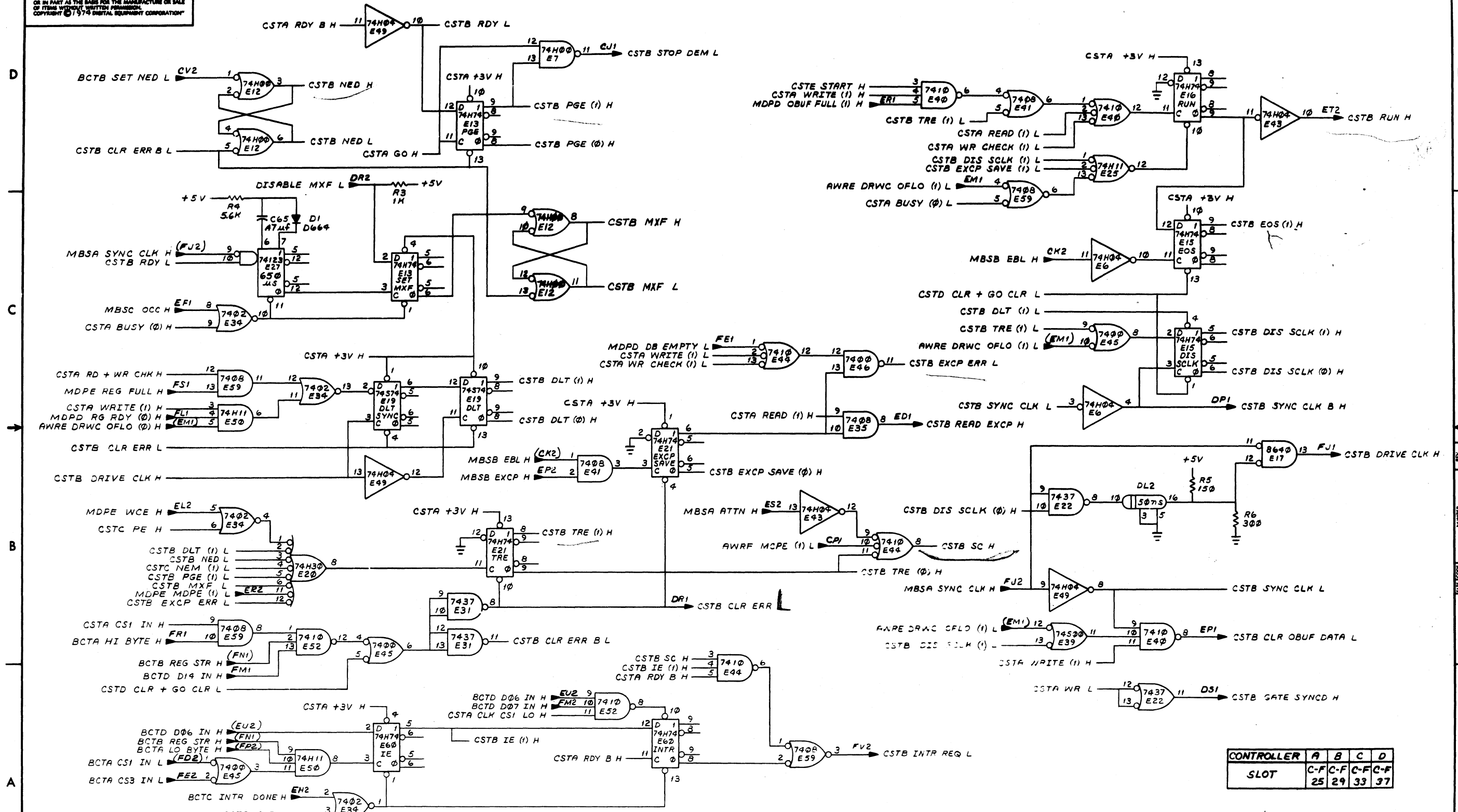
| CONTROLLER | A | B | C | D |
|------------|---------|---------|---------|---------|
| SLOT | C-F-C-F | C-F-C-F | C-F-C-F | C-F-C-F |
| | 25 | 29 | 33 | 37 |

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

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

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

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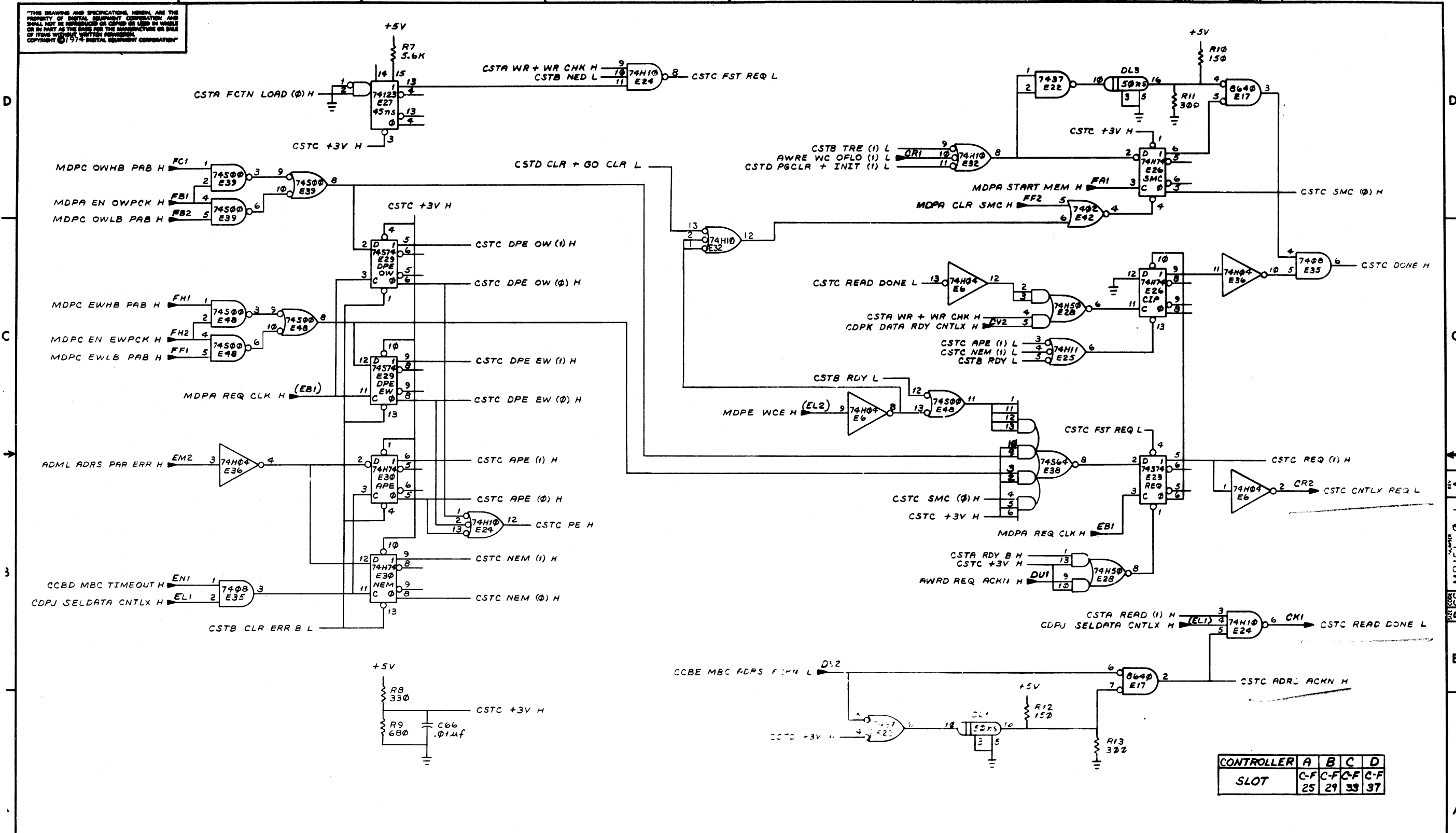
| CONTROLLER | A | B | C | D |
|------------|-----|-----|-----|-----|
| SLOT | C-F | C-F | C-F | C-F |
| | 25 | 29 | 33 | 37 |

ERRORS; IE; INTR REQ; § MASSBUS CONTROL

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

| TITLE | SIZE CODE | NUMBER | REV. |
|---------------------------|-----------|-----------|------|
| CONTROL AND STATUS (CSTB) | DCS | M8151-0-1 | A- |
| SCALE | SHEET | DIST. | |
| | 3 OF 6 | | |

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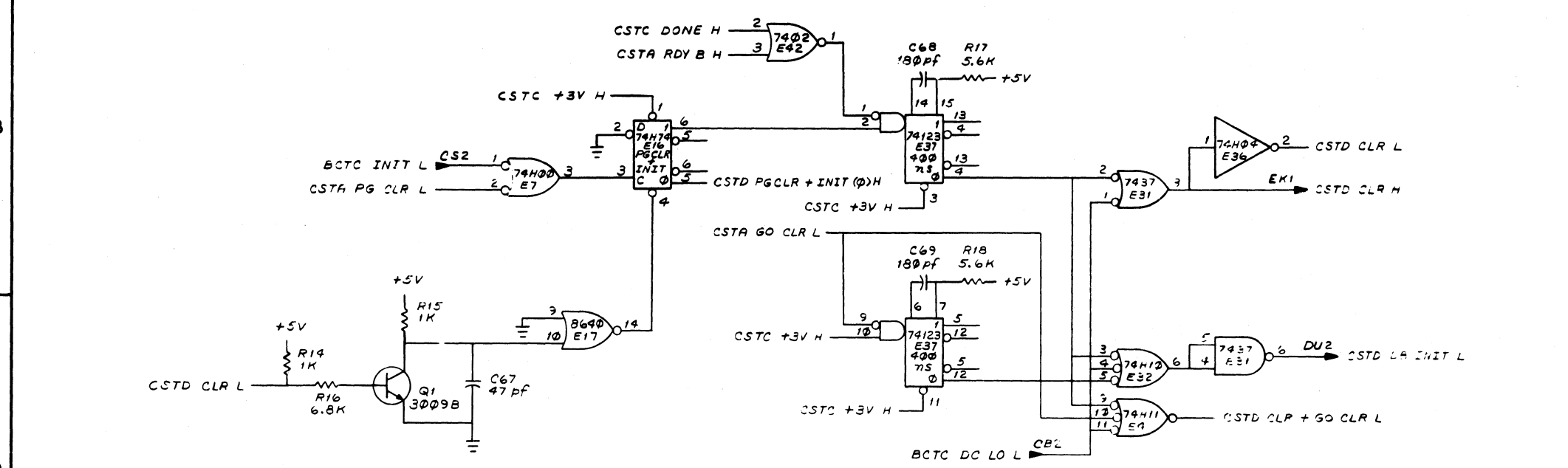
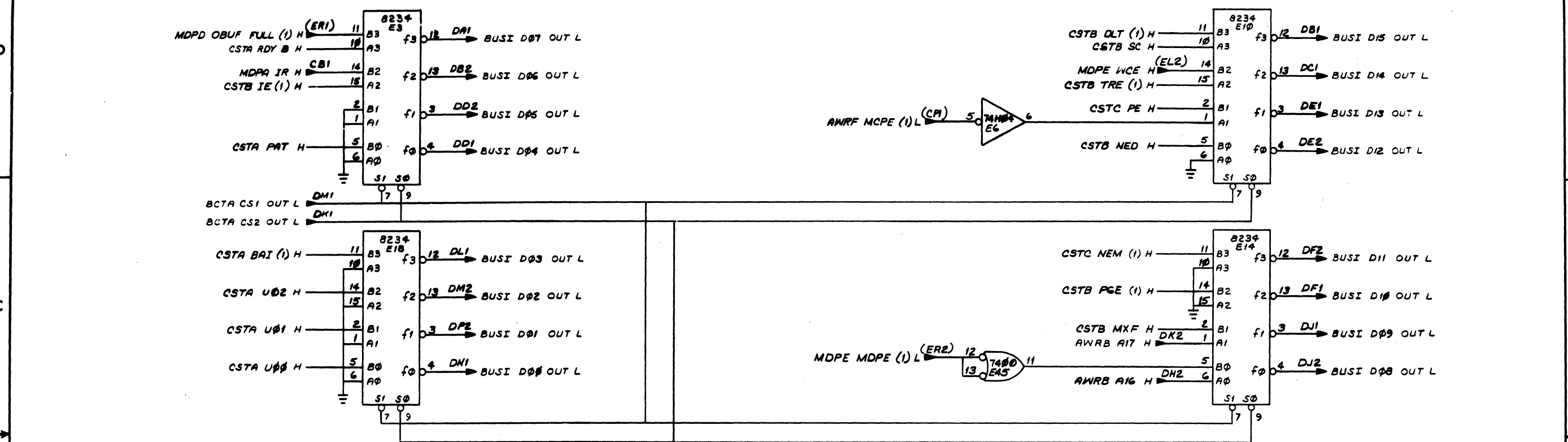


| CONTROLLER | A | B | C | D |
|------------|-----|-----|-----|-----|
| SLOT | C-F | C-F | C-F | C-F |
| | 25 | 29 | 33 | 37 |

PE; NEM & MEMORY CYCLE CONTROL

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

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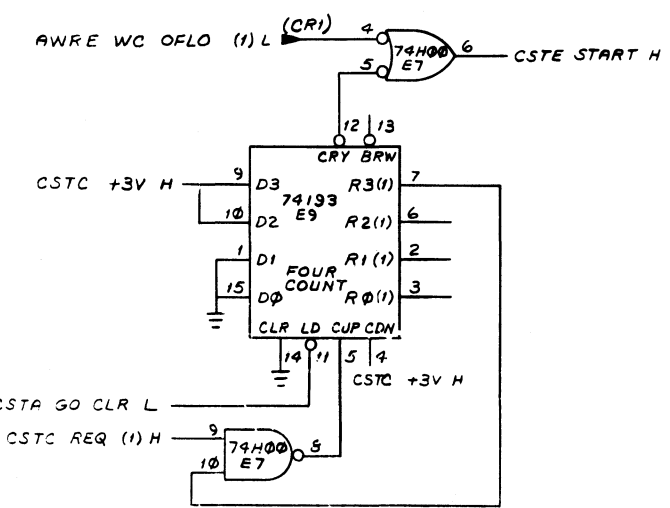
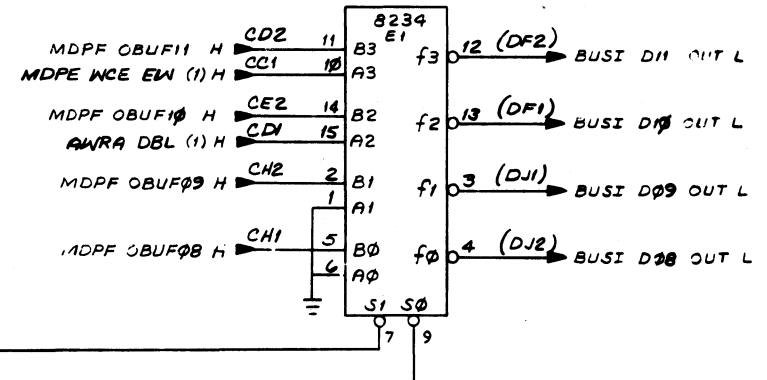
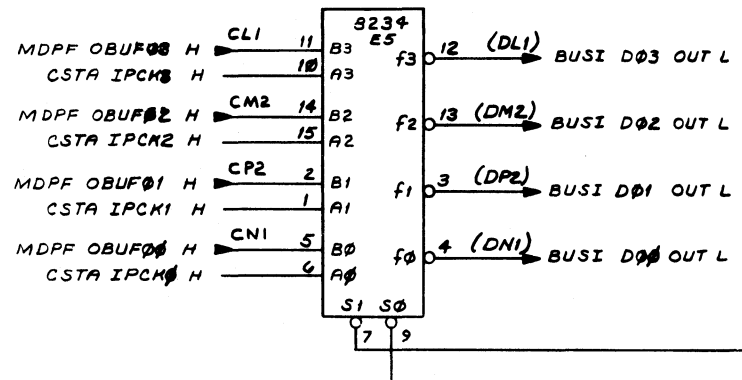
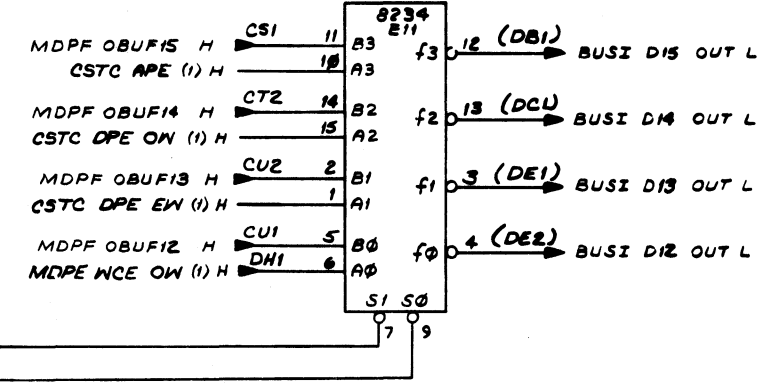
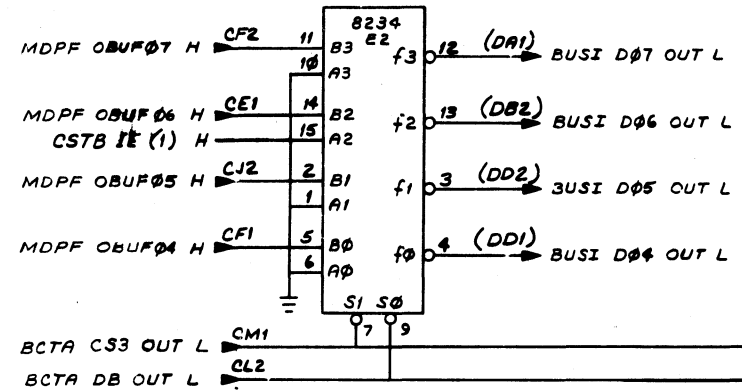
| 8234 OPEN COLLECTOR MULTIPLEXOR | | |
|---------------------------------------|----|----------------|
| S0 | S1 | OUTPUT |
| L | L | B→F (NOT USED) |
| L | H | B→F |
| H | L | A→F |
| H | H | OFF |

| 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. |
| | | |

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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 6 OF 6 | DIST. | |

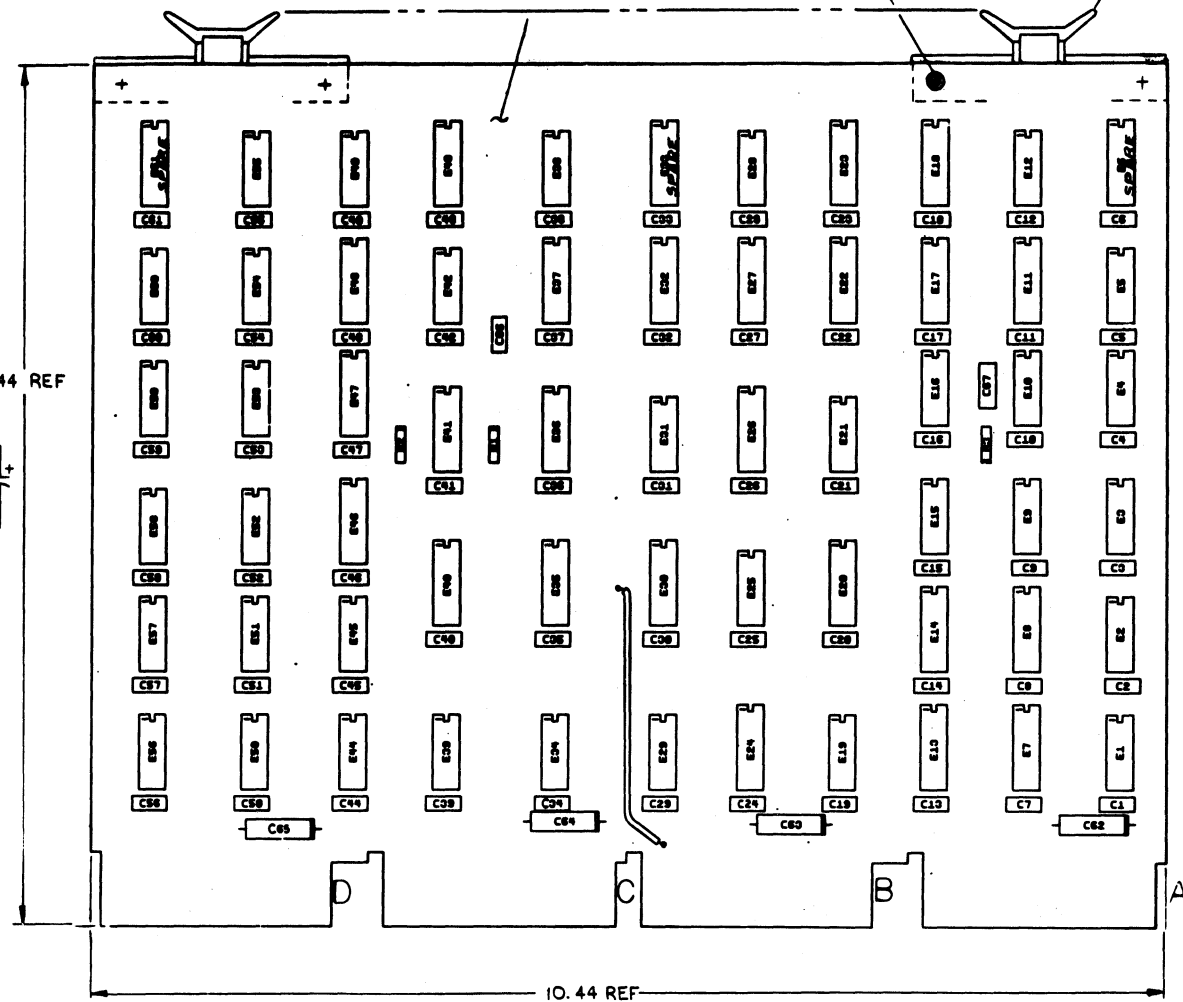
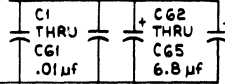
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NOTES:

- IC SLOTS EG, E33 AND EG1 ARE SPARES.
- 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 |

CR2, CV1, DA2, DV1, EA2, EV1, FA2, FV1 +5V
 CC2, CH1, CN2, CT1, DC2, DH1, DN2, DT1, EC2, EH1, EN2, ET1, FC2, FH1, FN2, FT1



| IC | DEC NO | QTY | TYPE |
|---------------|--------|------|------|
| IC DEC 0234 | 8 | 16 | |
| IC DEC 74193 | 8 | 16 | |
| IC DEC 74H106 | 13 | 5 | |
| IC DEC 74.57 | 8 | 16 | |
| IC DEC 74191 | 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-M8152-B-4 | 1 |
|-----|--|----------------------------------|------------|
| REF | ASSY/DRILLING HOLE LAYOUT | D-AH-M8152-B-5 | 2 |
| REF | MODULE E.C.O. HISTORY | B-MH-M8152-B-6 | 3 |
| 1 | ETCHED CIRCUIT BOARD | 5011285 | 4 |
| 62 | C1 THRU C62 | CAPACITOR, .01µf, 100V, 20% DISC | 1001610-01 |
| 4 | C62 THRU C65 | CAPACITOR, 6.8µf, 35V, 10% | .005306 |
| 1 | C67 | CAPACITOR, 27pf, 100V, 5% | 1001739 |
| 1 | R1 | RESISTOR, 330, 1/4W, 5% | 1300295 |
| 1 | R2 | RESISTOR, 600, 1/4W, 5% | 1301424 |
| 1 | R3 | RESISTOR, 1K, 1/4W, 5% | 1300365 |
| 4 | E1C, E42, E52, E53 | I.C. DEC 74H00 | 1909056 |
| 6 | E10, E21, E25, E29, E31, E34 | I.C. DEC 74H01-1 | 1908649 |
| 4 | E11, E17, E18, E22 | I.C. DEC 74191 | 1910096 |
| 8 | E30, E57, E51 | I.C. DEC 74H04 | 1909931 |
| 1 | E50 | I.C. DEC 7408 | 1910155 |
| 3 | E20, E54, E60 | I.C. DEC 74H10 | 1909057 |
| 3 | E5, E48, E59 | I.C. DEC 74H11 | 1909267 |
| 1 | E55 | I.C. DEC 7427 | 1910676 |
| 2 | E9, E15 | I.C. DEC 74H30 | 1909059 |
| 1 | E45 | I.C. DEC 74H55 | 1909063 |
| 1 | E58 | I.C. DEC 74H53 | 1909062 |
| 1 | E16 | I.C. DEC 74S40 | 1910541 |
| 3 | E4, E12, E56 | I.C. DEC 74H74 | 1909667 |
| 1 | E40 | I.C. DEC 74157 | 1910655 |
| 1 | E48 | I.C. DEC 74H106 | 1910408 |
| 4 | E1, E2, E39, E44 | I.C. DEC 74180 | 1910724 |
| 10 | E23, E27, E32, E35, E36, E37, E41, E43, E46, E47 | I.C. DEC 74193 | 1910016 |
| 8 | E7, E8, E13, E14, E20, E24, E26, E36 | I.C. DEC 0234 | 1911315 |
| 1 | E3 | I.C. DEC 74S04 | 1910534 |
| 4 | | HANDLES FLIP CHIP (MAGENTA) | 9008337-6 |
| 8 | | EYELET HANDLES | 9006732 |
| 4" | | WIRE #30 AWG BUSS (RETROFIT) | 9105740-55 |

FIRST USED ON OPTION MODEL
RH70

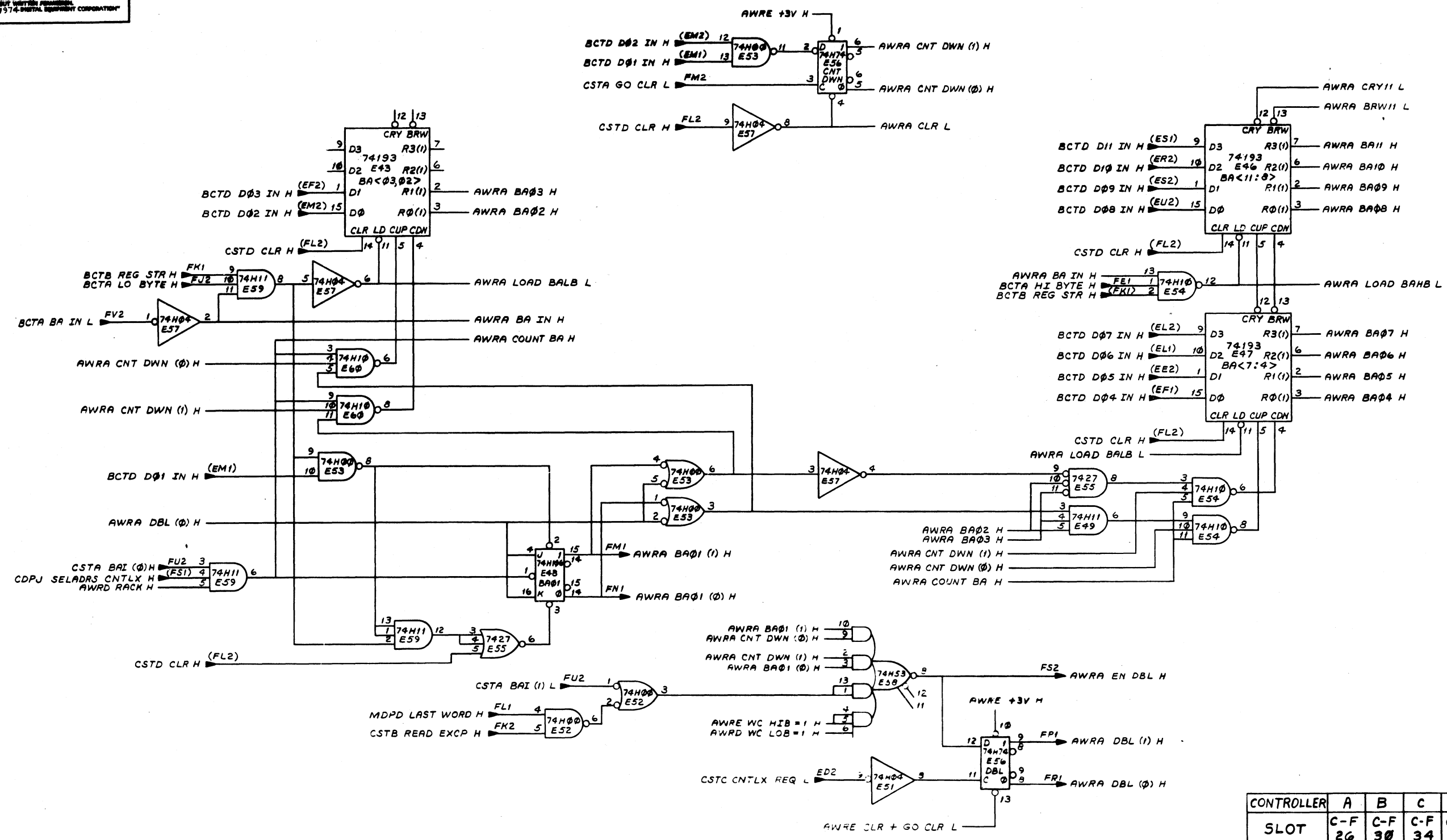
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|--------------------------------|-----|-----------|-----|------|-------|------|-----|------|----------|------|------|------|--------------------------------|-----------|--------------|------|
| | | | | | | | | | | | | | digital EQUIPMENT CORPORATION | | | |
| | | | | | | | | | | | | | ADDR. & WORD COUNT REGS. (AWR) | D/CS | M8152-0-1 | * |
| SEMICONDUCTOR CONVERSION CHART | | | | | | | | | | | | | SCALE | | SHEET 1 OF 7 | |

D/CS M8152-0-1

B

A

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

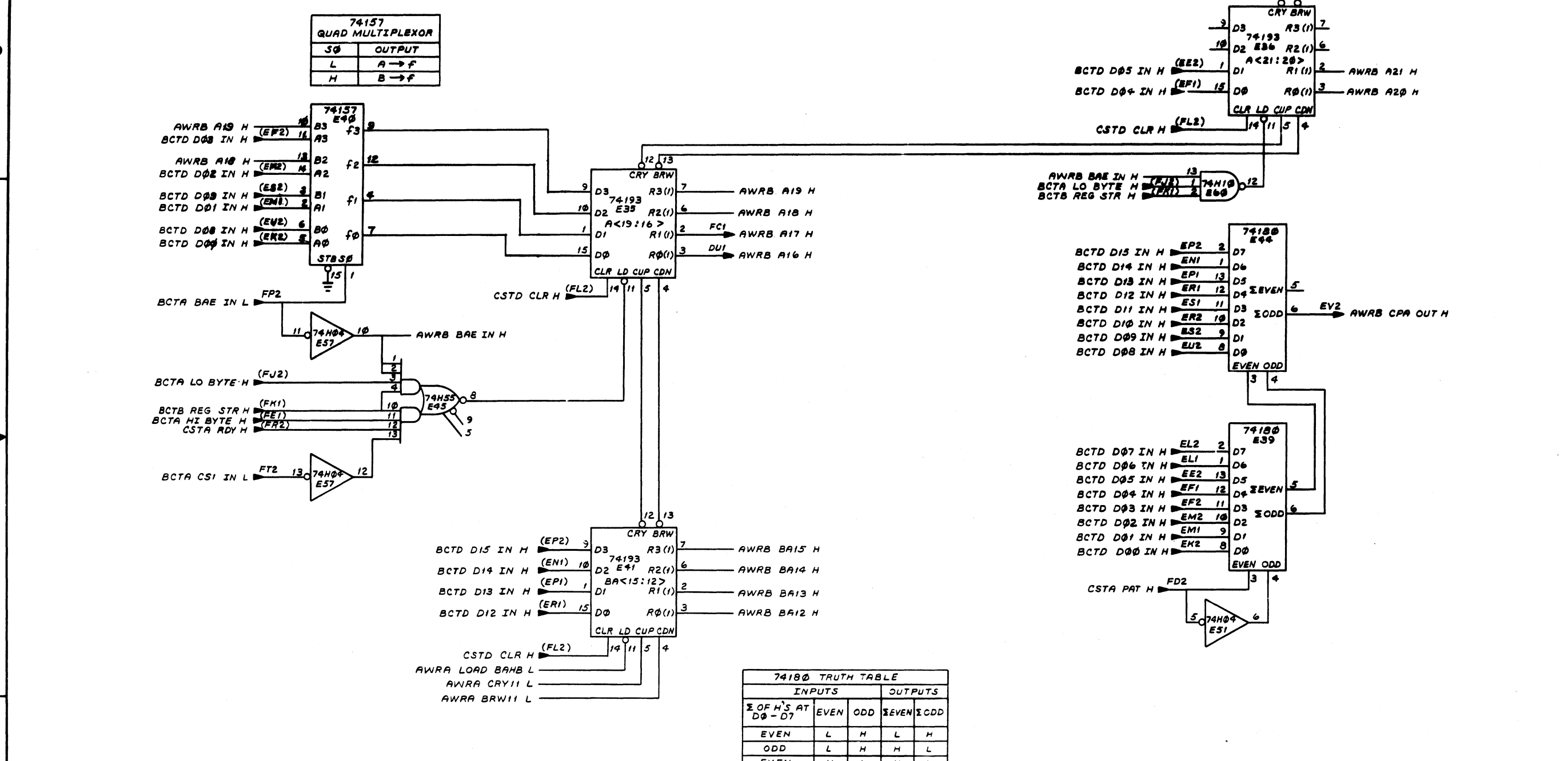
(BUS ADDR REG. <11:01>)

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

| | | | | | | | |
|-------|---------------------------------|-----------|--------|--------|-----------|------|---|
| TITLE | ADDR. & WORD COUNT REGS. (AWRA) | SIZE CODE | DCS | NUMBER | M8152-0-1 | REV. | * |
| SCALE | 1/8" | SHEET | 2 OF 7 | DIST. | | | |

DCS M8152-0-1

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74180 TRUTH TABLE

| INPUTS | | OUTPUTS | |
|-------------------|-----|---------|-------|
| Σ OF H'S AT D0-D7 | | 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 |
| SLOTS | C-F | C-F | C-F | C-F |
| | 26 | 30 | 34 | 38 |

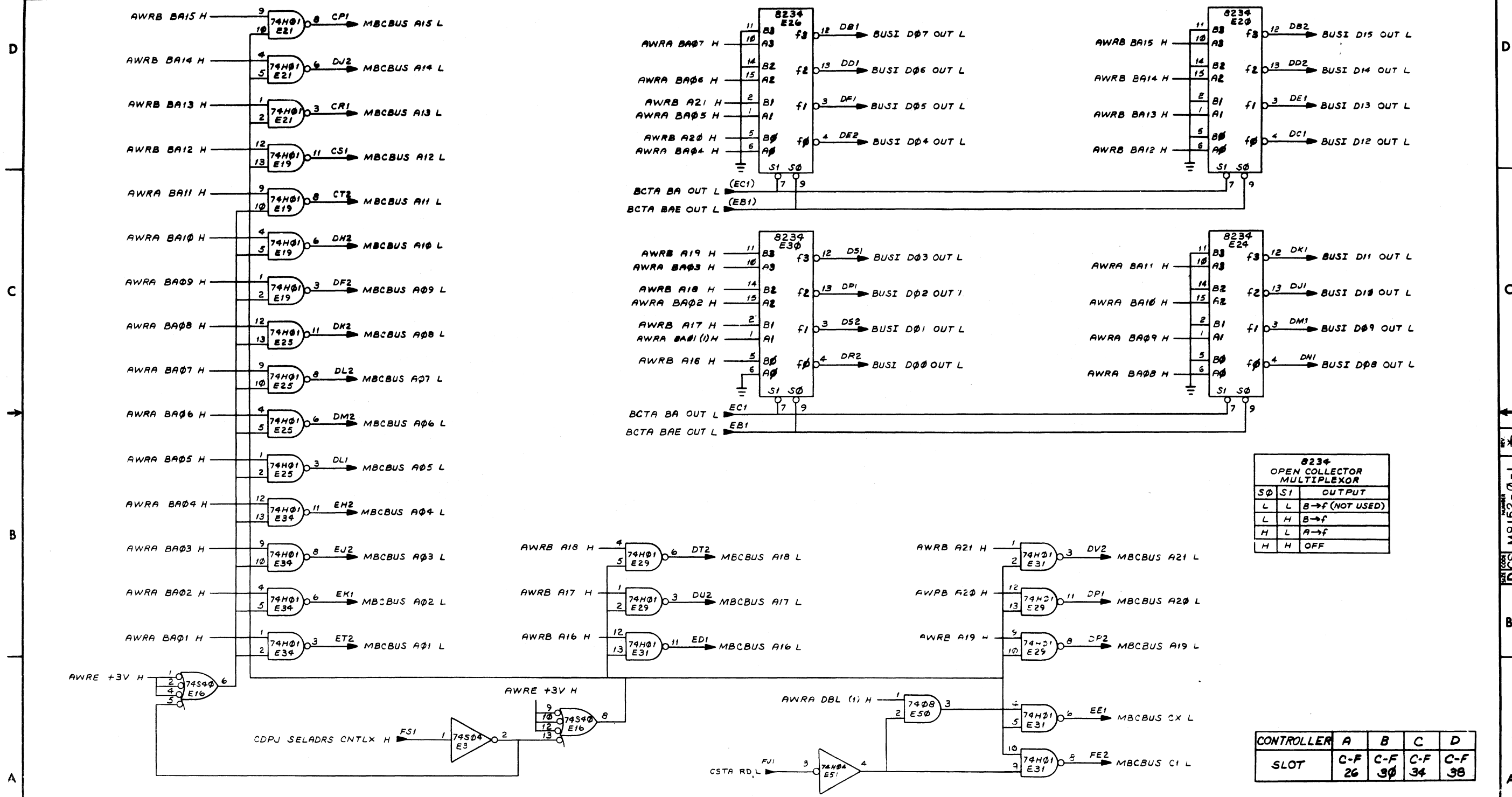
(BUS ADDR & EXTENSION <21:12> & CNTL PARITY OUT)

REVISIONS

| CHK | CHANGE NO. | REV. |
|-----|------------|------|
| | | |

| | | | | | | | |
|-------|--------------------------------|-----------|--------|--------|-----------|------|---|
| TITLE | ADDR. & WORD COUNT REGS.(AWRB) | REV. CODE | DCS | NUMBER | M8152-0-1 | REV. | * |
| SCALE | 1/1 | SHEET | 3 OF 7 | DWT. | | | |

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8234
OPEN COLLECTOR
MULTIPLEXOR

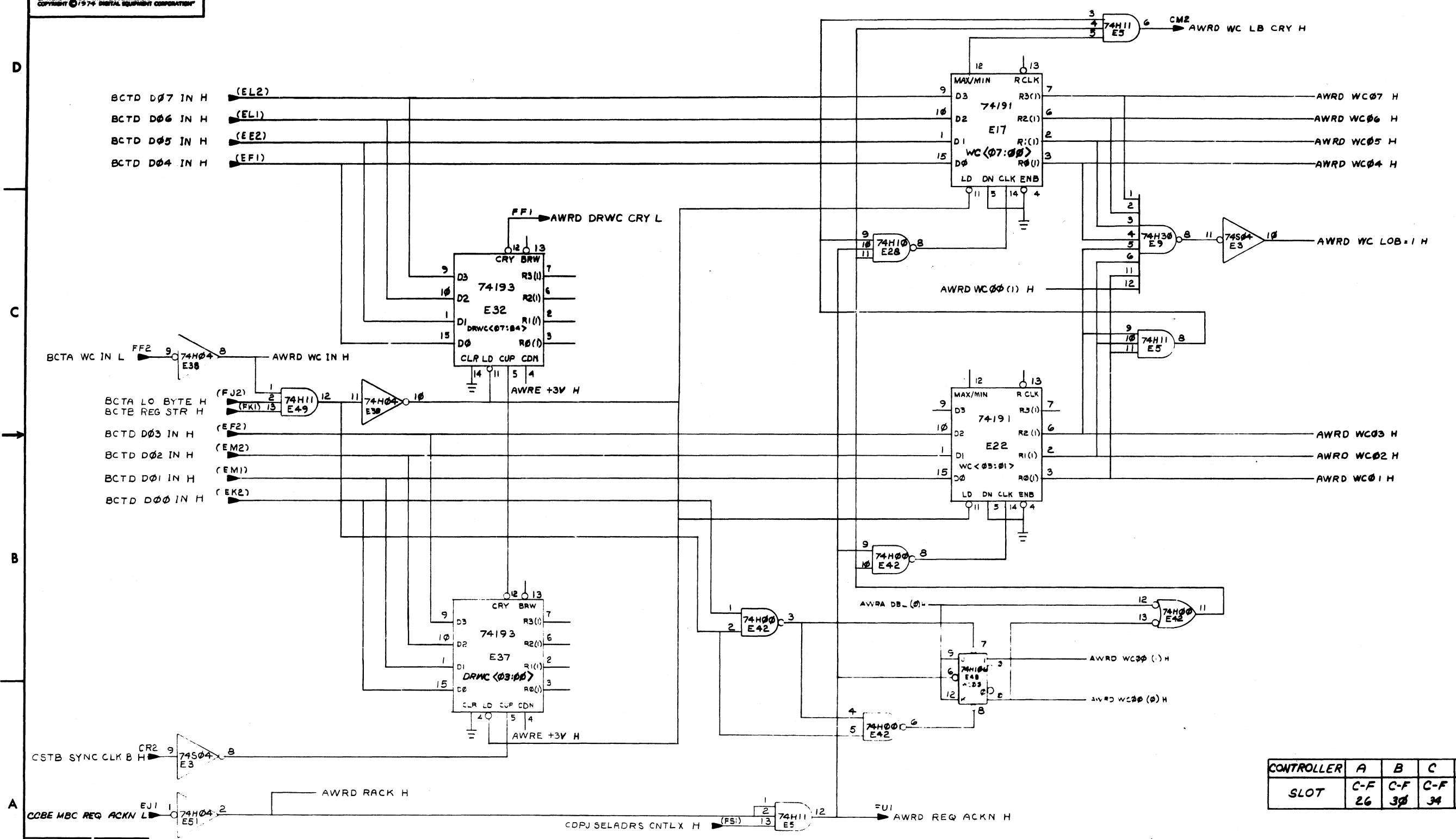
| S0 | S1 | OUTPUT |
|----|----|----------------|
| L | L | B→F (NOT USED) |
| L | H | B→f |
| H | L | A→f |
| H | H | OFF |

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

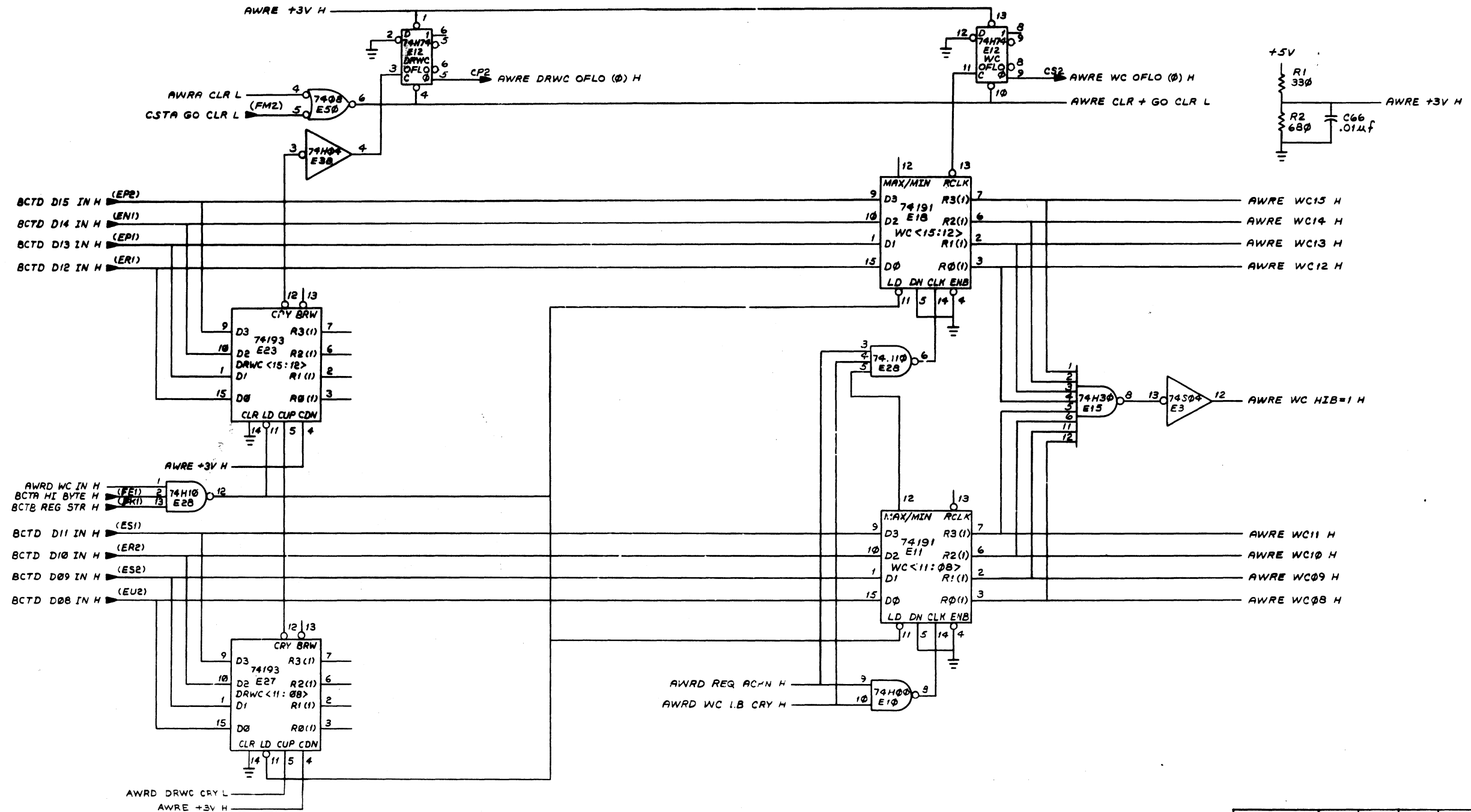
(WCRC COUNT REGS. <07:00>)

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |
| | | |

| | | | | | | | |
|-------|---------------------------------|-----------|-----|--------|-----------|-------|---|
| TITLE | ADDR. & WORD COUNT RE S. (AWRD) | SIZE CODE | DCS | NUMBER | M8152-0-1 | REV. | * |
| SCALE | // | SHEET | 5 | OF | 7 | DIST. | |

REV. * NUMBER DCS M8152-0-1

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

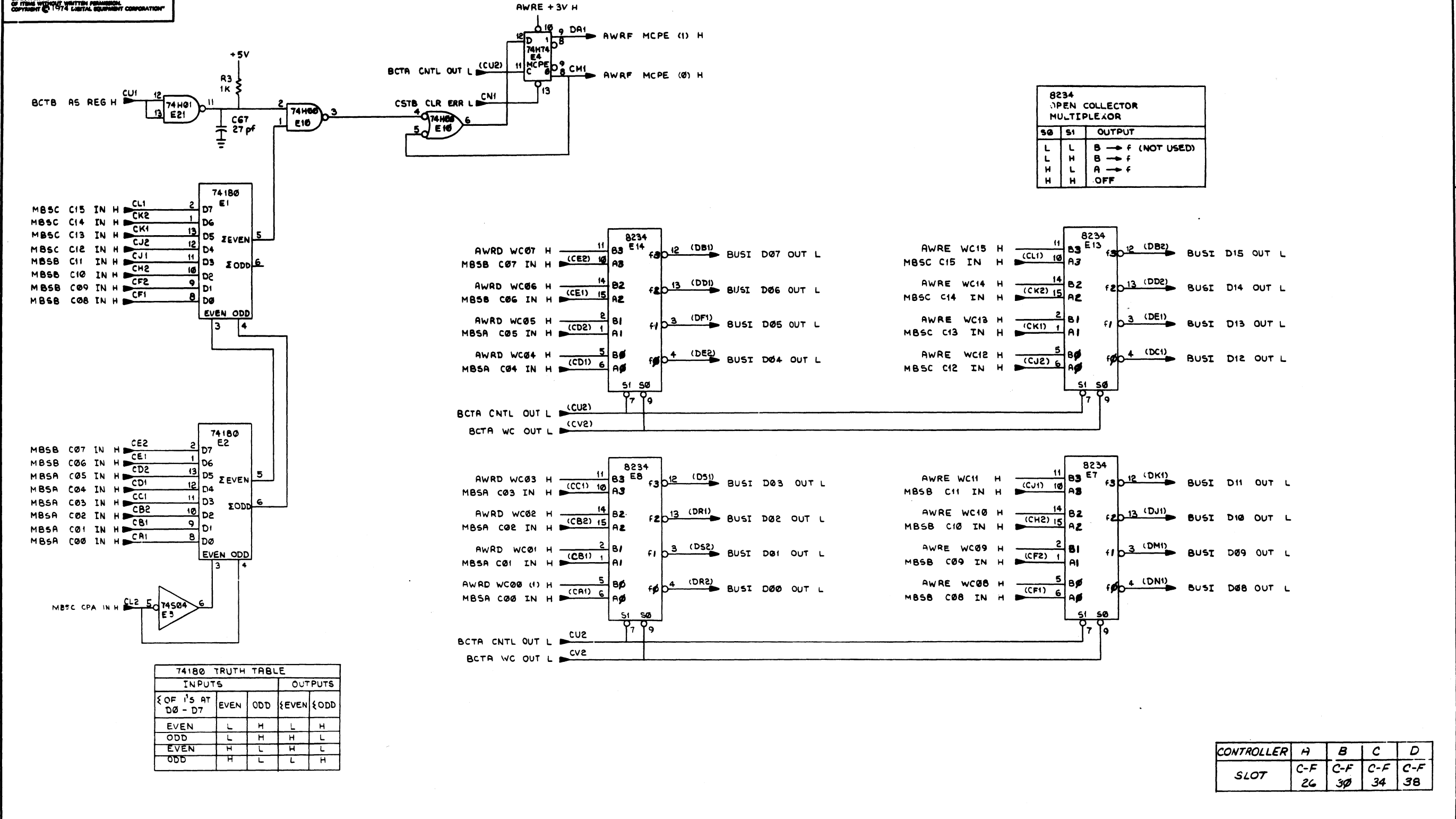
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| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

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

DCS M8152-0-1

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| 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 |

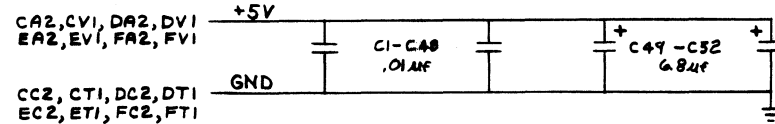
| CHK | CHANGE NO. | REV. |
|-----|------------|------|
| | | |

REV. * M8152-0-1

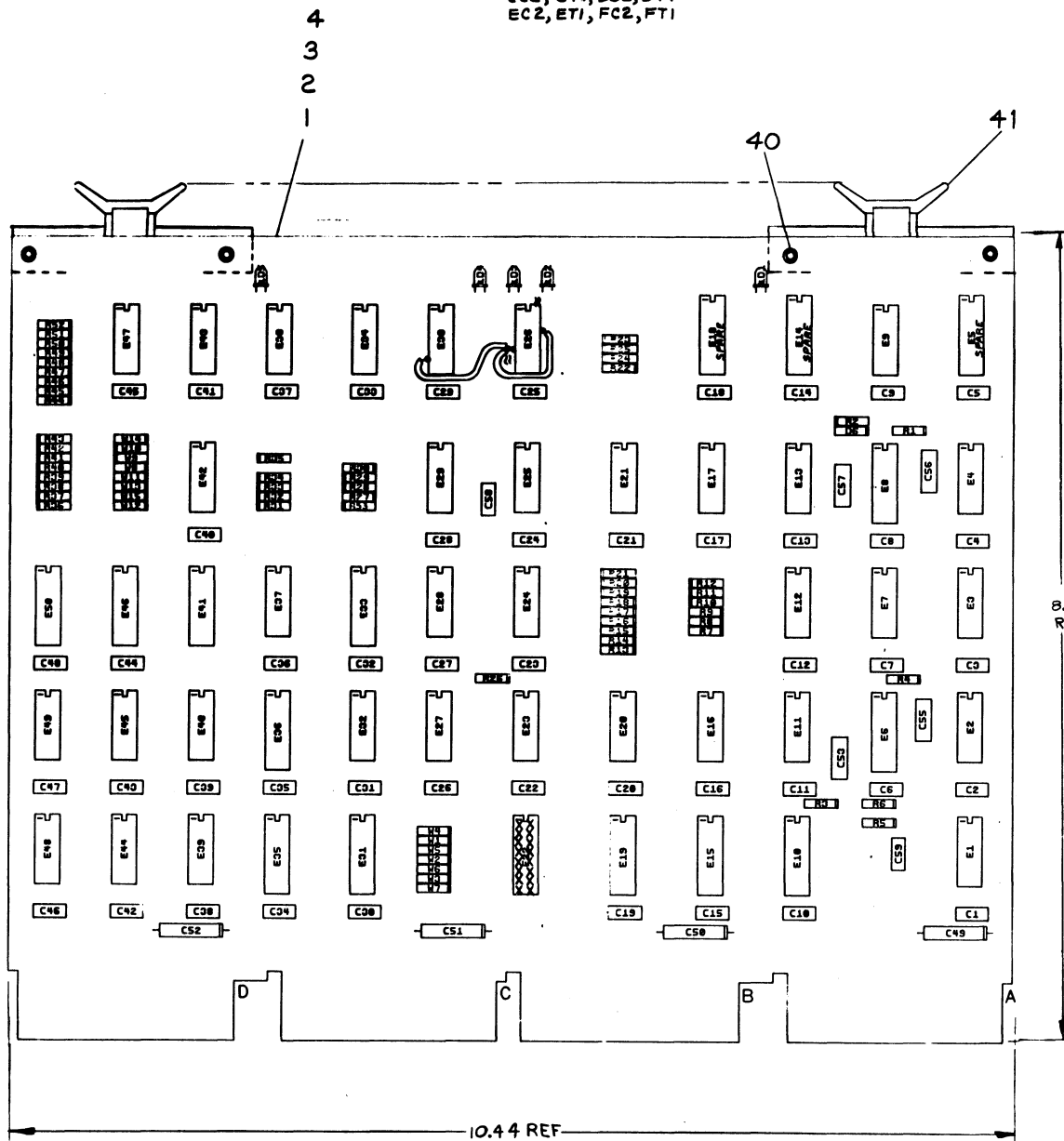
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NOTES:

- 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 | X-Y COORDINATE HOLE LOCATION | K-CD-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% | 5 |
| 1 | C56 | CAPACITOR, 100pf, 100V, 5% | 6 |
| 1 | C57 | CAPACITOR, 220pf, 100V, 5% | 7 |
| 1 | C58 | CAPACITOR, 330pf, 100V, 5% | 8 |
| 49 | C1 THRU C48, C59 | CAPACITOR, .01µf, 100V, 20% DISC | 9 |
| 4 | C49 THRU C52 | CAPACITOR, 6.8µf, 35V, 10% | 10 |
| | C55 | CAPACITOR, 22pf, 100V, 5% | 11 |
| 1 | D6 | DIODE, D884 | 12 |
| 5 | D1 THRU D5 | DIODE, LED | 13 |
| 1 | E22 | I.C. SOCKET 16 PIN | 14 |
| 1 | E41 | I.C. COMPONENT CARRIER | 15 |
| 1 | R20 | RESISTOR, 47, 1/4W, 5% | 16 |
| 7 | R6, R22 THRU R25, R26, R35 | RESISTOR, 390, 1/4W, 5% | 17 |
| 38 | R7 THRU R21, R26, R30 THRU R34, R36 THRU R52 | RESISTOR, 1K, 1/4W, 5% | 18 |
| 3 | R5, R27, R53 | RESISTOR, 100, 1/4W, 5% | 19 |
| 3 | R1, R3, R4 | RESISTOR, 5.0K, 1/4W, 5% | 20 |
| 1 | R2 | RESISTOR, 27K, 1/4W, 5% | 21 |
| 2 | E1, E30 | I.C. DEC 7402 | 22 |
| 2 | E7, E9 | I.C. DEC 74H00 | 23 |
| 2 | E12, E38 | I.C. DEC 74H10 | 24 |
| 2 | E13, E43 | I.C. DEC 74H11 | 25 |
| 4 | E11, E17, E24, E26 | I.C. DEC 74H74 | 26 |
| 5 | E4, E27, E28, E29, E32 | I.C. DEC 8081 | 27 |
| 2 | E42, E47 | I.C. DEC 8242 | 28 |
| 5 | E9, E16, E20, E23, E34 | I.C. DEC 74H04 | 29 |
| 3 | E10, E15, E19 | I.C. DEC 7442 | 30 |
| 2 | E2, E40 | I.C. DEC 7437 | 31 |
| 1 | E25 | I.C. DEC 7408 | 32 |
| 1 | E46 | I.C. DEC 7495 | 33 |
| 2 | E6, E8 | I.C. DEC 74123 | 34 |
| 1 | E21 | I.C. DEC 7427 | 35 |
| 4 | E31, E33, E35, E36 | I.C. DEC 8038 | 36 |
| 6 | E37, E39, E44, E45, E46, E49 | I.C. DEC 8640 | 37 |
| 1 | E50 | I.C. DEC 8223 PROM | 38 |
| 1 | (E22) | PRIORITY JUMPER LEVEL #5 | 39 |
| 8 | | EYELET | 40 |
| 4 | | HANDLE, FLIP CHIP (MAGENTA) | 41 |
| 15 | W1 THRU W15 | JUMPER, INSULATED | 42 |
| A/R | (E41) | #22 AWG BUSS WIRE (UNINSULATED) | 43 |
| 2" | | WIRE #30 AWG BUS (RETROFIT) | 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 | 11/2/74 |
| CHK'D | DATE | 1/3/75 |
| ENGR | DATE | 1/14/75 |
| PROB'G | DATE | 1/14/75 |
| PROB'G | DATE | 1/14/75 |

digital EQUIPMENT CORPORATION

TITLE
UNIBUS CONTROL (BCT)

NEXT HIGHER ASSY
B-DD-RH7Ø-Ø

SCALE 1 OF 6

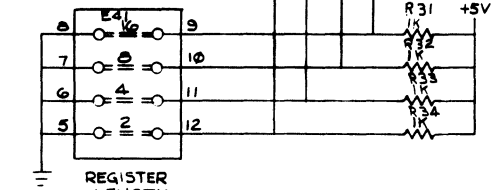
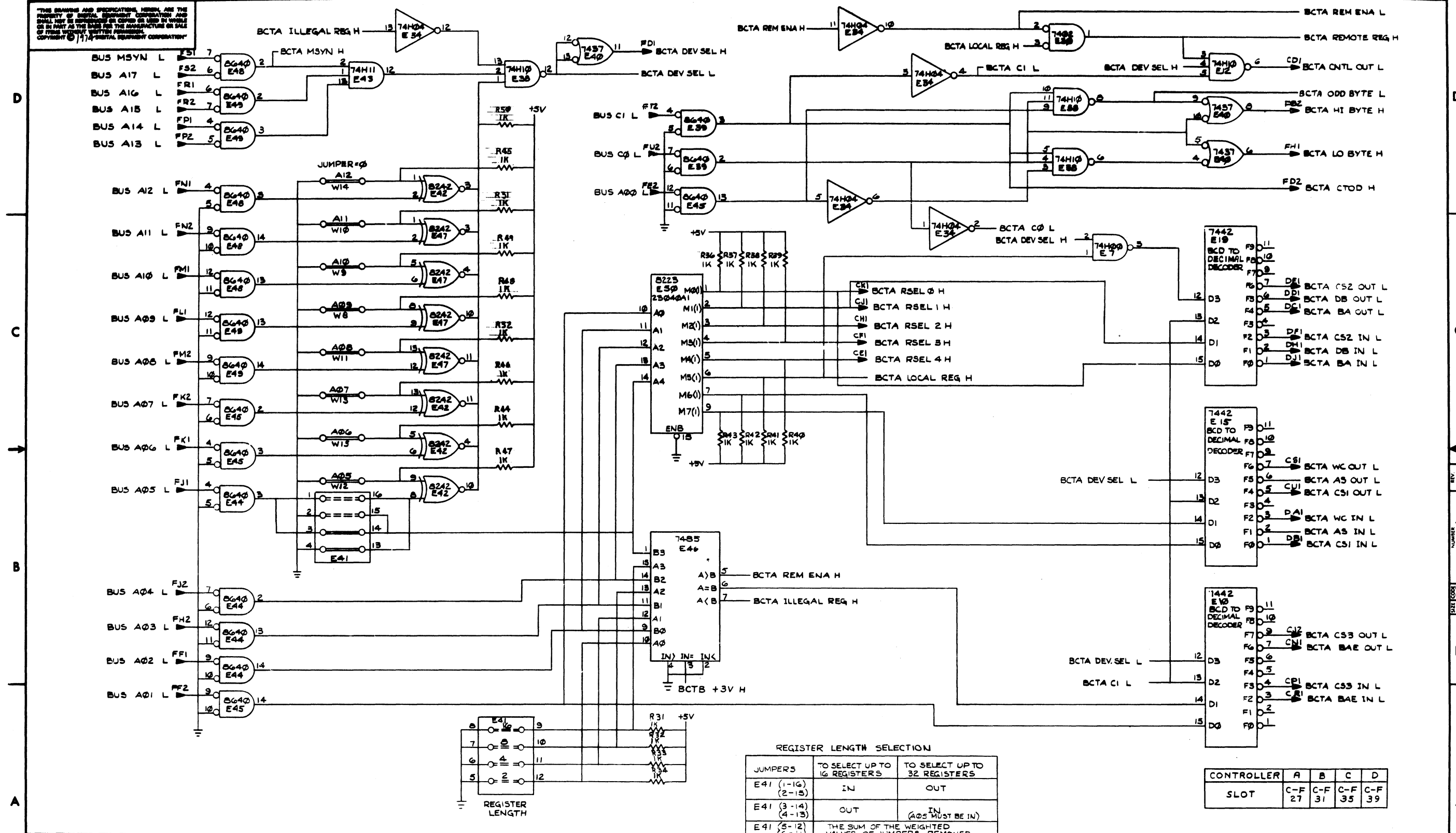
SEMICONDUCTOR CONVERSION CHART

SIZE CODE DCS M8153-Ø-1

NUMBER 1

REV. A

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REGISTER LENGTH SELECTION

| JUMPERS | TO SELECT UP TO 16 REGISTERS | TO SELECT UP TO 32 REGISTERS |
|---|--|------------------------------|
| E41 (1-10) (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

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

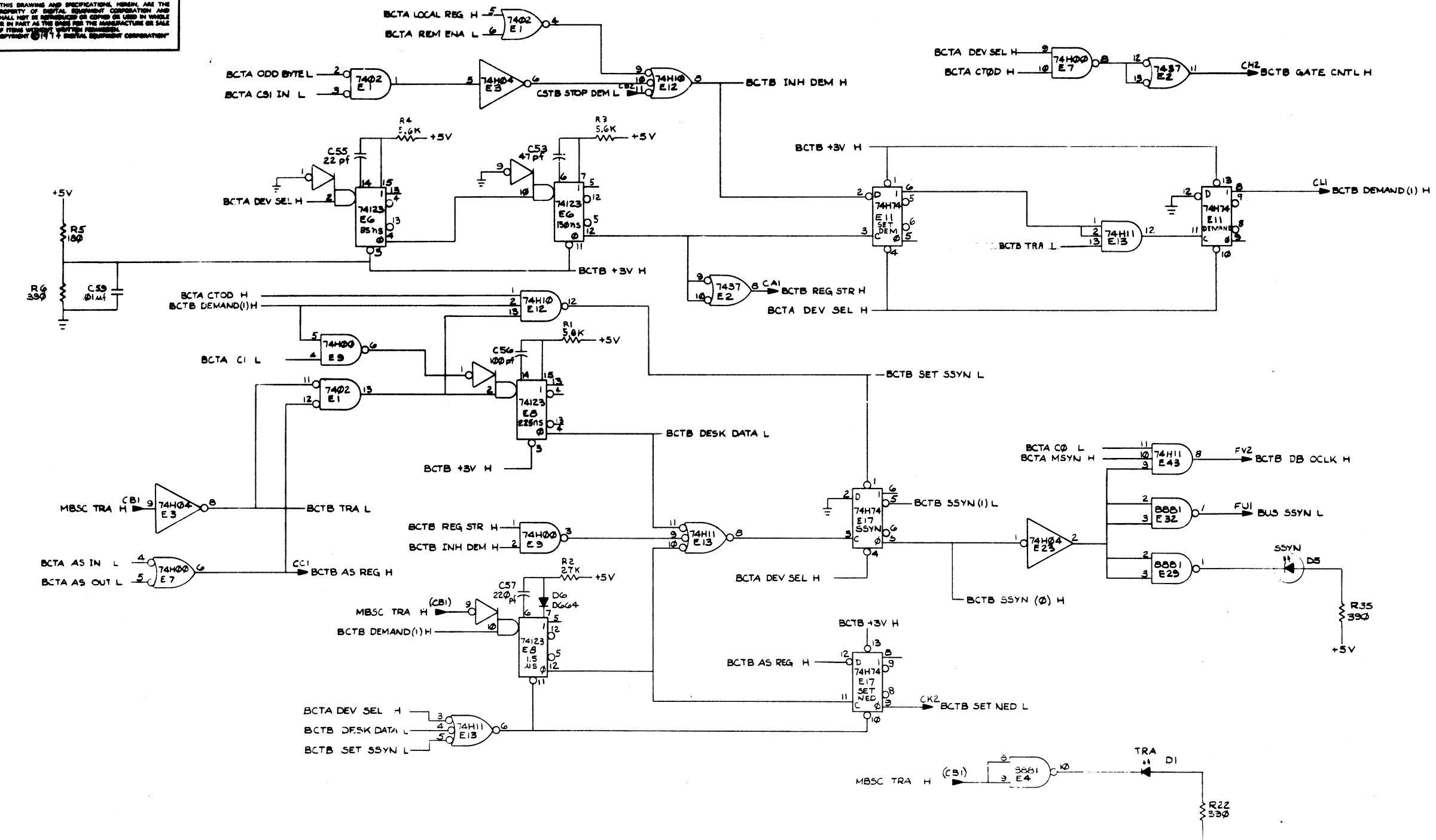
(REGISTER SELECTION)

REV. IONS

| CHK | CHANGE NO. | REV. |
|-----|------------|------|
| | | |

REV. A
M8153-0-1
DCS

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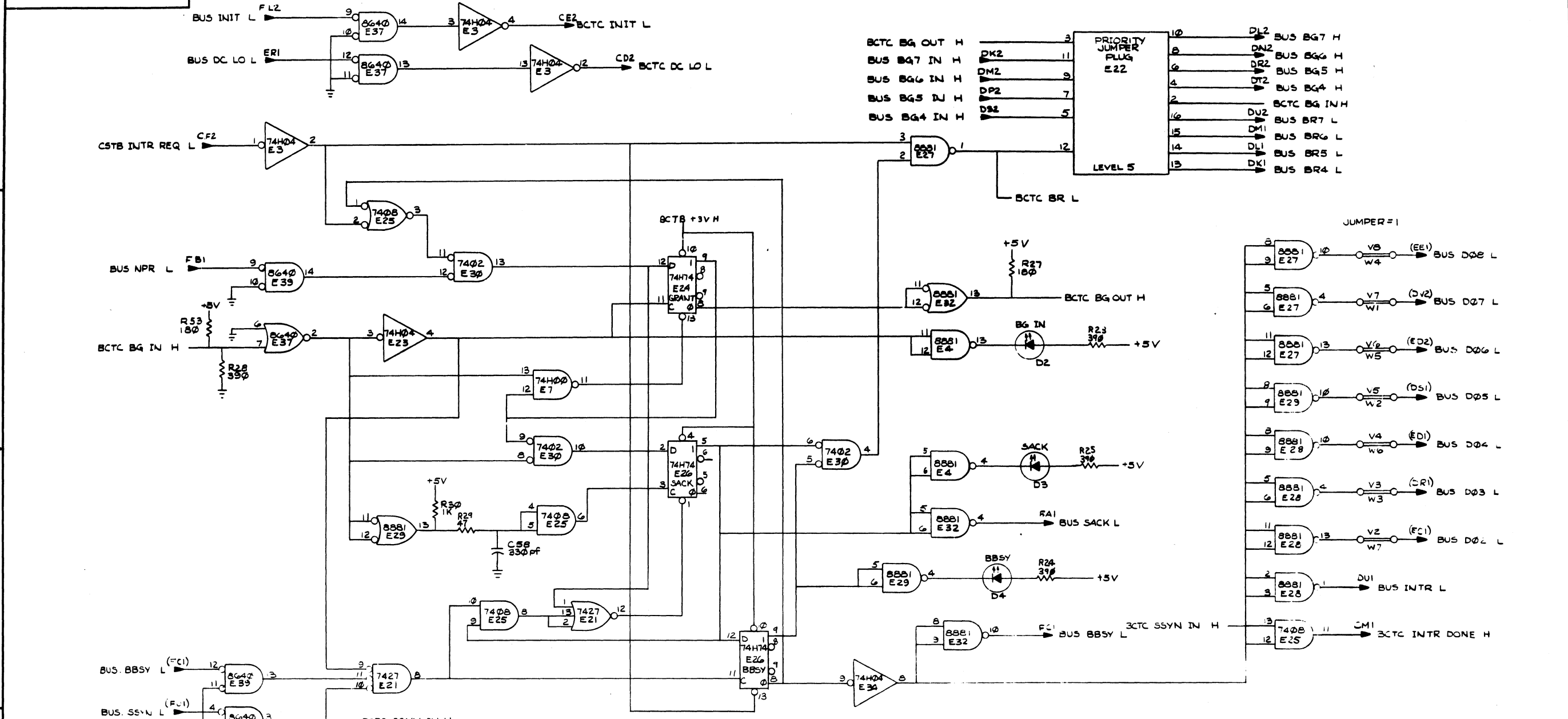
| CONTROLLER | A | B | C | D |
|------------|-----|-----|-----|-----|
| SLOT | C-F | C-F | C-F | C-F |
| | 27 | 31 | 35 | 39 |

(SSYN & DEMAND LOGIC)

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

| REVISIONS | | |
|-----------|-----------|-----|
| CHK | CHANGE NO | REV |
| | | |

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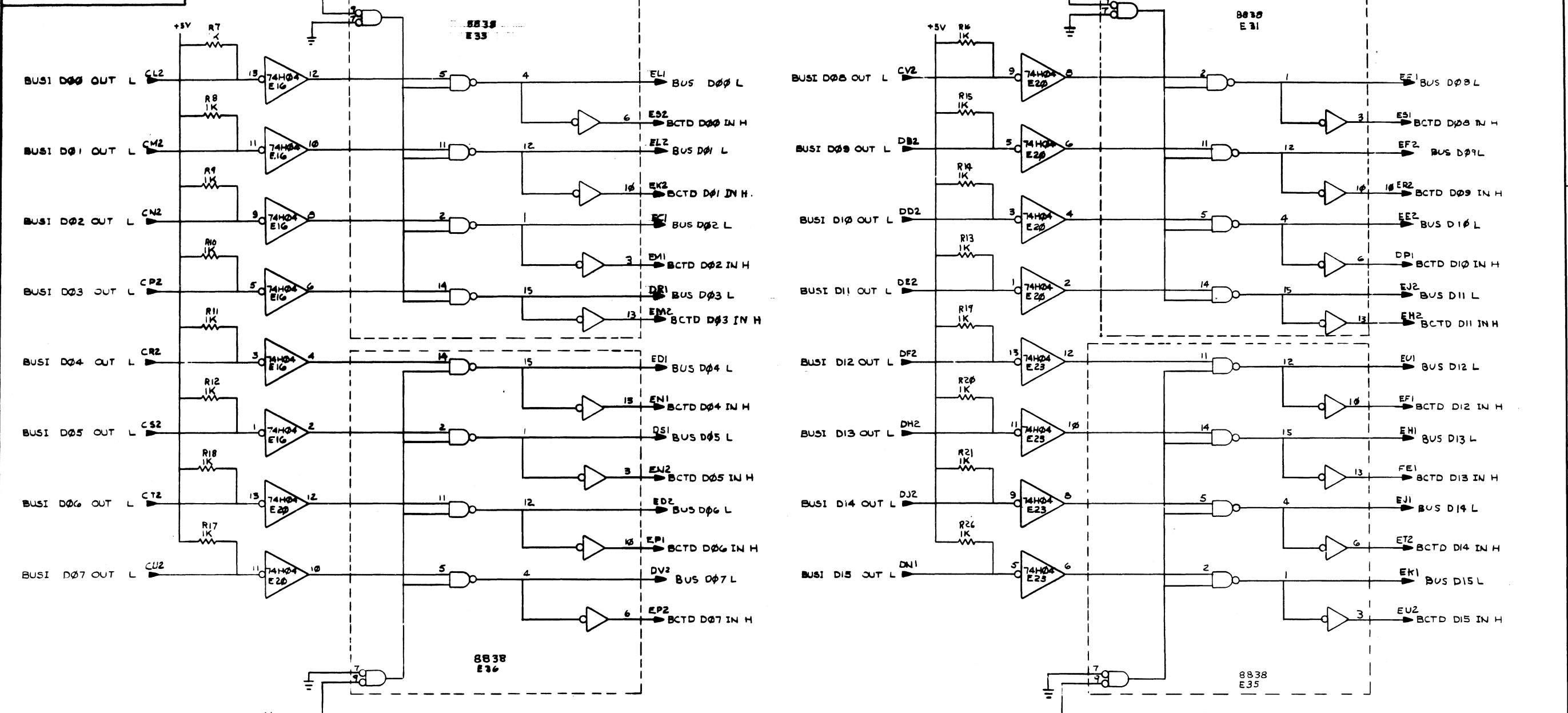


| CONTROLLER | A | B | C | D |
|------------|-----------|-----------|-----------|-----------|
| SLOT | C-F 27 | C-F 31 | C-F 35 | C-F 39 |

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

(UNIBUS INTERRUPT LOGIC)
 TITLE UNIBUS CONTROL (BCTC) SIZE CODE D CS 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. |
| | | |
| | | |

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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 (8228) | | | | | | | | |
|---------------------------------------|----|----|--------------|-----------|-----------|-----------|-----------|-----------|
| 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

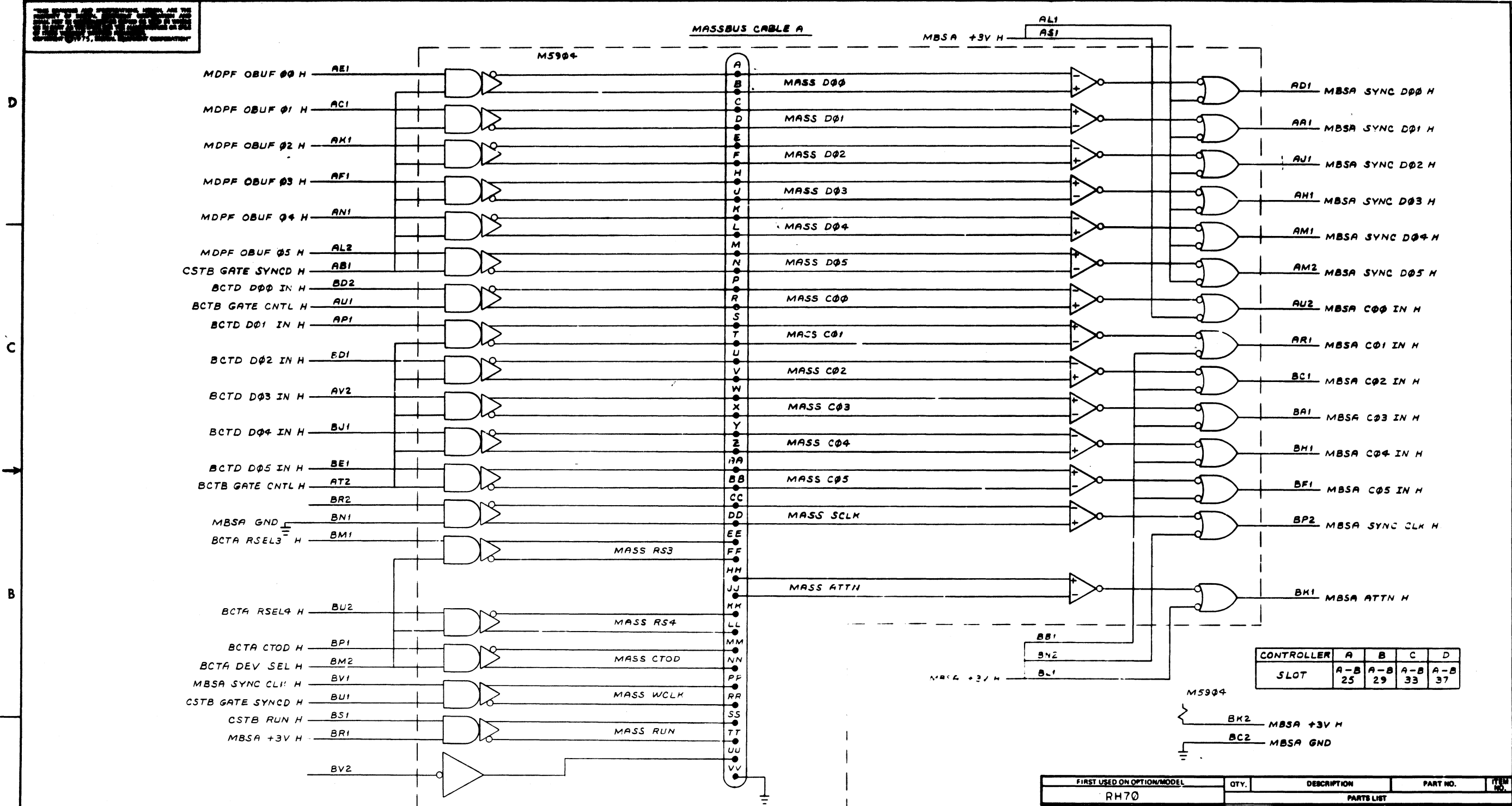
| CONTROLLER | A | B | C | D |
|------------|--------|--------|--------|--------|
| SLOT | C-F 27 | C-F 31 | C-F 35 | C-F 39 |

(PROM TRUTH TABLE)

| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

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

REV. 1
D CS M8153-0-1



REVISIONS

| REV. | CHANGE NO. |
|------|------------|
| | |

DEC FORM NO. 500 102 C

| FIRST USED ON OPTION/MODEL | QTY. | DESCRIPTION | PART NO. | ITEM NO. |
|----------------------------|------|----------------------------|----------|----------|
| RH70 | | MASSBUS TRANSCEIVER (MBSA) | | |

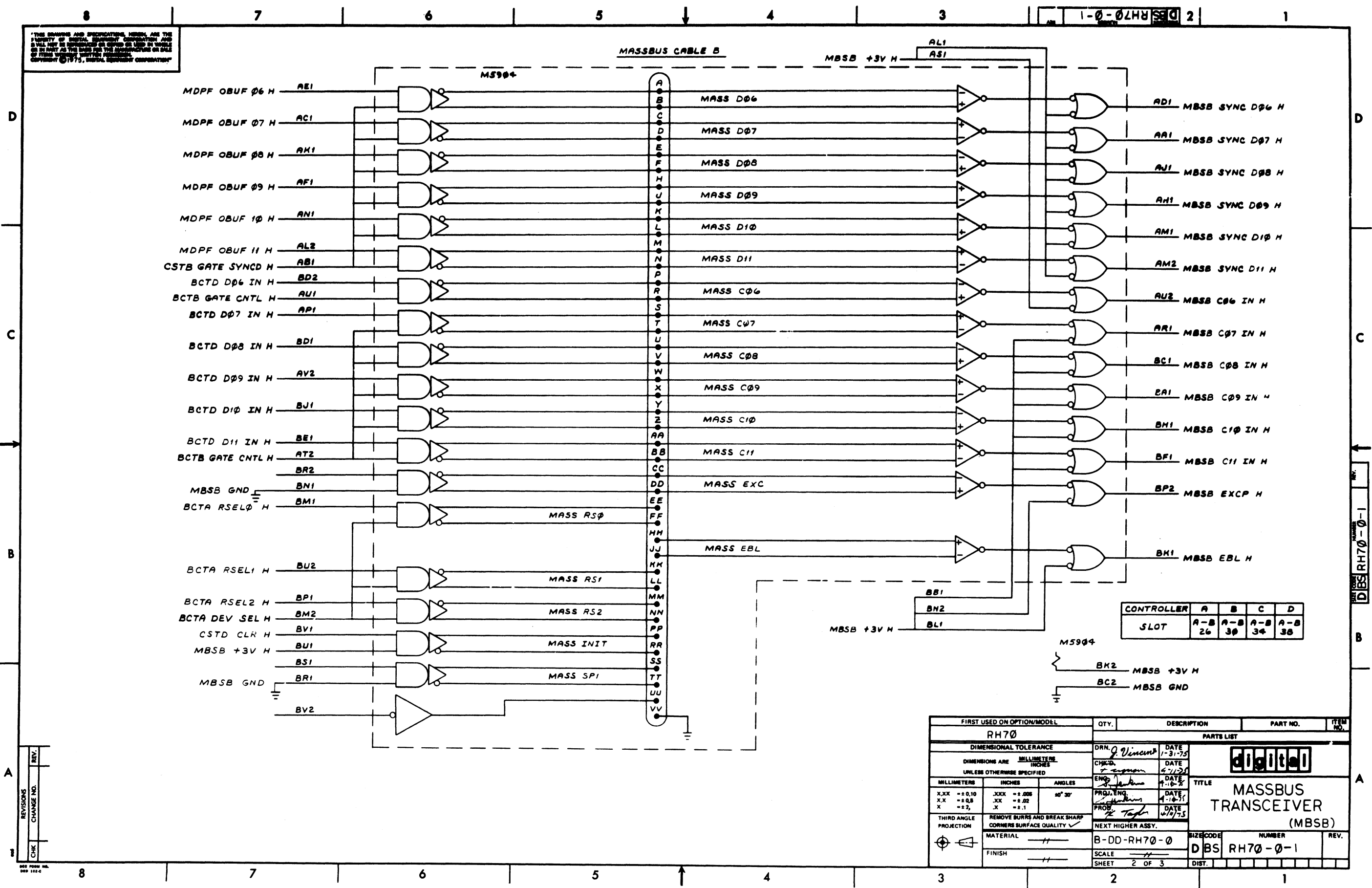
| DIMENSIONAL TOLERANCE | | DRN | DATE |
|---|----------|-------------------|---------|
| DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED | | <i>J. Vincent</i> | 1-31-75 |
| MILLIMETERS | | CHK'D | DATE |
| X,XX ±0.10 | XX ±0.05 | <i>J. Vincent</i> | 1-16-75 |
| XX ±0.5 | XX ±0.02 | PROJ ENGR | DATE |
| X ±2 | X ±0.1 | <i>J. Vincent</i> | 1-16-75 |
| | | PROJ | DATE |
| | | <i>J. Vincent</i> | 1-16-75 |

| TITLE | SIZE | CODE | NUMBER | REV. |
|----------------------------|------|--------|--------|----------|
| MASSBUS TRANSCEIVER (MBSA) | B-DD | RH70-0 | DBS | RH70-0-1 |


| THIRD ANGLE PROJECTION | REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY | NEXT HIGHER ASSY. |
|------------------------|--|-------------------|
| | | |

| FINISH | SCALT | SHEET | OF | DIST. |
|--------|-------|-------|----|-------|
| | | 1 | 3 | |

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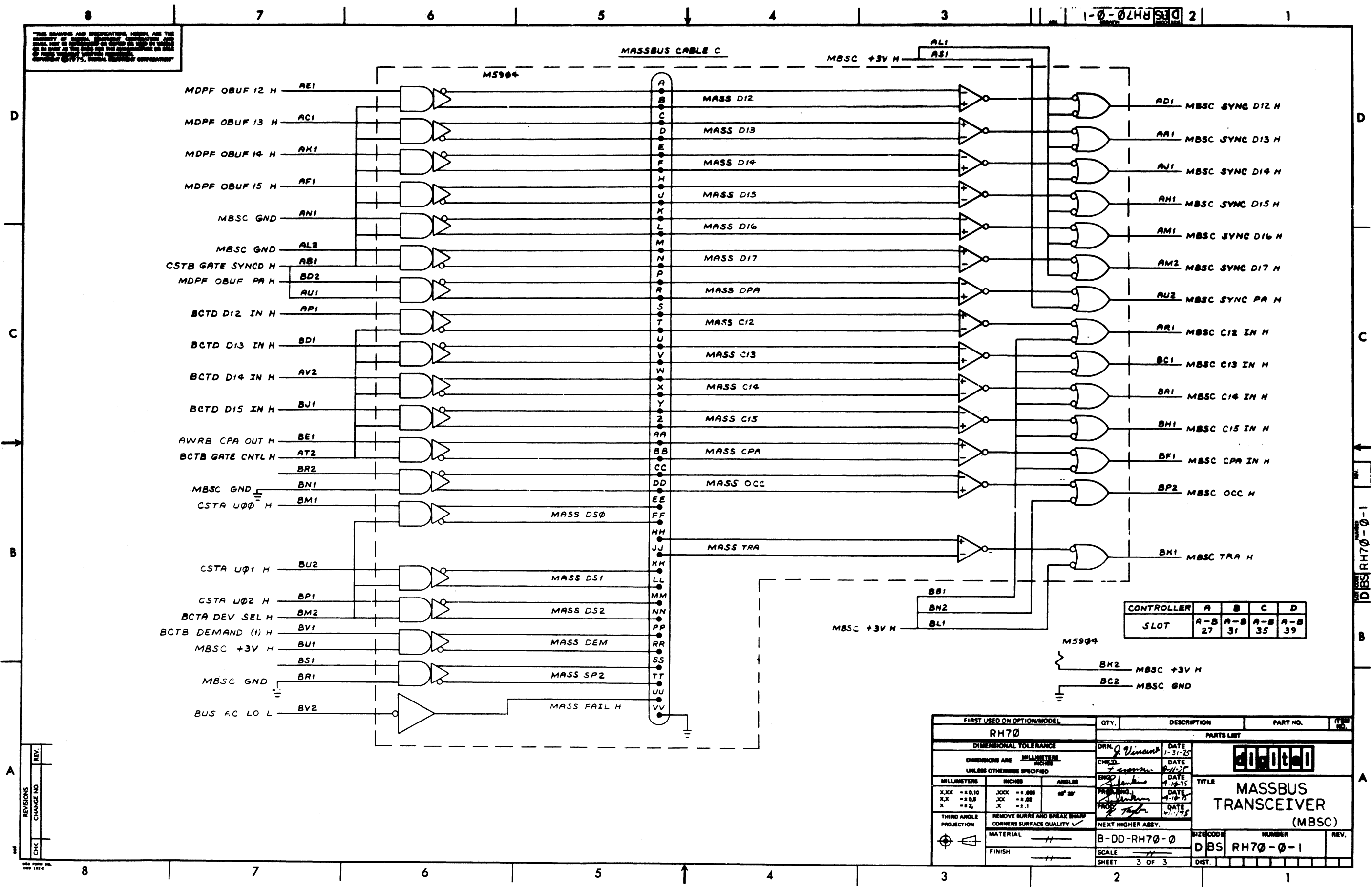
| CONTROLLER | A | B | C | D |
|------------|-----|-----|-----|-----|
| SLOT | A-B | A-B | A-B | A-B |
| | 26 | 30 | 34 | 38 |

| | | | | | |
|---|--|---------------------------|--------------|---|----------|
| FIRST USED ON OPTION/MODEL RH70 | | QTY. | DESCRIPTION | PART NO. | ITEM NO. |
| PARTS LIST | | | | | |
| DIMENSIONAL TOLERANCE | | DRN. <i>Q. Vincini</i> | DATE 1-31-75 |  | |
| DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED | | CHKD. <i>T. Simpson</i> | DATE 5-11-75 | | |
| MILLIMETERS | INCHES | ANGLES | DATE 4-16-75 | | |
| X,XX ±0.10 .XX ±0.5 X ±2 | .XX ±0.008 .XX ±0.02 .X ±0.1 | 40° 30' | DATE 4-16-75 | | |
| THIRD ANGLE PROJECTION | REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓ | PRGJ. ENG. <i>J. Tapp</i> | DATE 4-16-75 | TITLE MASSBUS TRANSCEIVER (MBSB) | |
| MATERIAL | | NEXT HIGHER ASSY. | | SIZE CODE | NUMBER |
| FINISH | | B-DD-RH70-0 | | DBS | RH70-0-1 |
| SCALE | | SHEET 2 OF 3 | | DIST. | REV. |

| | |
|------------|------|
| REVISIONS | REV. |
| CHANGE NO. | |
| CHK | |

980 FORM NO. 100-1

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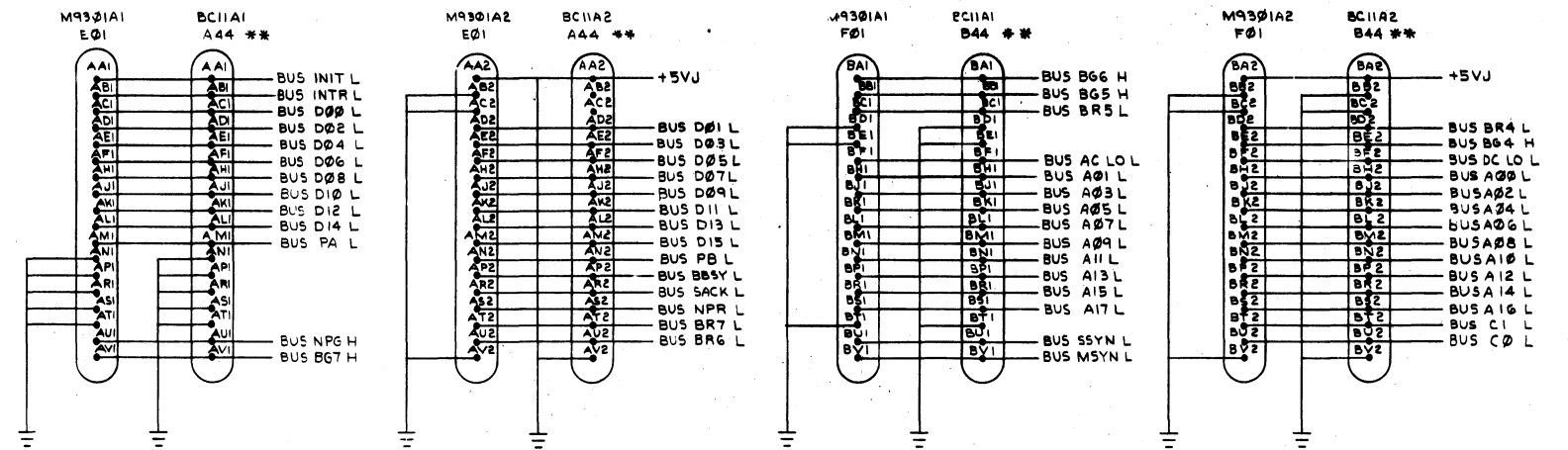
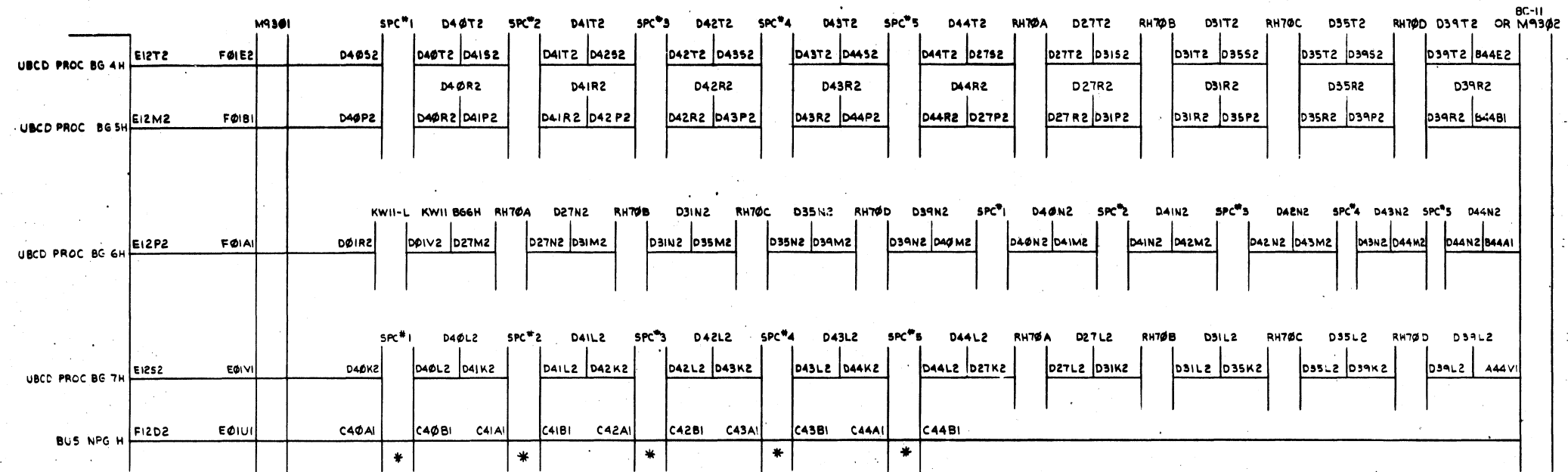


| CONTROLLER | A | B | C | D |
|------------|-----------|-----------|-----------|-----------|
| SLOT | A-B 27 | A-B 31 | A-B 35 | A-B 39 |

| FIRST USED ON OPTION/MODEL | QTY. | DESCRIPTION | PART NO. | ITEM NO. |
|---|-------------------------------------|------------------------------|--------------|----------------------------|
| RH70 | | | | |
| PARTS LIST | | | | |
| DIMENSIONAL TOLERANCE | | DRN. <i>J. Vincent</i> | DATE 1-31-75 | |
| DIMENSIONS ARE MILLIMETERS UNLESS OTHERWISE SPECIFIED | | CHKD. <i>J. Vincent</i> | DATE 2/1/75 | |
| MILLIMETERS | INCHES | ENCD. <i>J. Vincent</i> | DATE 7-18-75 | |
| XXX = ±0.10 XX = ±0.05 X = ±0.2 | XXX = ±.008 XX = ±.02 X = ±.1 | PROB. ENG. <i>J. Vincent</i> | DATE 7-10-75 | |
| THIRD ANGLE PROJECTION | | PROD. <i>J. Vincent</i> | DATE 6/1/75 | TITLE |
| REMOVES BURRS AND BREAK SHARP CORNERS SURFACE QUALITY | | NEXT HIGHER ASSY. | | MASSBUS TRANSCEIVER (MBCS) |
| MATERIAL | | B-DD-RH70-0 | SIZE CODE | NUMBER |
| FINISH | | SCALE | DBS | RH70-0-1 |
| | | SHEET 3 OF 3 | DIST. | REV. |

| 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.

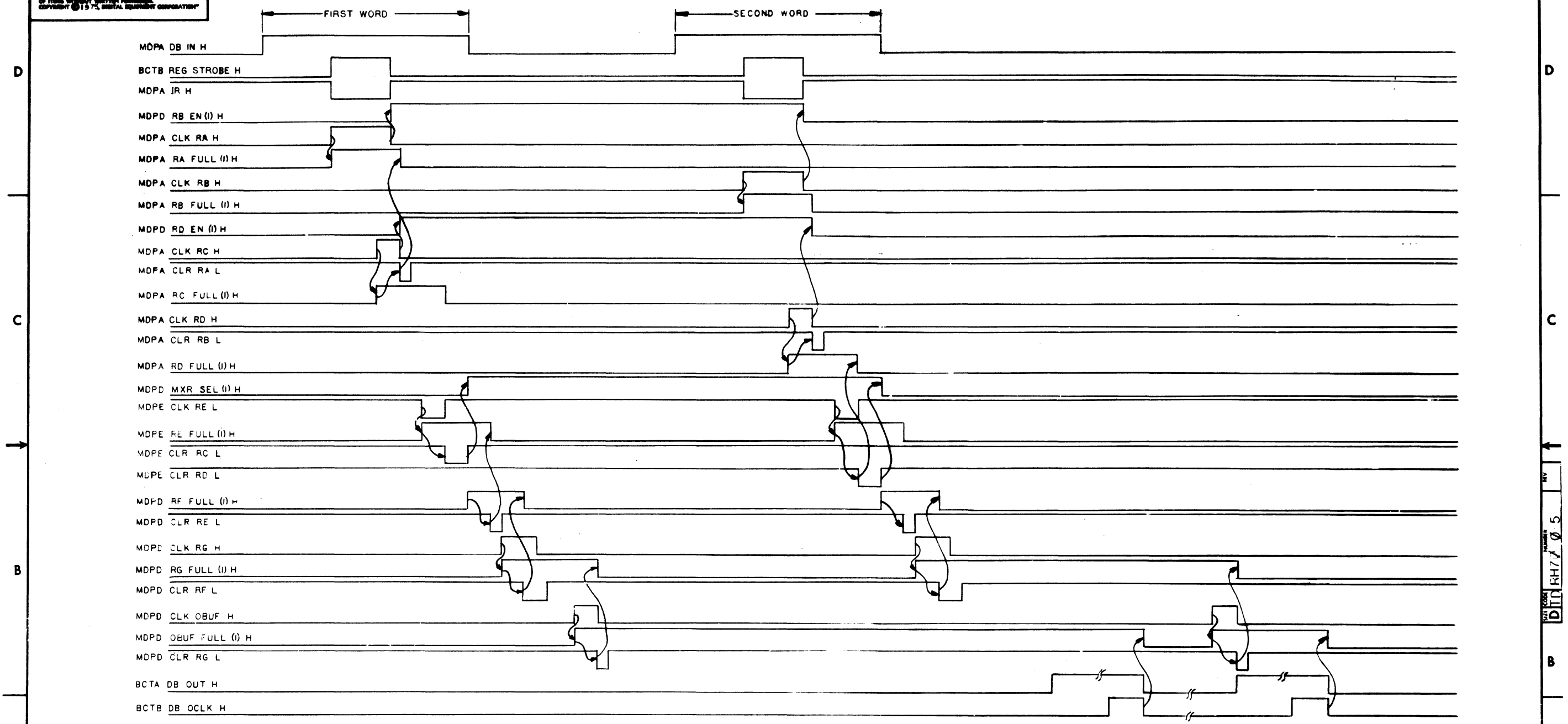
REVISIONS

| REV. | CHANGE NO. | DATE |
|------|------------|----------|
| 1 | 1 | 12/17/71 |

| FIRST USED ON OPTION/MODEL | QTY. | DESCRIPTION | PART NO. | ITEM NO. |
|---|------|--|---------------|-------------------------------------|
| KB11 | | | | |
| PARTS LIST | | | | |
| DIMENSIONAL TOLERANCE | | DRN: <i>W. Thellon</i> | DATE: 3/5/75 | |
| DIMENSIONS ARE UNLESS OTHERWISE SPECIFIED | | CHK'D: <i>W. Thellon</i> | DATE: 2/21/75 | |
| UNLESS OTHERWISE SPECIFIED | | ENG: <i>W. Thellon</i> | DATE: 3/11/75 | |
| | | PROJ. ENG: <i>W. Thellon</i> | DATE: 12/1/74 | |
| THIRD ANGLE PROJECTION | | REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓ | | TITLE: UNIBUS CABLE AND GRANT CHAIN |
| MATERIAL | | B-DD-KB11-B | | SIZE CODE: D I C |
| FINISH | | SCALE: NONE | | NUMBER: KB11-B-7 |
| | | SHEET 1 OF 1 | | REV. A |

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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. |
| PARTS LIST | | | | | |
| DIMENSIONAL TOLERANCE | | DRN. <i>W. Esposito</i> | DATE <i>3/19/75</i> | digital | |
| DIMENSIONS ARE MILLIMETERS INCHES | | CHK'D. <i>F. Taylor</i> | DATE <i>4-10-75</i> | | |
| UNLESS OTHERWISE SPECIFIED | | END. <i>J. Jenkins</i> | DATE <i>4-10-75</i> | | |
| MILLIMETERS | INCHES | ANGLES | DATE | TITLE | |
| X.XX = ±0.10 X.X = ±0.5 X = ±2 | .XXX = ±.005 .XX = ±.02 .X = ±.1 | 30° 30' | <i>4-10-75</i> | RH70 DATA BUFFER TIMING DIAG. | |
| THIRD ANGLE PROJECTION | REMOVE BURRS AND BREAK SHARP CORNERS SURFACE QUALITY ✓ | NEXT HIGHER ASSY. | DATE | REV. | |
| MATERIAL | FINISH | B-DD-RH70-0 | DATE | SIZE CODE NUMBER | |
| | | SCALE | DATE | D TD RH70-0-5 | |
| | | SHEET 1 OF 4 | DIST. | | |

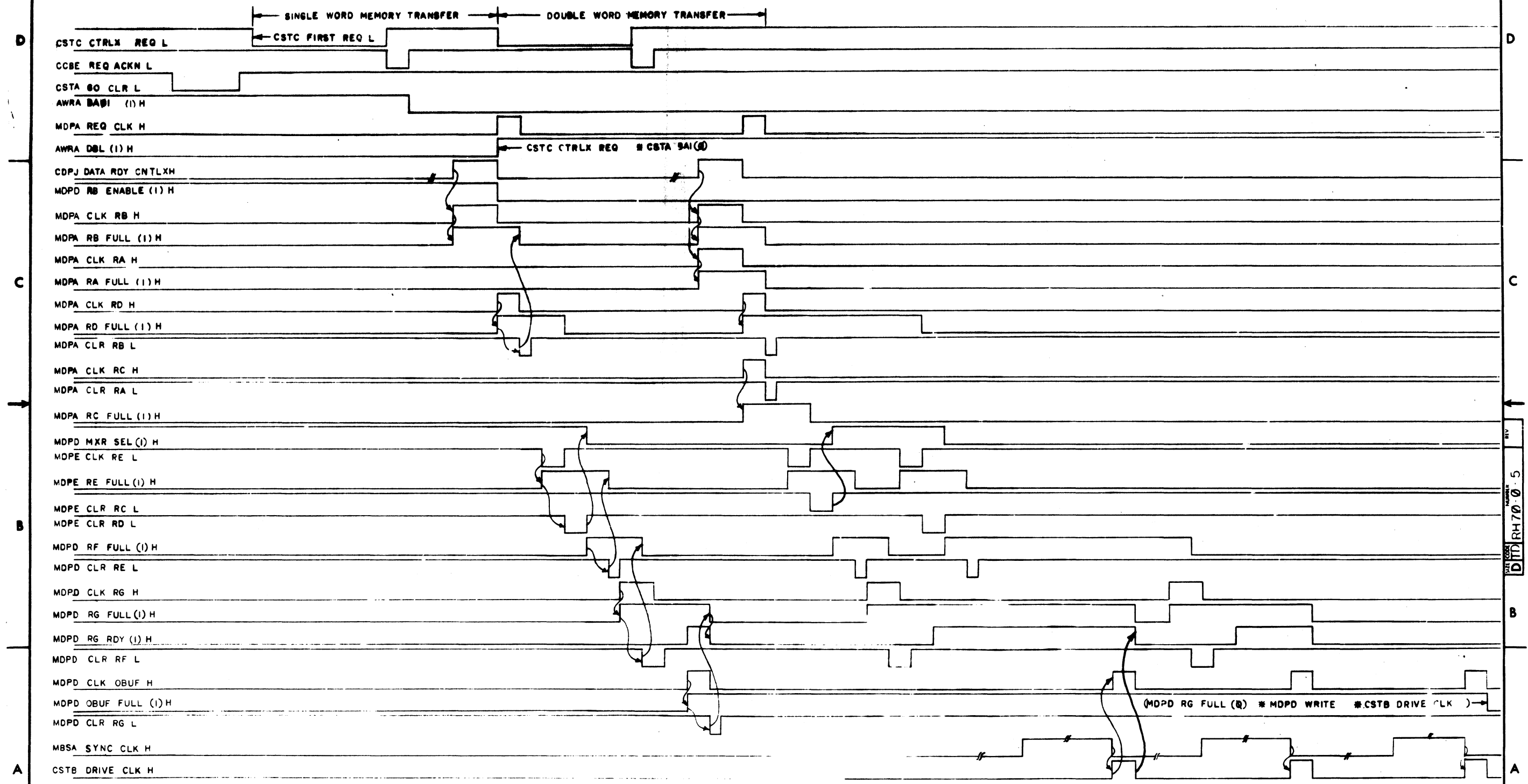
| | |
|------------|--|
| REV. | |
| CHANGE NO. | |
| CHK | |

REV. 5
 DTD RH70-0-5

THIS DRAWING AND SPECIFICATIONS HEREAFTER ARE THE PROPERTY OF THE UNITED STATES GOVERNMENT AND ARE TO BE USED IN WHOLE OR IN PART AS THE BASIS FOR THE MANUFACTURE OF BALL BEARING TYPE BALL BEARING OPERATOR

WRITE COMMAND DATA BUFFER TIMING

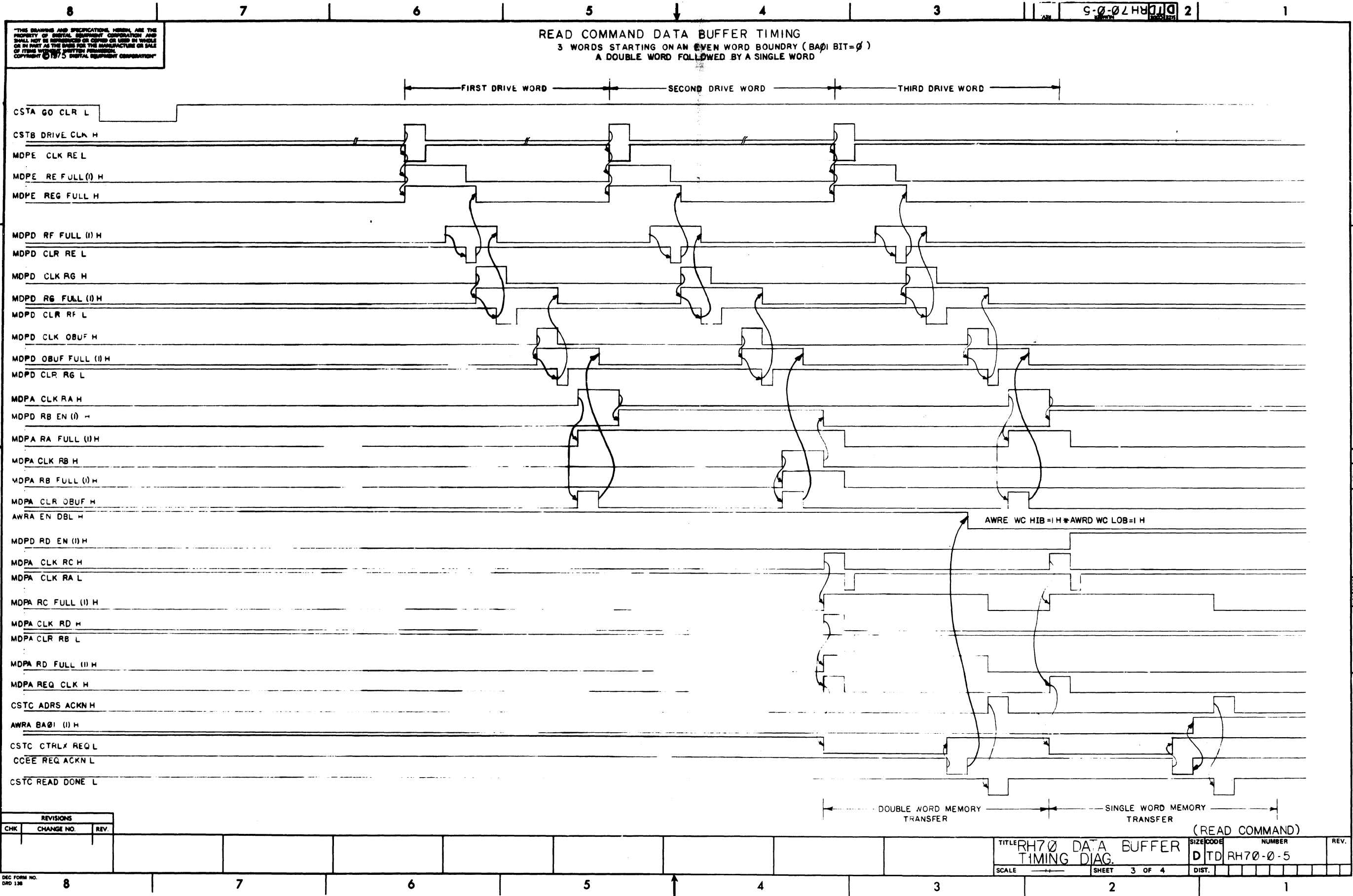
3 WORD WRITE STARTING ON AN ODD WORD BOUNDARY (BA#1 BIT=1)
A SINGLE WORD FOLLOWED BY A DOUBLE WORD



| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

| | | | | |
|-------------------------------|-------|------------|-------|------|
| TITLE | | NUMBER | | REV. |
| RH70 DATA BUFFER TIMING DIAG. | | D10 RH70-5 | | |
| SCALE | SHEET | OF | DIST. | |
| | 2 | 4 | | |

D10 RH70-5



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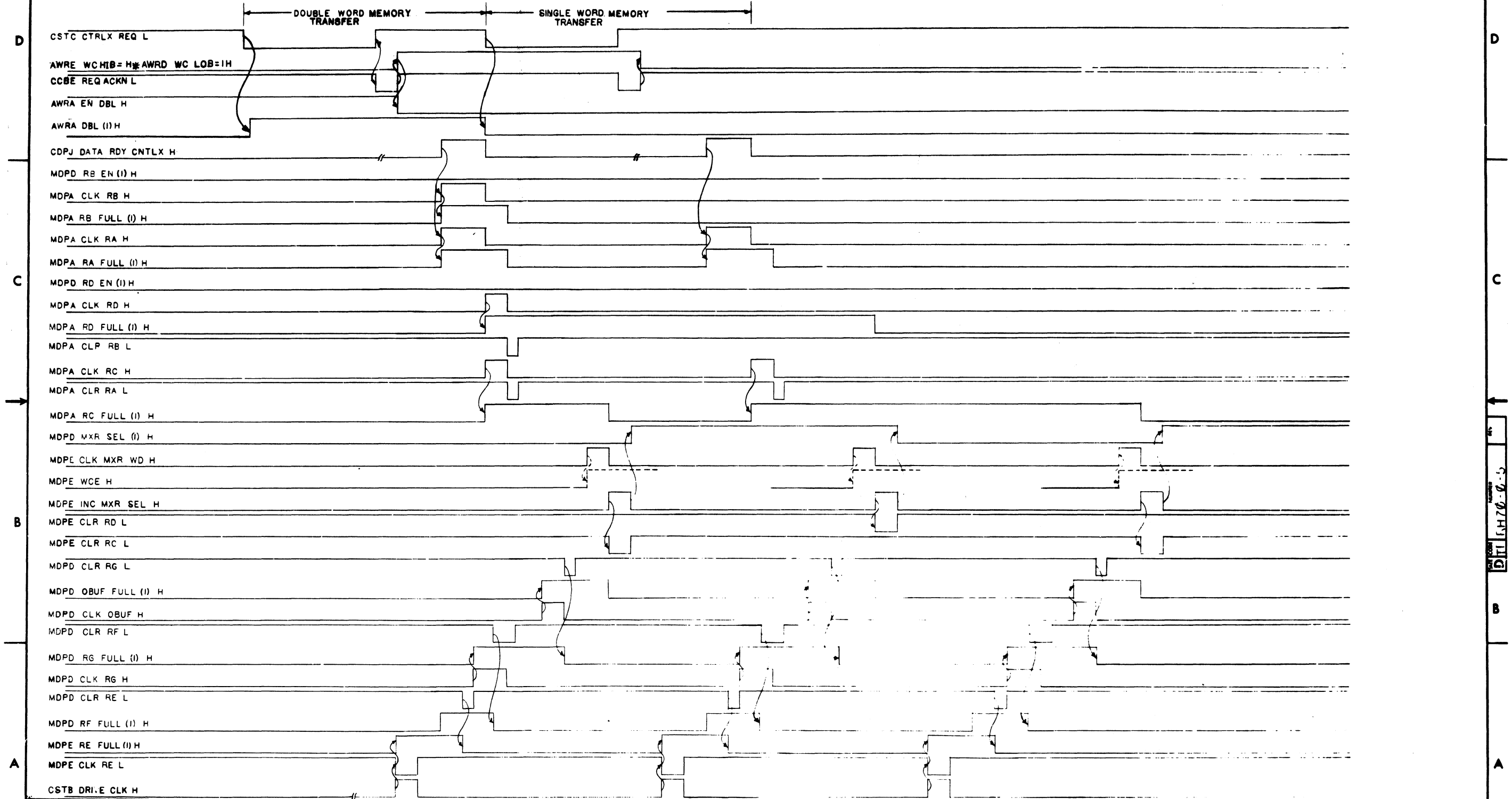
| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |
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| | | | | | | | |
|-------|-------------------------------|-----------|--------|--------|----------|------|--|
| TITLE | RH70 DATA BUFFER TIMING DIAG. | SIZE CODE | D TD | NUMBER | RH70-0-5 | REV. | |
| SCALE | --- | SHEET | 3 OF 4 | DIST. | | | |

DEC FORM NO. DFD 130

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WRITE CHECK DATA BUFFER TIMING
3 WORDS STARTING ON AN EVEN WORD BOUNDARY (8A0 BIT - 0)
A DOUBLE WORD FOLLOWED BY A SINGLE WORD

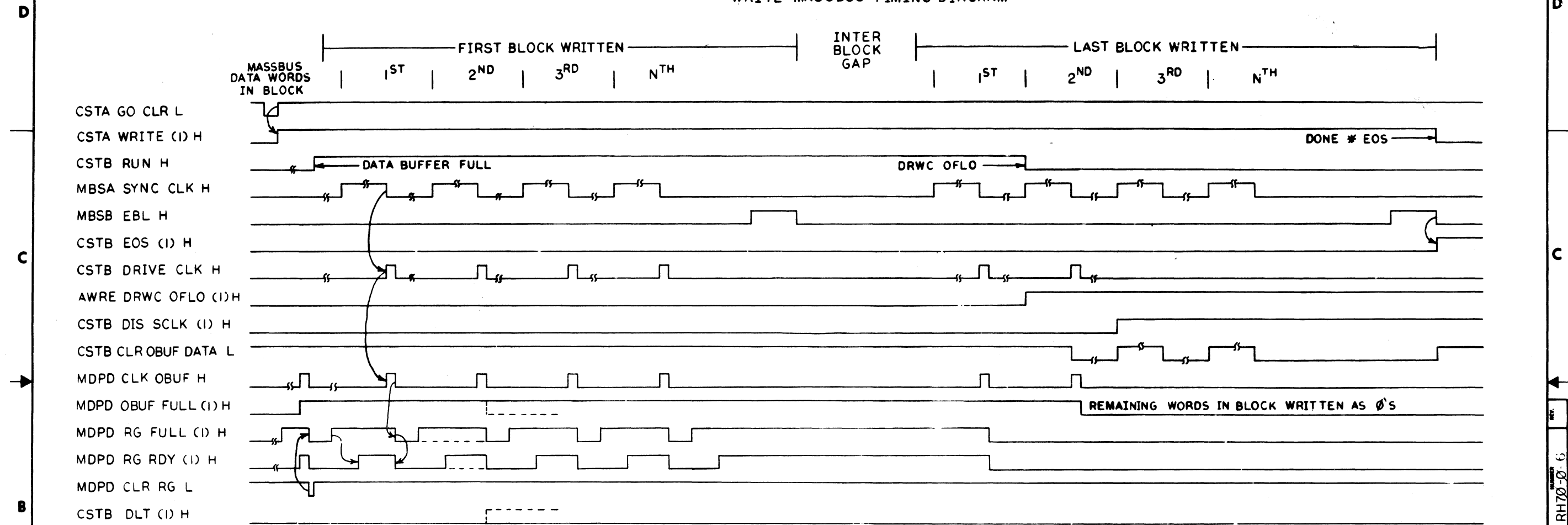


| REVISIONS | | |
|-----------|------------|------|
| CHK | CHANGE NO. | REV. |
| | | |

(WRITE CHECK COMMAND)

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WRITE MASSBUS TIMING DIAGRAM

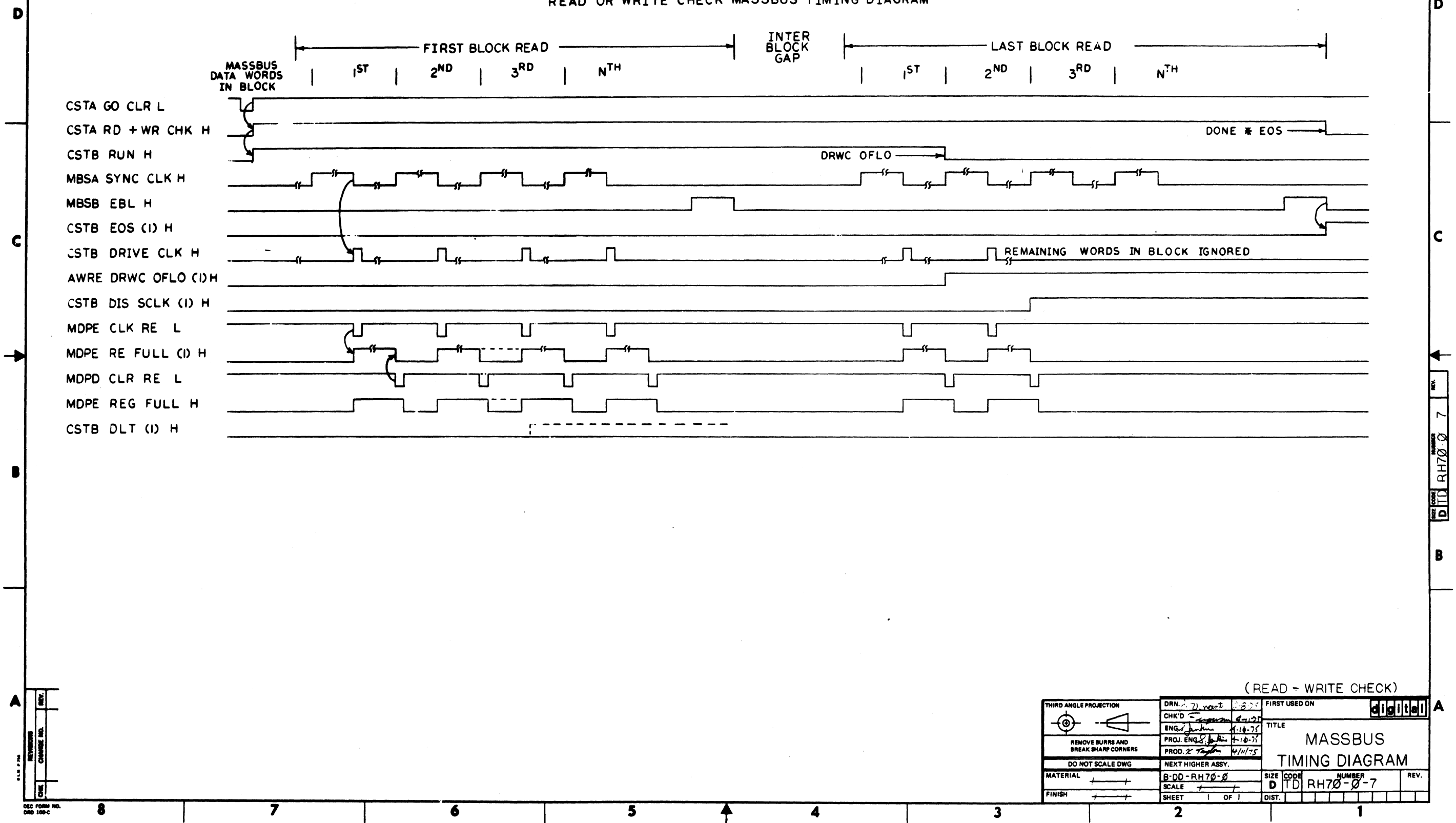


| | |
|------------------------|--------|
| REV. 1 | REV. 2 |
| CHG | CHG |
| DEC FORM NO. DRD 100-C | |

| | | |
|--------------------------------------|-------------------|------------------------------|
| THIRD ANGLE PROJECTION | DRN. | FIRST USED ON |
| REMOVE BURRS AND BREAK SHARP CORNERS | CHK'D | TITLE |
| DO NOT SCALE DWG | ENG. | WRITE MASSBUS TIMING DIAGRAM |
| MATERIAL | PROJ. ENG. | SIZE CODE |
| FINISH | PROD. 2 | D 10 RH70-0-6 |
| | NEXT HIGHER ASSY. | NUMBER |
| | B-DD-RH70-0 | 1 |
| | SCALE | DIST. |
| | SHEET 1 OF 1 | |

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READ OR WRITE CHECK MASSBUS TIMING DIAGRAM



(READ - WRITE CHECK)

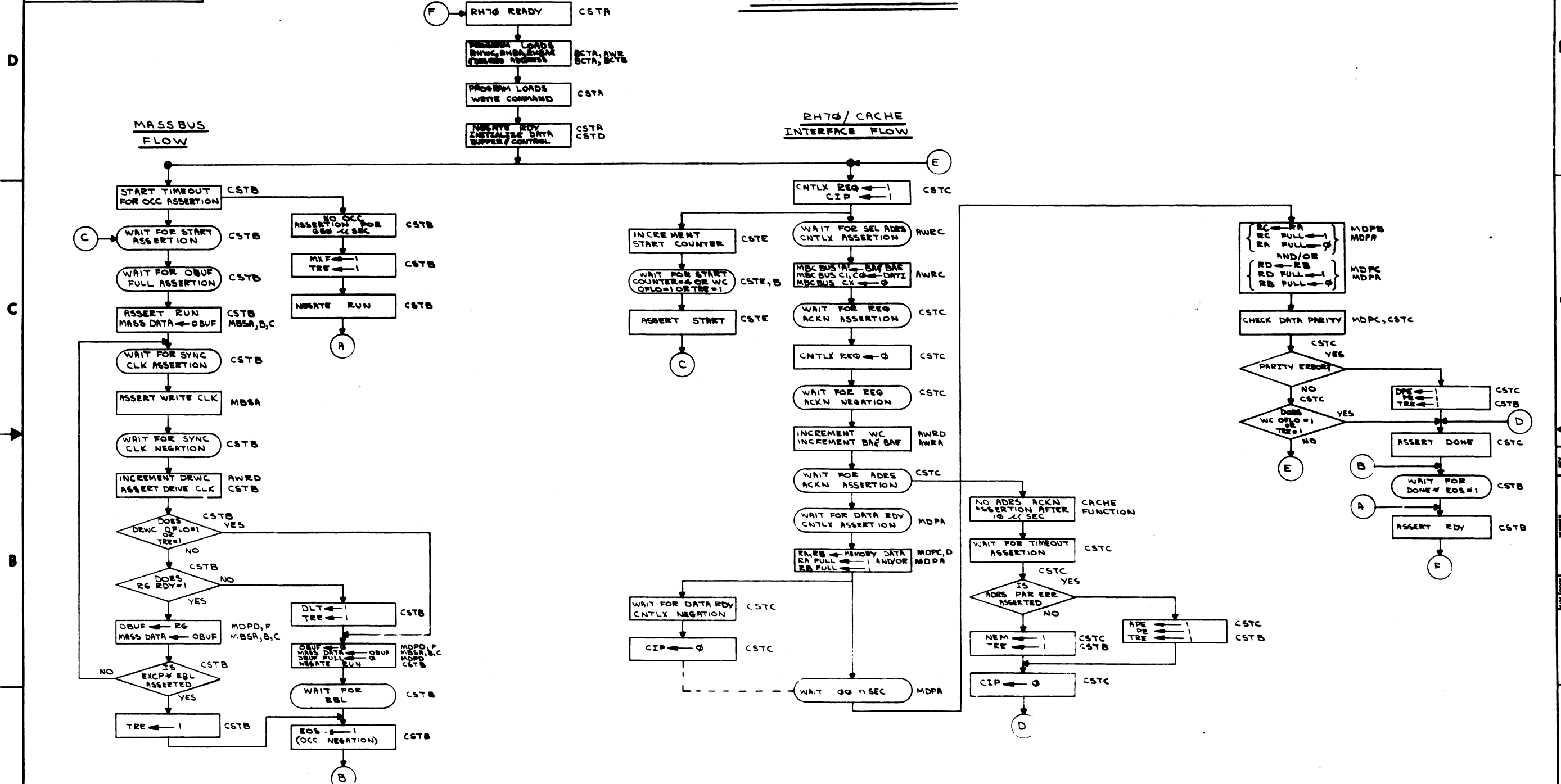
| | | | |
|--------------------------------------|---------------------------------------|-------------------|------------------------|
| THIRD ANGLE PROJECTION | DRN. <i>J. Vent</i> 4/10/75 | FIRST USED ON | digital |
| REMOVE BURRS AND BREAK SHARP CORNERS | CHK'D <i>[Signature]</i> 4/10/75 | TITLE | MASSBUS TIMING DIAGRAM |
| DO NOT SCALE DWG | PROJ. ENG. <i>[Signature]</i> 4/10/75 | NEXT HIGHER ASSY. | |
| MATERIAL | PROD. <i>[Signature]</i> 4/11/75 | MATERIAL | B-DD-RH70-0 |
| FINISH | | SCALE | |
| | | SHEET | 1 OF 1 |
| | | SIZE | D |
| | | CODE | TD |
| | | NUMBER | RH70-0-7 |
| | | REV. | |
| | | DIST. | |

SEE FORM NO. 000 100-C

DIGITAL RH70-0-7

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WRITE COMMAND

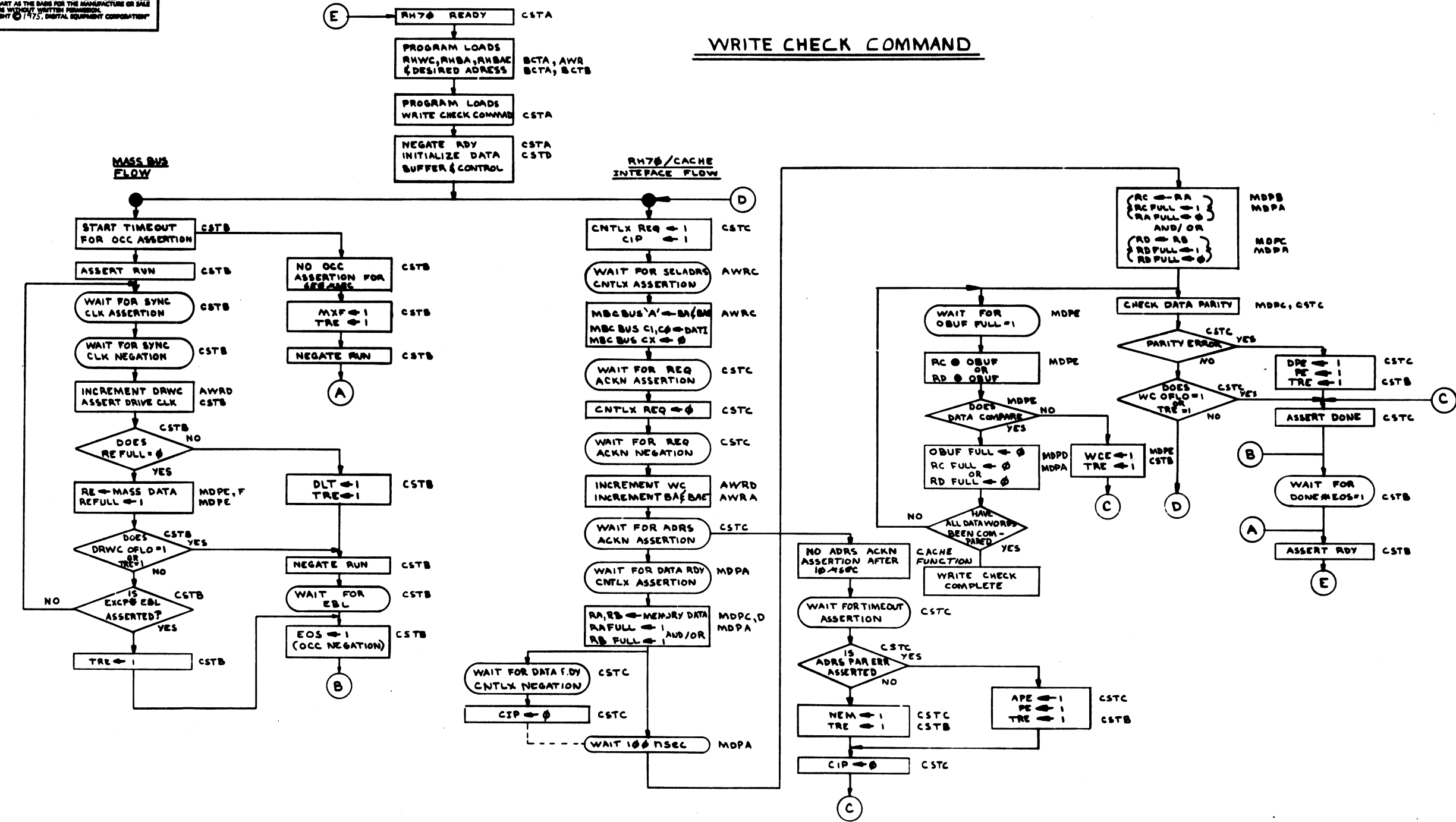


| | |
|------|--|
| REV. | |
| CHG. | |
| REV. | |
| CHG. | |

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

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WRITE CHECK COMMAND



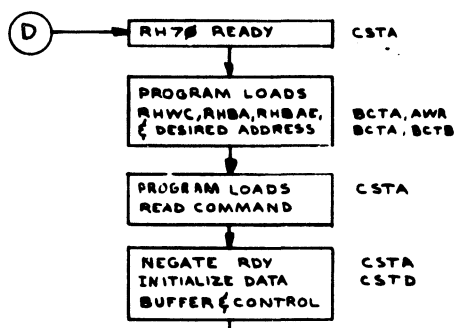
| | |
|------|--|
| REV. | |
| CHG | |
| REV. | |
| CHG | |

| | | | |
|--------------------------------------|---------------------------------------|--|--------------------|
| THIRD ANGLE PROJECTION | DRN. <i>[Signature]</i> 4-10-75 | FIRST USED ON | <i>[Signature]</i> |
| REMOVE BURRS AND BREAK SHARP CORNERS | CHK'D <i>[Signature]</i> 4-10-75 | TITLE WRITE CHECK COMMAND FLOW DIAGRAM | |
| DO NOT SCALE DWG | PROJ. ENG. <i>[Signature]</i> 4-10-75 | NEXT HIGHER ASSY. | |
| MATERIAL | SCALE | SIZE D | CODE FD |
| FINISH | SHEET OF 1 | DIST. | NUMBER RH70-0-3 |

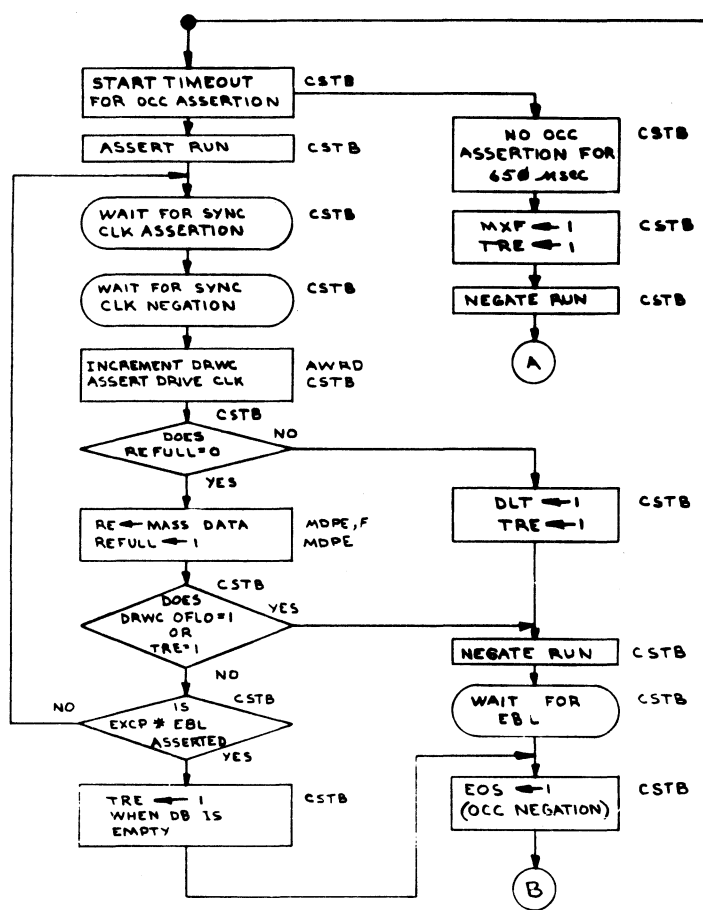
DEC FORM NO. DRD 130-C

READ COMMAND

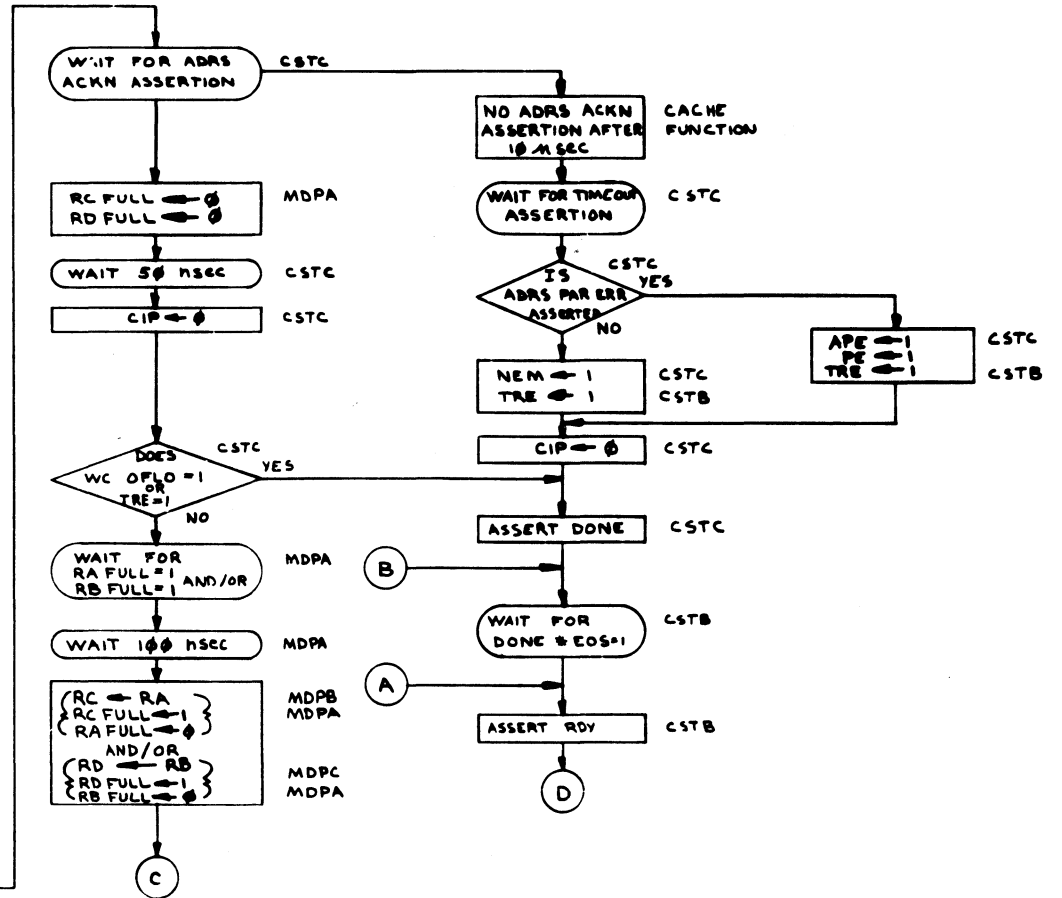
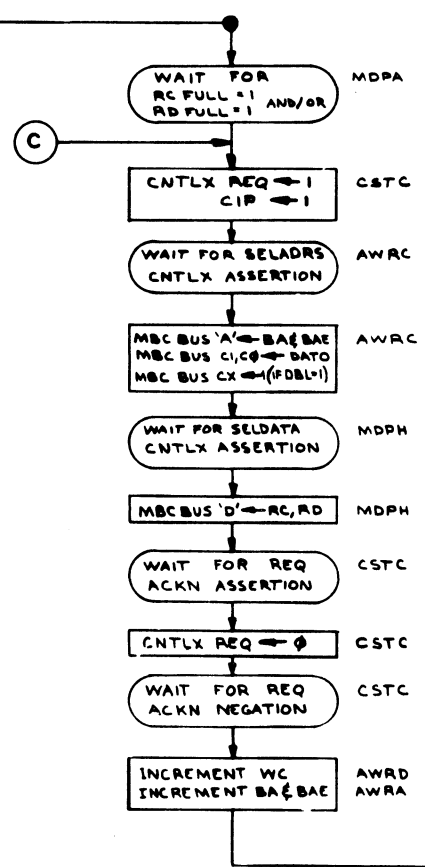
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MASS BUS FLOW



RH70 / CACHE INTERFACE FLOW



| | |
|------|--|
| REV. | |
| CHG. | |
| CHK. | |

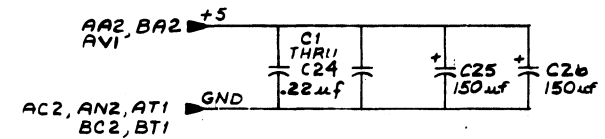
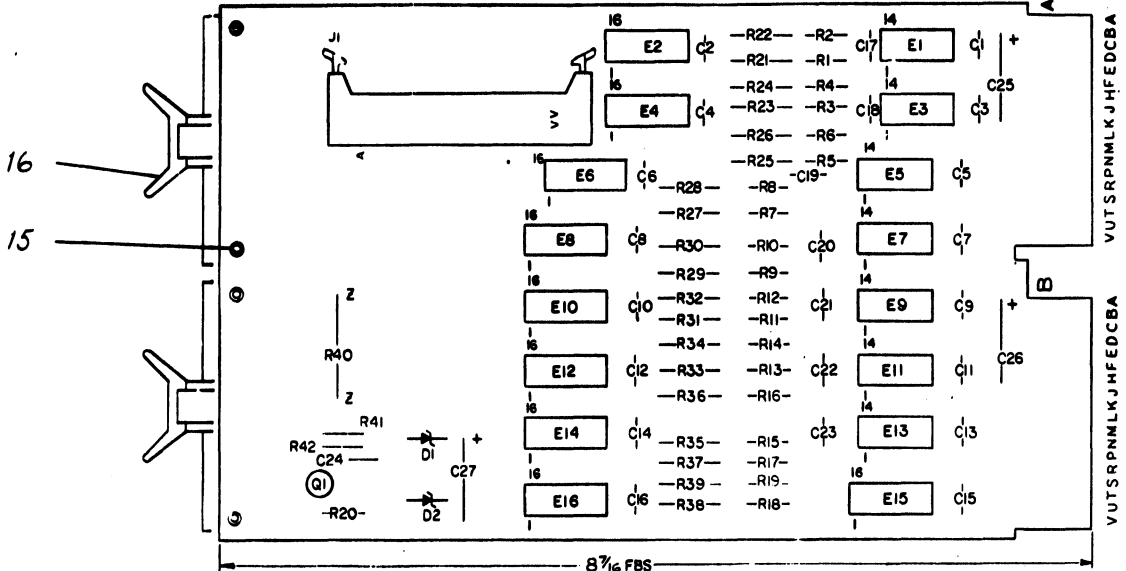
| | | |
|--------------------------------------|-------------------|---------------|
| THIRD ANGLE PROJECTION | DRN. | FIRST USED ON |
| REMOVE BURRS AND BREAK SHARP CORNERS | CHK'D | |
| DO NOT SCALE DWG | ENG. | |
| MATERIAL | PROJ. ENG. | |
| FINISH | PROD. & MFG. | |
| | NEXT HIGHER ASSY. | |
| | SCALE | SIZE |
| | SHEET | CODE |
| | OF | DIST. |
| | | NUMBER |
| | | REV. |

TITLE
READ COMMAND
FLOW DIAGRAM

SIZE D
CODE FD
NUMBER RH70-04
REV.

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NOTES:



| IC TYPE | 13 | 7 | 14 |
|-------------|-----|-----|-----|
| I.C. 75107B | | | |
| I.C. 75113 | | | |
| IC TYPE | -5V | GND | +5V |

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

IC PIN LOCATIONS

| CHK | CHANGE NO. | REV |
|--------------|------------|-----|
| T. STAMBAUGH | | |
| M5904-00004 | | F |
| D. POTTER | | E |
| M5904-00003 | | D |
| D. POTTER | | C |
| M5904-00002 | | B |
| M5904-00001 | | A |

| DEC NO. | EIA NO. | DEC NO. | EIA NO. |
|----------|---------|---------|---------|
| DEC 3646 | | | |

| DRN | DATE |
|------------|---------|
| J. Vincent | 4-27-73 |
| CHKD | DATE |
| ENG | DATE |
| PROJ. ENG. | DATE |
| PROD. | DATE |

digital EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS

CONTROLLER TRANSCEIVER

SIZE CODE: DCS M5904-0-1
NUMBER: 1
REV: F

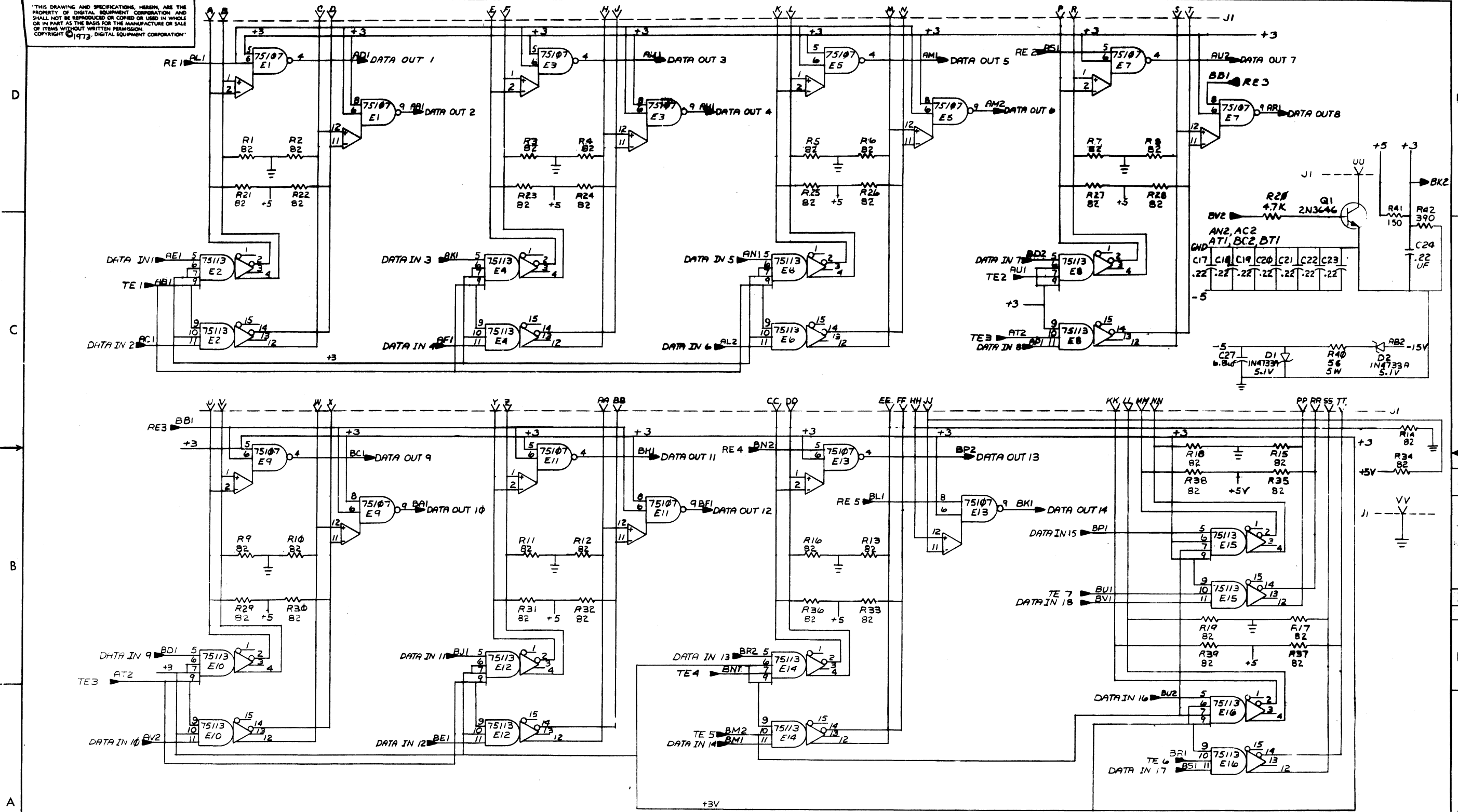
| REF | DESCRIPTION | PART NO. | ITEM NO. |
|-----|------------------------------------|-----------------------------|----------|
| REF | X-Y COORDINATE HOLE LOCATION | K-CO-M5904-0-1 | 1 |
| REF | ASSY/DRILLING HOLE LAYOUT | D-AM-M5904-0-5 | 2 |
| REF | MODULE ECO HISTORY | B-MH-M5904-0-6 | 3 |
| 1 | ETCHED CIRCUIT BOARD | 5010503 | 4 |
| 2A | C1 THRU C24 | CAP. .22µf 20% 50V DISC | 5 |
| 2 | D1, D2 | DIODE ZENER 1N4733A 5.1V 1W | 7 |
| 19 | R21 THRU R29 | RES. 82 5% 1/4W | 8 |
| 19 | R1 THRU R19 | RES. 82 5% 1/4W | 9 |
| 1 | R41 | RES. 150 5% 1/4W | 10 |
| 1 | R42 | RES. 390 5% 1/4W | 11 |
| 1 | R40 | RES. 56 5% 5W | 12 |
| 7 | E1, E3, E6, E7, E9, E11, E13 | I.C. DEC 75107B | 13 |
| 9 | E2, E4, E5, E8, E10, E12, E14, E15 | I.C. DEC 75113 | 14 |
| 4 | EYELET | 9006732 | 15 |
| 2 | HANDLE, FLIP-CHIP MAGENTA | 9008337-06 | 16 |
| 1 | J1 | CONN. (40 PIN) | 17 |
| 2 | C25, C26 | CAP. 150µf 20% 6V | 18 |
| 1 | Q1 | TRANS. DEC 2N3646 | 19 |
| 1 | R20 | RES. 4.7K 5% 1/4W | 20 |
| 1 | C27 | CAP. 6.8µf 35V 5.TANT | 21 |
| 1 | CLIP | 1209941-3 | 22 |
| 1 | CLIP | 1209941-4 | 23 |

| QTY | REF DESIGNATION | DESCRIPTION | PART NO. | ITEM NO. |
|-----|-----------------|------------------|----------|----------|
| | RH11 | ETCH BOARD REV F | | |

SEMICONDUCTOR CONVERSION CHART

DCS M5904-0-1 REV F

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| REVISIONS | | |
|-----------|-----------|-----|
| CHK | CHANGE NO | REV |
| | | |

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

DCS M5904-0-1 F

