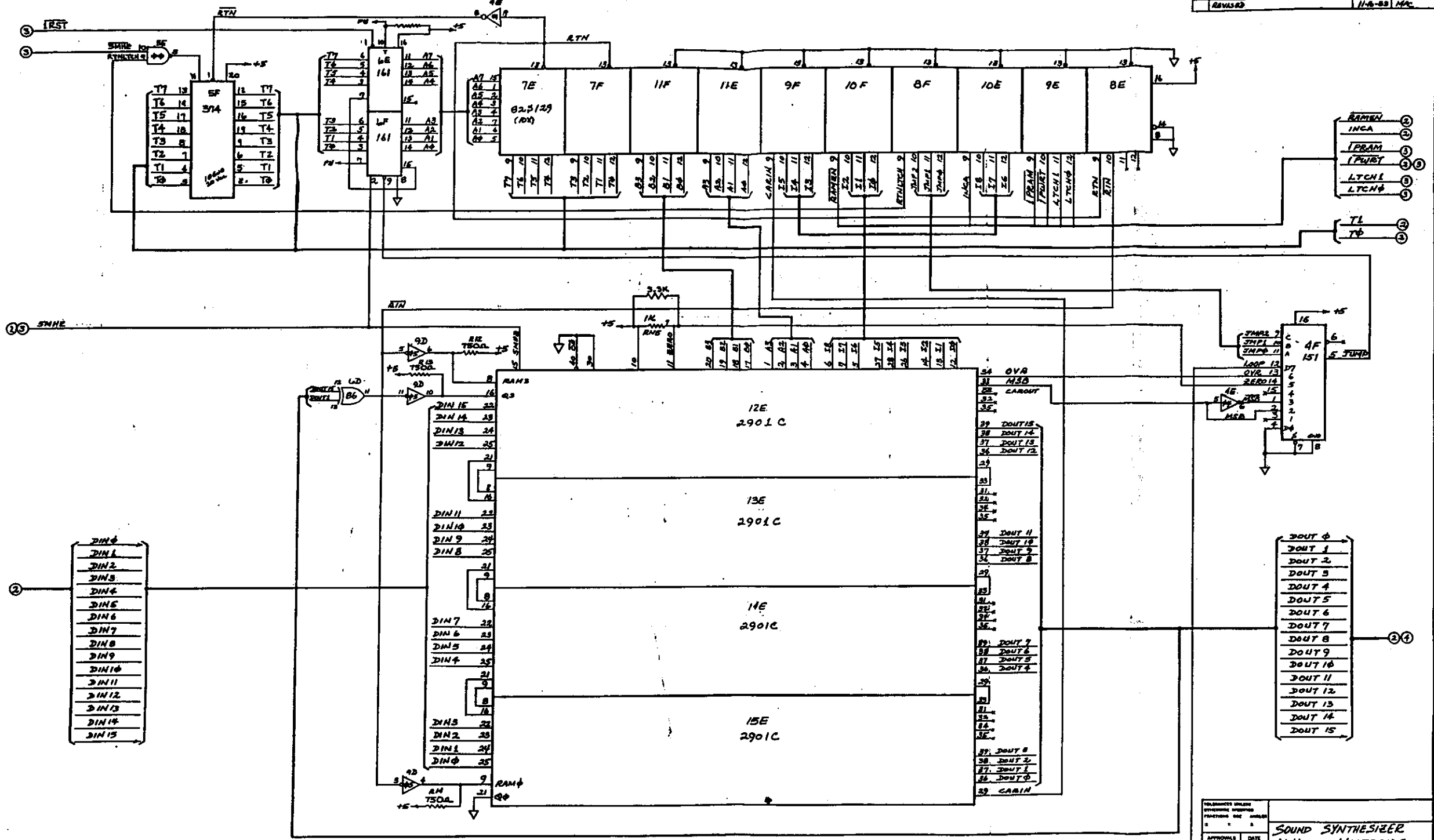
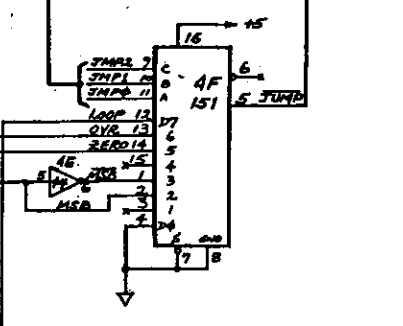


| REVISIONS | | | |
|-----------|-------------|---------|----------|
| REV | DESCRIPTION | DATE | APPROVED |
| 1 | REVISED | 11-6-83 | MAL |



- RAMEN ②
- INCA ②
- IPRAM ③
- IPWRT ③
- LTCN1 ④
- LTCN2 ④
- TL ③
- TP ③

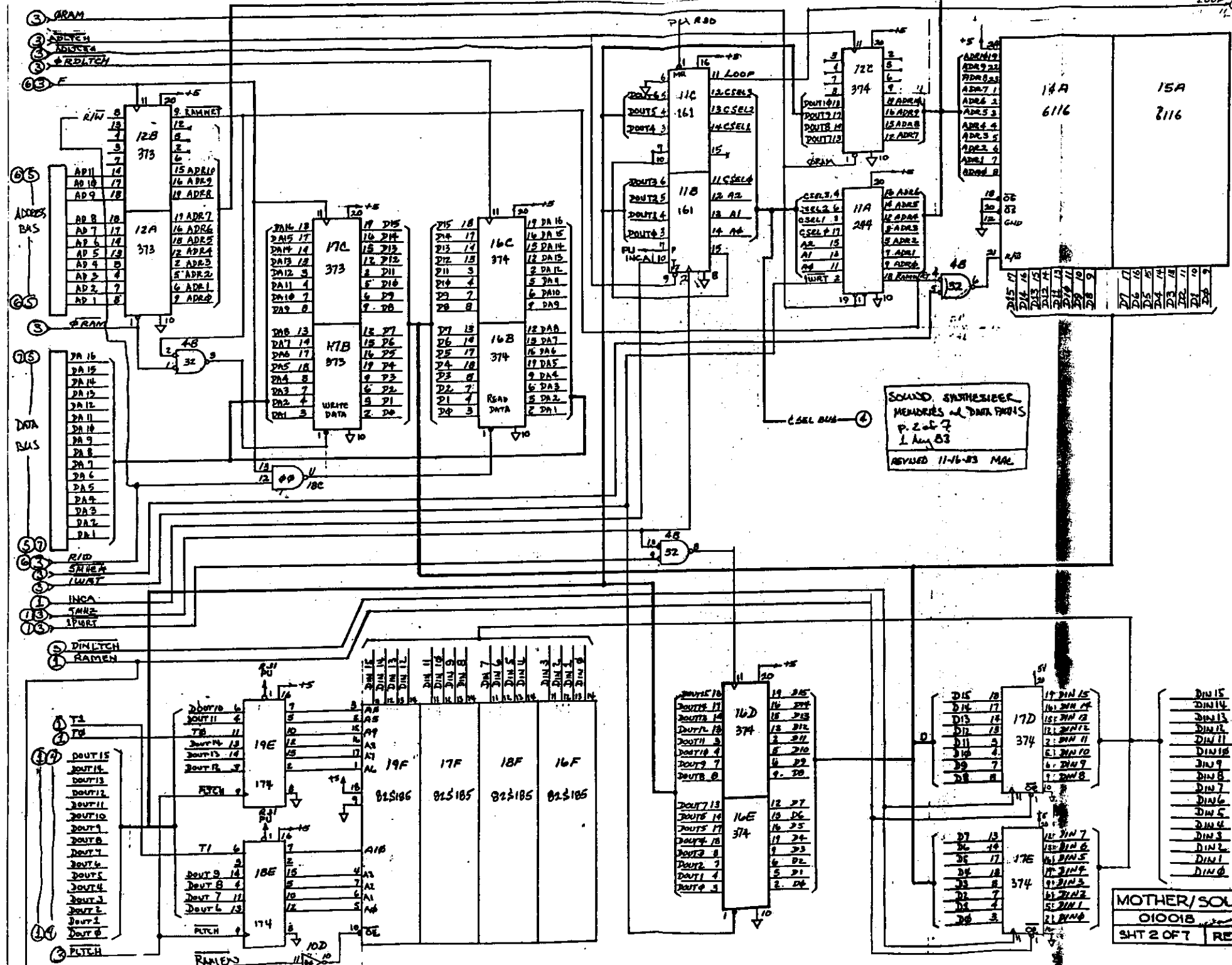


- DOUT 0
- DOUT 1
- DOUT 2
- DOUT 3
- DOUT 4
- DOUT 5
- DOUT 6
- DOUT 7
- DOUT 8
- DOUT 9
- DOUT 10
- DOUT 11
- DOUT 12
- DOUT 13
- DOUT 14
- DOUT 15

| | | | |
|----------------------|--|--------------|--------|
| APPROVALS | | DATE | REV |
| DESIGNED | | 11/6/83 | 5 |
| CHECKED | | | |
| SCALE | | D | 010018 |
| DO NOT SCALE DRAWING | | SHEET 1 OF 7 | |

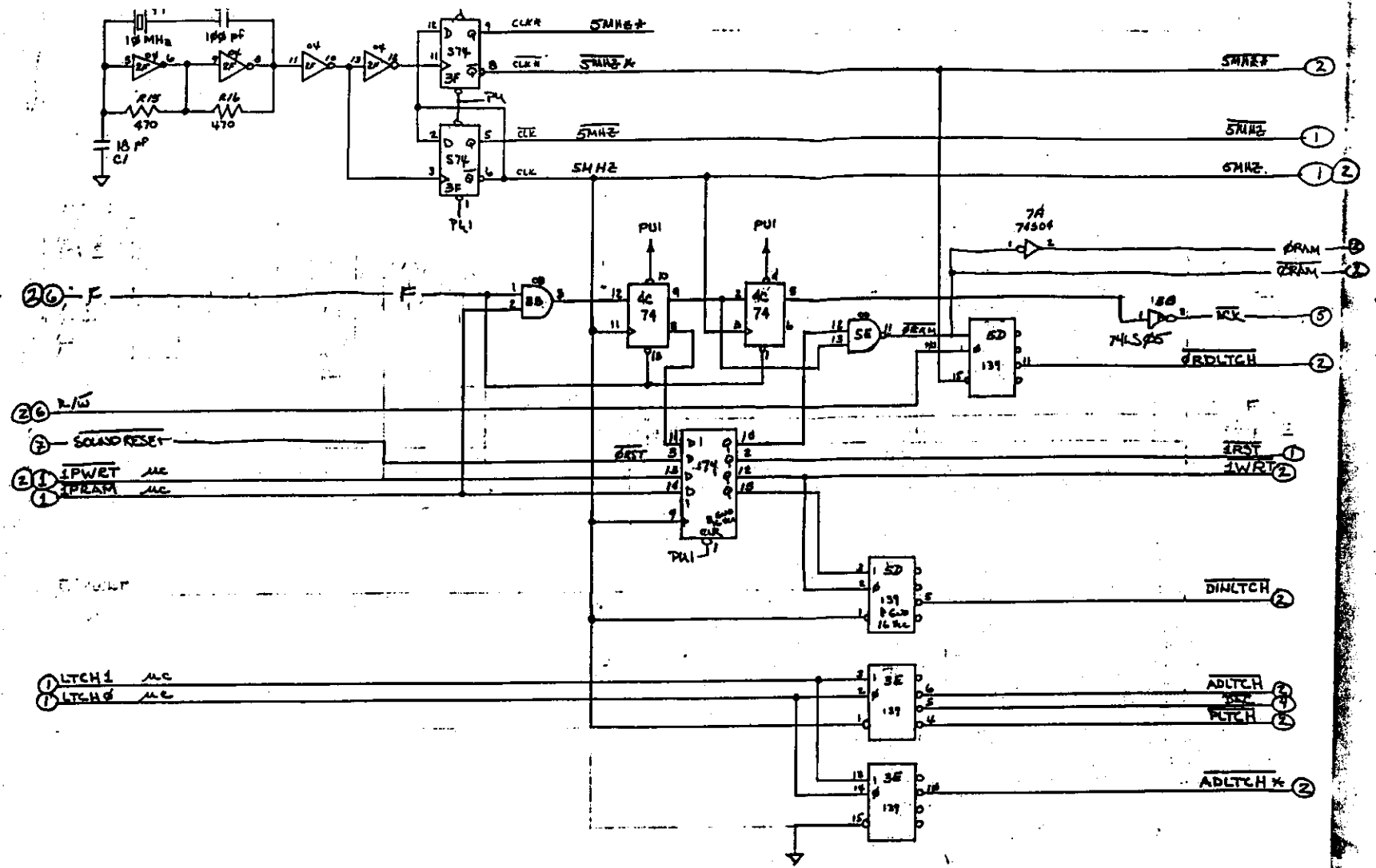
**SOUND SYNTHESIZER
ALU AND MICROCODE**

Loop



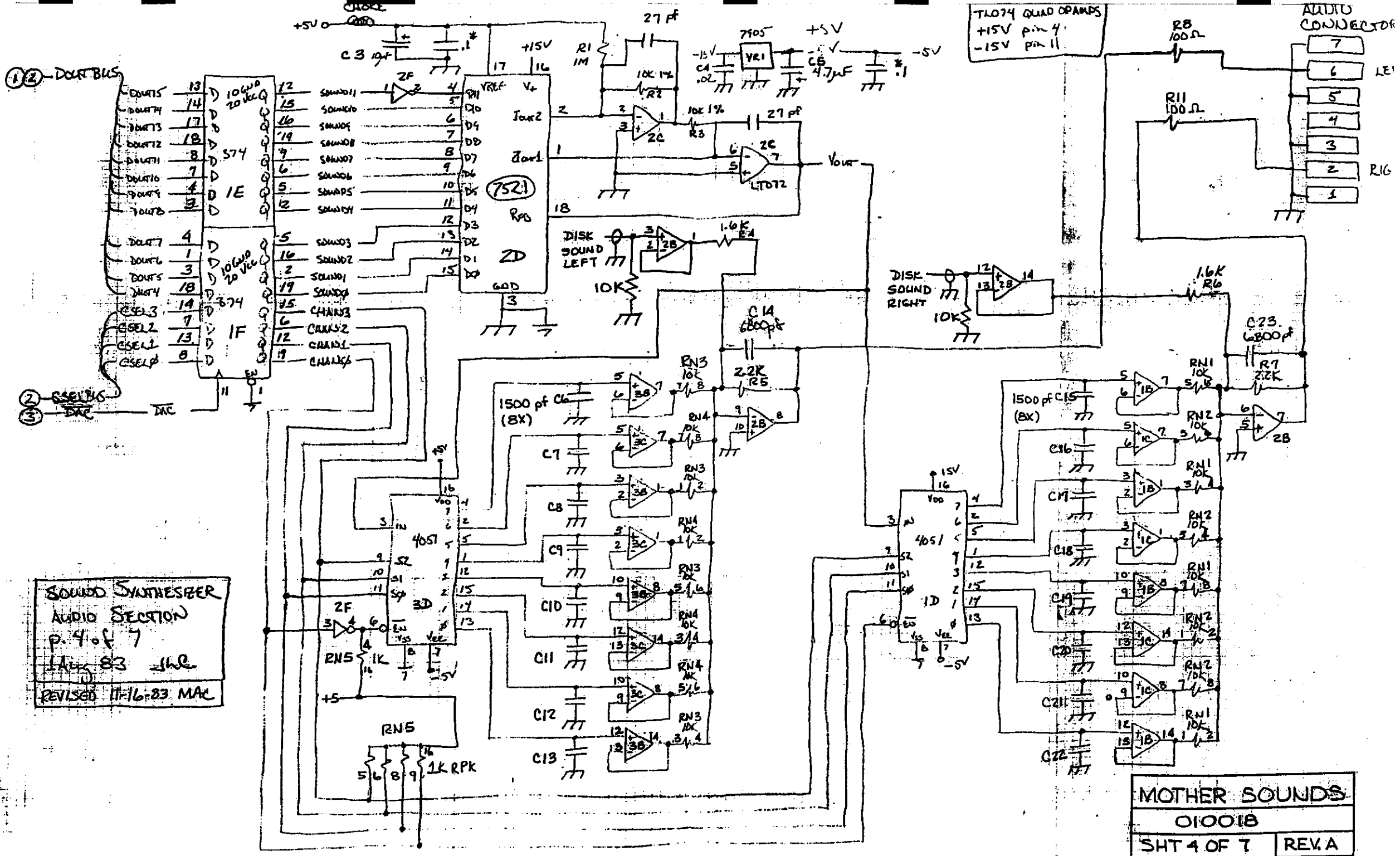
SOUND SYNTHESIZER
MEMORIES & DATA PARTS
p. 2 of 7
1 Aug 83
REVISED 11-16-83 MAC

MOTHER/SOUNDS
010018
SHT 2 OF 7 REV. A



SOUND SYNTHESIZER
 CONTROLLER
 P. 3 of 7
 1 Aug 83
 REVISED 11-16-83 MAZ

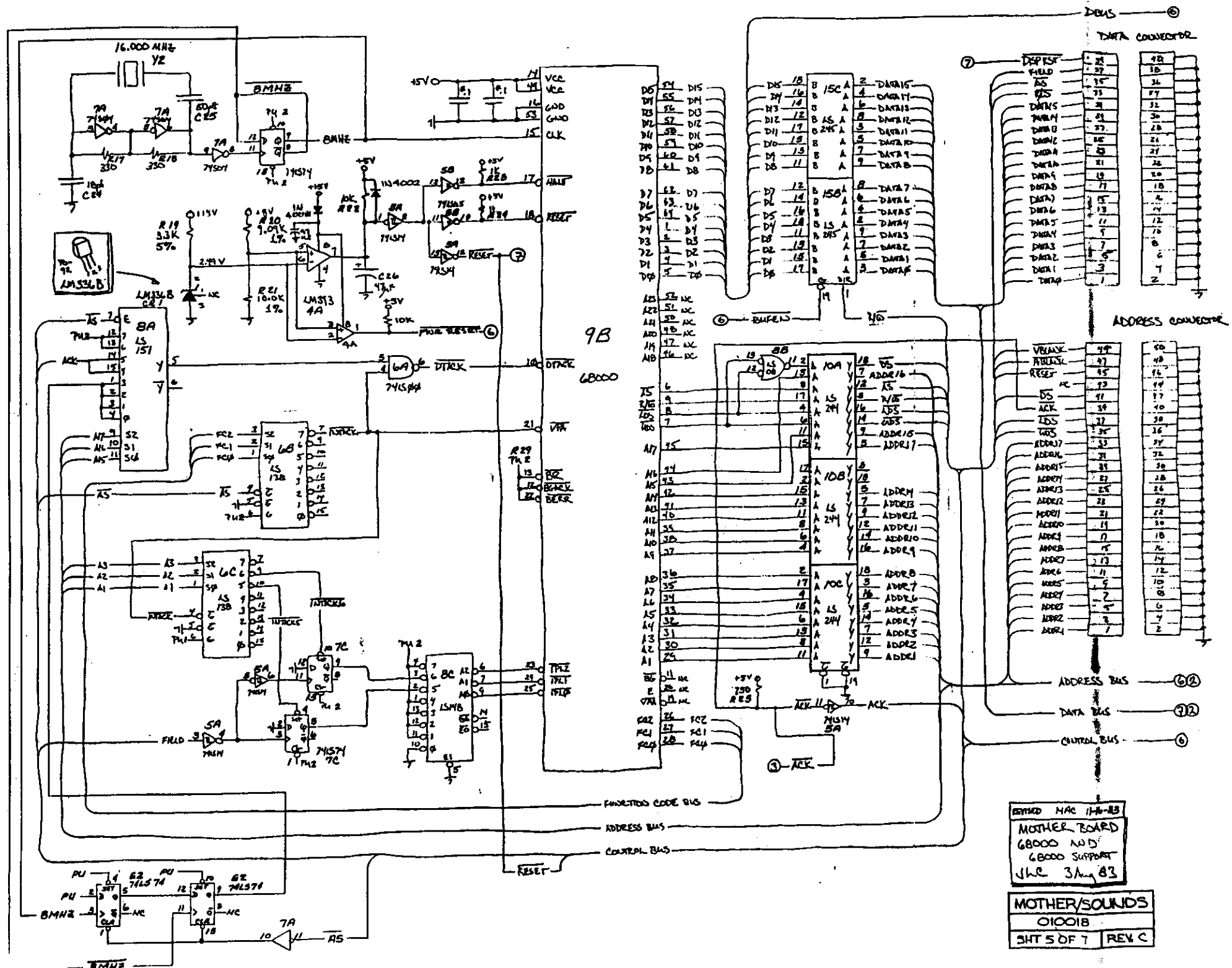
MOTHER/SOUNDS
 010018
 SHEET 3 OF 7 REV. A



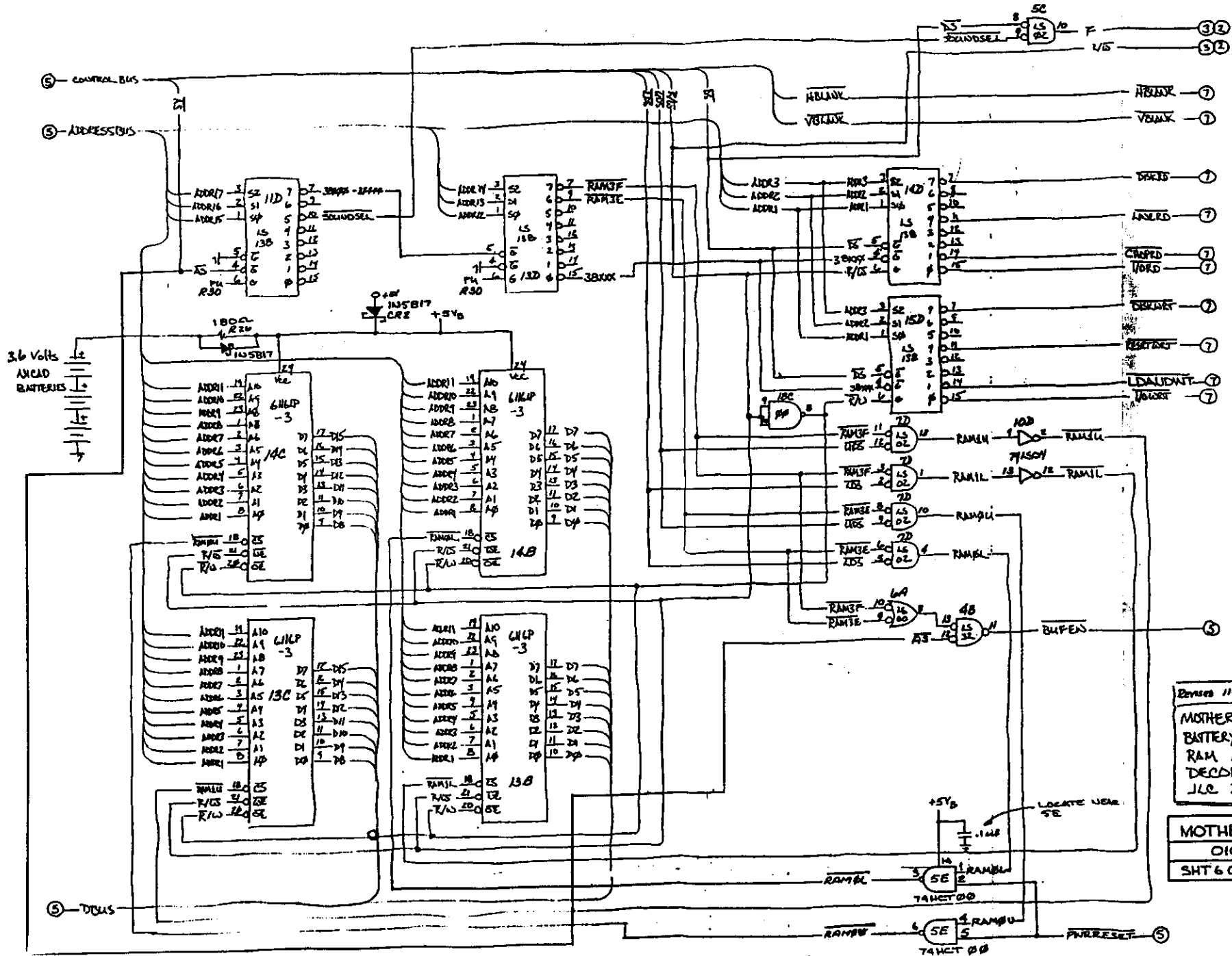
TL074 QUAD OPAMPS
 +15V pin 4
 -15V pin 11

SOUND SYNTHESIZER
 AUDIO SECTION
 P. 4 of 7
 Aug 83 Jhe
 REVISED 11-16-83 MAC

MOTHER SOUNDS
 010018
 SHT 4 OF 7 REV. A



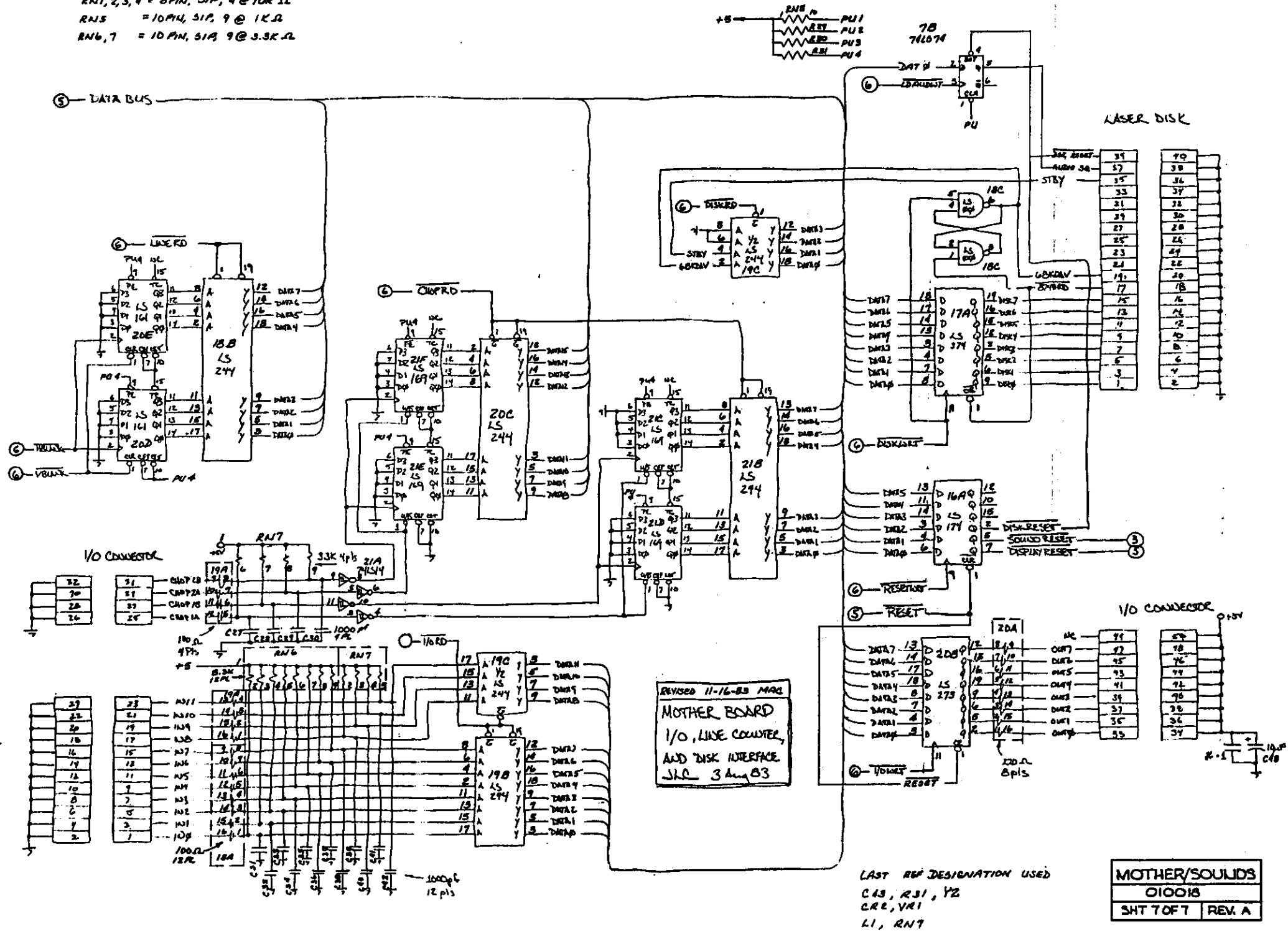
REVISED MAC 11-16-83
 MOTHER BOARD
 68000 AND
 68000 SUPPORT
 JHE 3 Aug 83
 MOTHER/SOUNDS
 010018
 SHEET 5 OF 7 REV C



Revised 11-11-83 MMS
 MOTHER BOARD
 BATTERY-BACKED
 RAM AND
 DECODING
 JLC 3 Aug 83

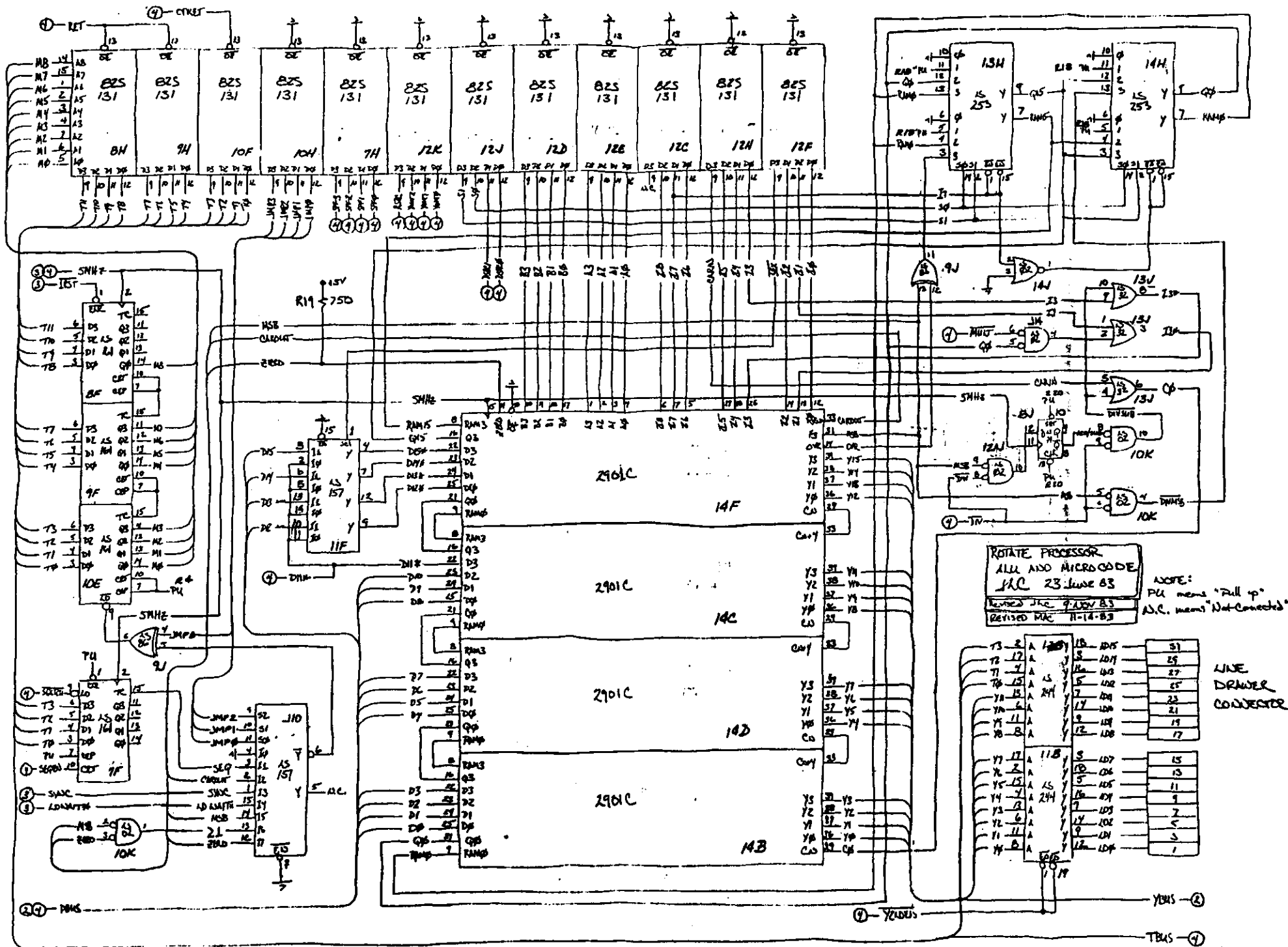
MOTHER SOUNDS
 010018
 SHT 6 OF 7 REV. B

RN1, 2, 3, 4 = 8PIN, 51P, 4 @ 10K Ω
 RN5 = 10PIN, 51P, 9 @ 1K Ω
 RN6, 7 = 10PIN, 51P, 9 @ 3.3K Ω



LAST REF DESIGNATION USED
 C43, R31, Y2
 C42, V41
 L1, R47

| | |
|---------------|--------|
| MOTHER/SOUNDS | |
| 010018 | |
| SMT 70FT | REV. A |



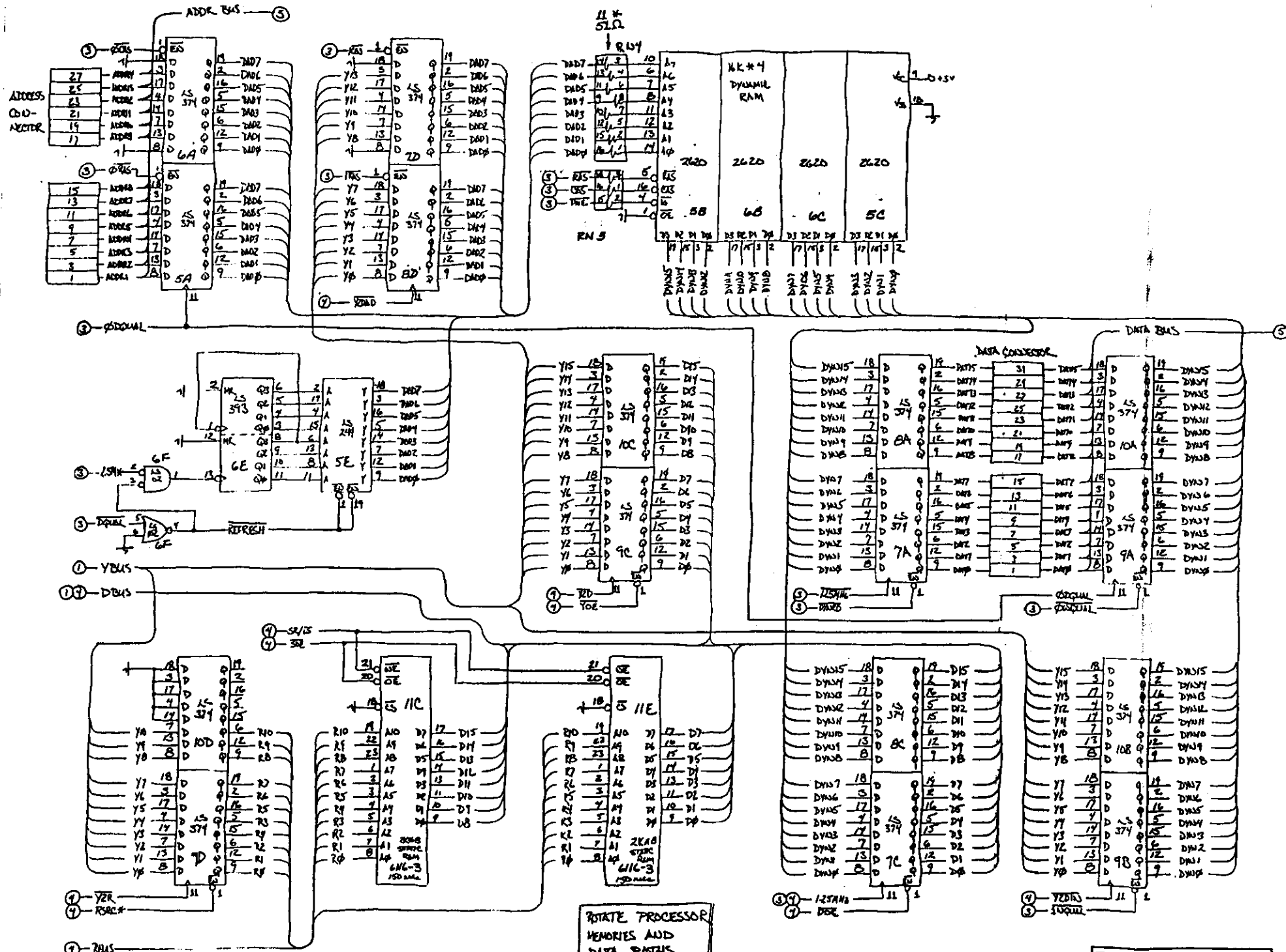
ROTATE PROCESSOR
 ALL AND MICROCODE
 MAC 23: June 63
 Revised MAC 9-10-63
 Revised MAC 11-14-63

NOTE:
 PU means "Pull up"
 A.C. means "Not Connected"

| | | | | | | | |
|----|---|-----|---|----|-----|---|----|
| Y3 | A | 118 | Y | 12 | 108 | Y | 1 |
| Y2 | A | 117 | Y | 11 | 107 | Y | 2 |
| Y1 | A | 116 | Y | 10 | 106 | Y | 3 |
| Y0 | A | 115 | Y | 9 | 105 | Y | 4 |
| Y3 | A | 114 | Y | 8 | 104 | Y | 5 |
| Y2 | A | 113 | Y | 7 | 103 | Y | 6 |
| Y1 | A | 112 | Y | 6 | 102 | Y | 7 |
| Y0 | A | 111 | Y | 5 | 101 | Y | 8 |
| Y3 | A | 110 | Y | 4 | 100 | Y | 9 |
| Y2 | A | 109 | Y | 3 | 99 | Y | 10 |
| Y1 | A | 108 | Y | 2 | 98 | Y | 11 |
| Y0 | A | 107 | Y | 1 | 97 | Y | 12 |

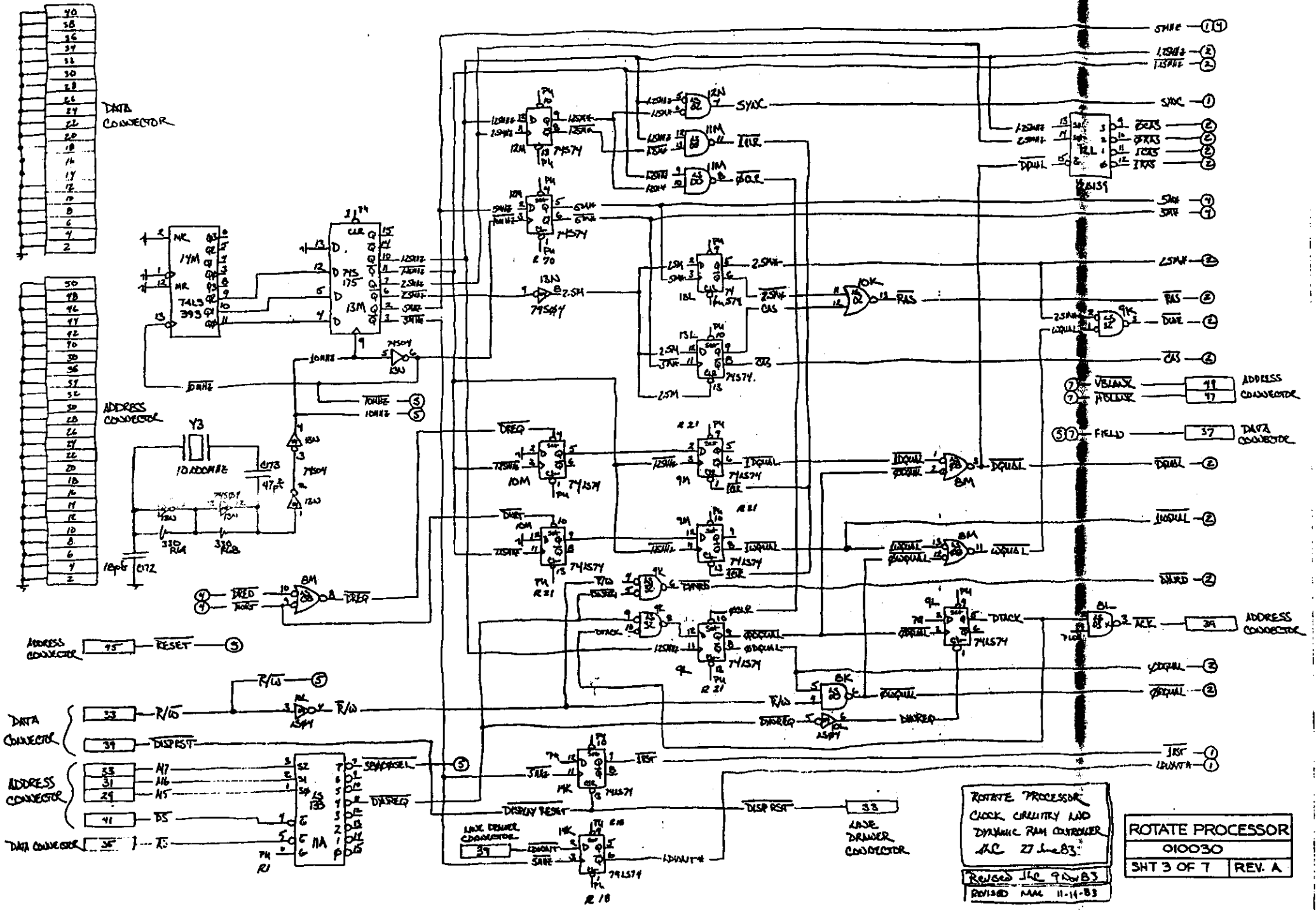
LINE
 DRAWER
 CONVERTER

ROTATE PROCESSOR
 010030
 SHT 1 OF 7 REV. A



ROTATE PROCESSOR
 MEMORIES AND
 DATA PATHS
 JLC 22 Jun 83
 Revised JLC 9 Dec 83
 Revised MAC 11-11-83

ROTATE PROCESSOR
 010030
 SHT 2 OF 7 REV. A



DATA CONNECTOR

| |
|----|
| 30 |
| 28 |
| 26 |
| 24 |
| 22 |
| 20 |
| 18 |
| 16 |
| 14 |
| 12 |
| 10 |
| 8 |
| 6 |
| 4 |
| 2 |

ADDRESS CONNECTOR

| |
|----|
| 30 |
| 28 |
| 26 |
| 24 |
| 22 |
| 20 |
| 18 |
| 16 |
| 14 |
| 12 |
| 10 |
| 8 |
| 6 |
| 4 |
| 2 |

ADDRESS CONNECTOR

| |
|----|
| 75 |
|----|

DATA CONNECTOR

| |
|----|
| 33 |
| 39 |

ADDRESS CONNECTOR

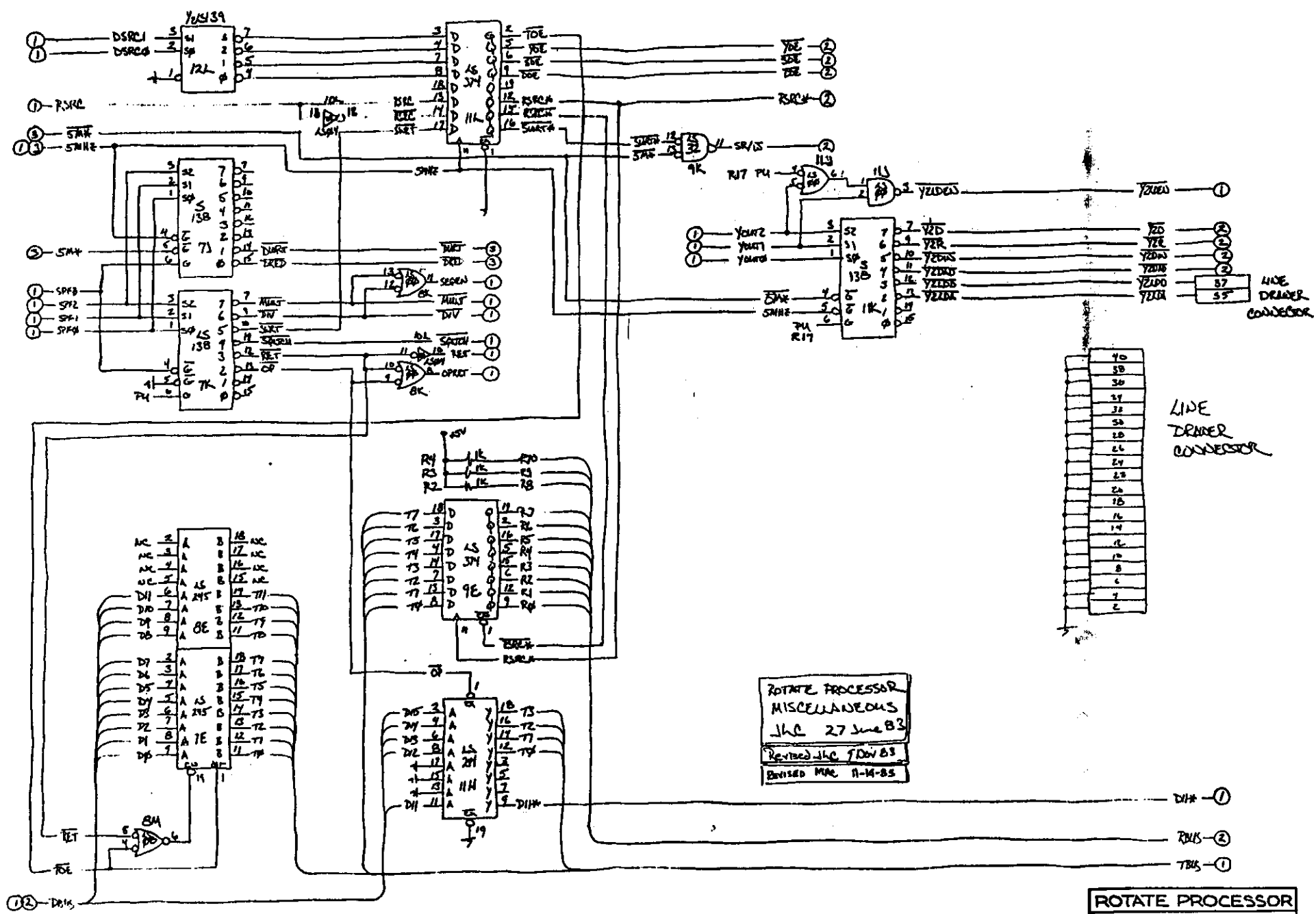
| |
|----|
| 33 |
| 31 |
| 29 |

DATA CONNECTOR

| |
|----|
| 41 |
| 35 |

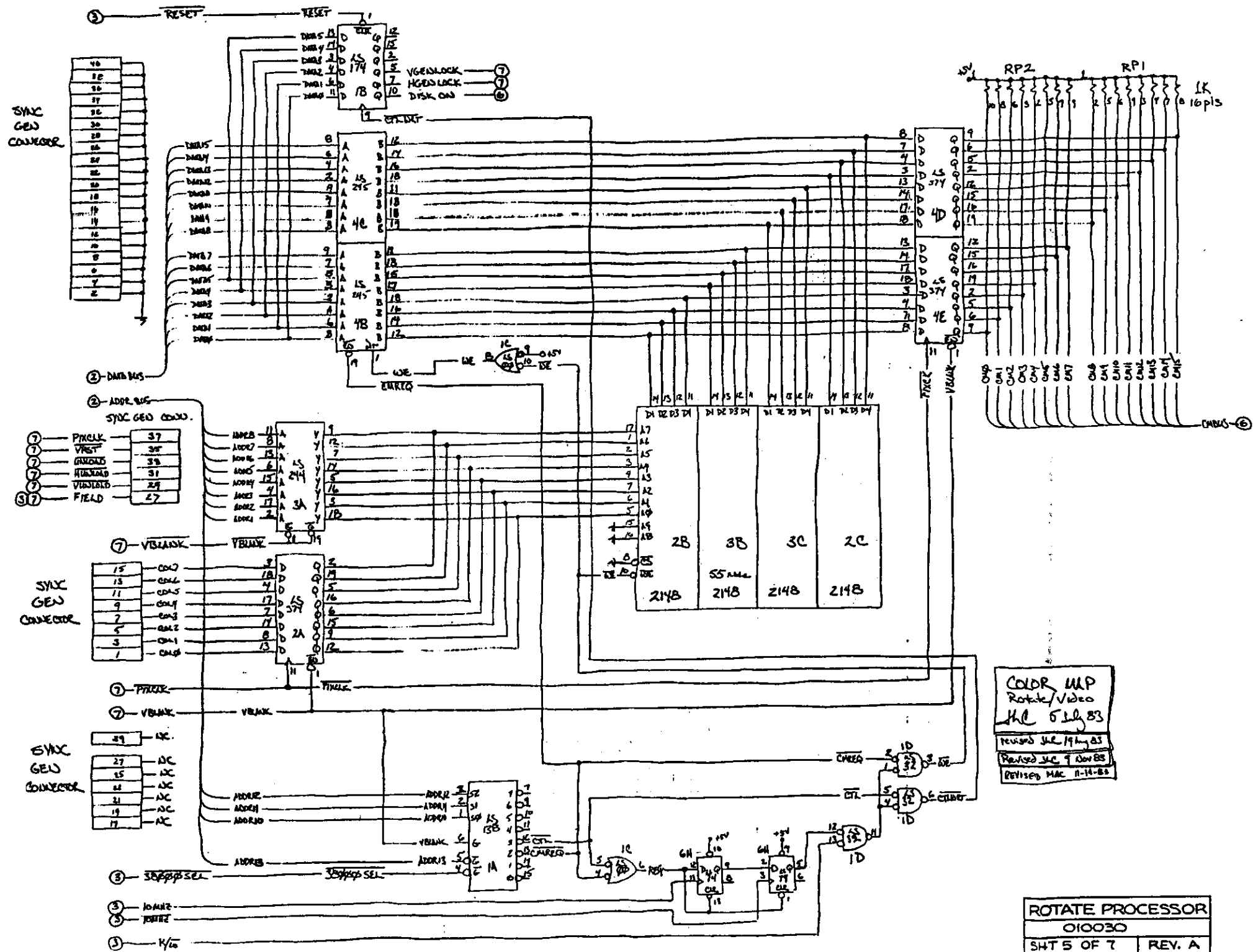
ROTATE PROCESSOR
 CLOCK CIRCUITRY AND
 DYNAMIC RAM CONTROLLER
 AC 27 June 83
 REVISED ILC 9 Nov 83
 REVISED NAA 11-14-83

ROTATE PROCESSOR
 010030
 SHT 3 OF 7 REV. A



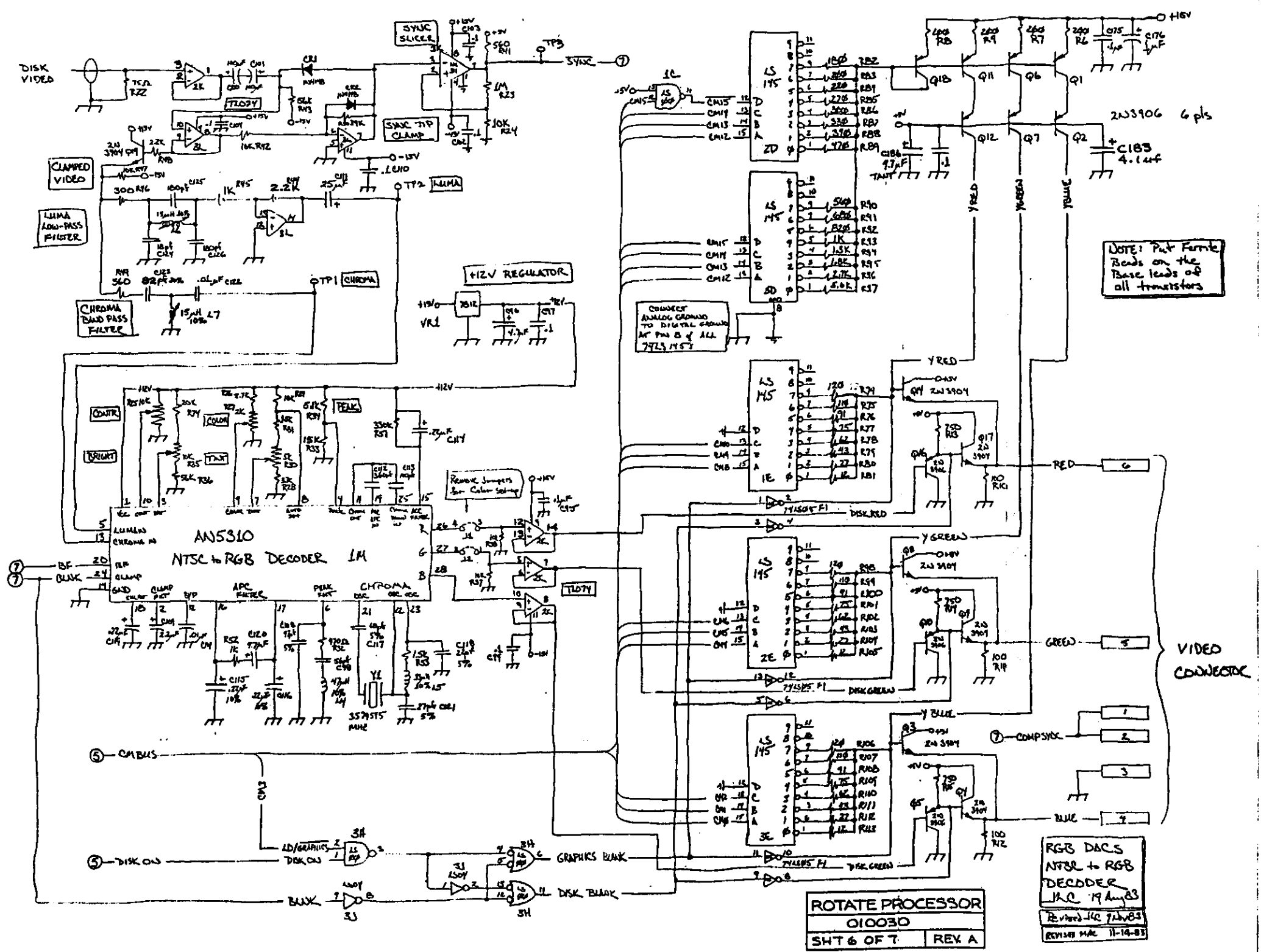
ROTATE PROCESSOR
 MISCELLANEOUS
 JHC 27 June 83
 Revised JHC FDN 83
 Revised MAC 11-14-85

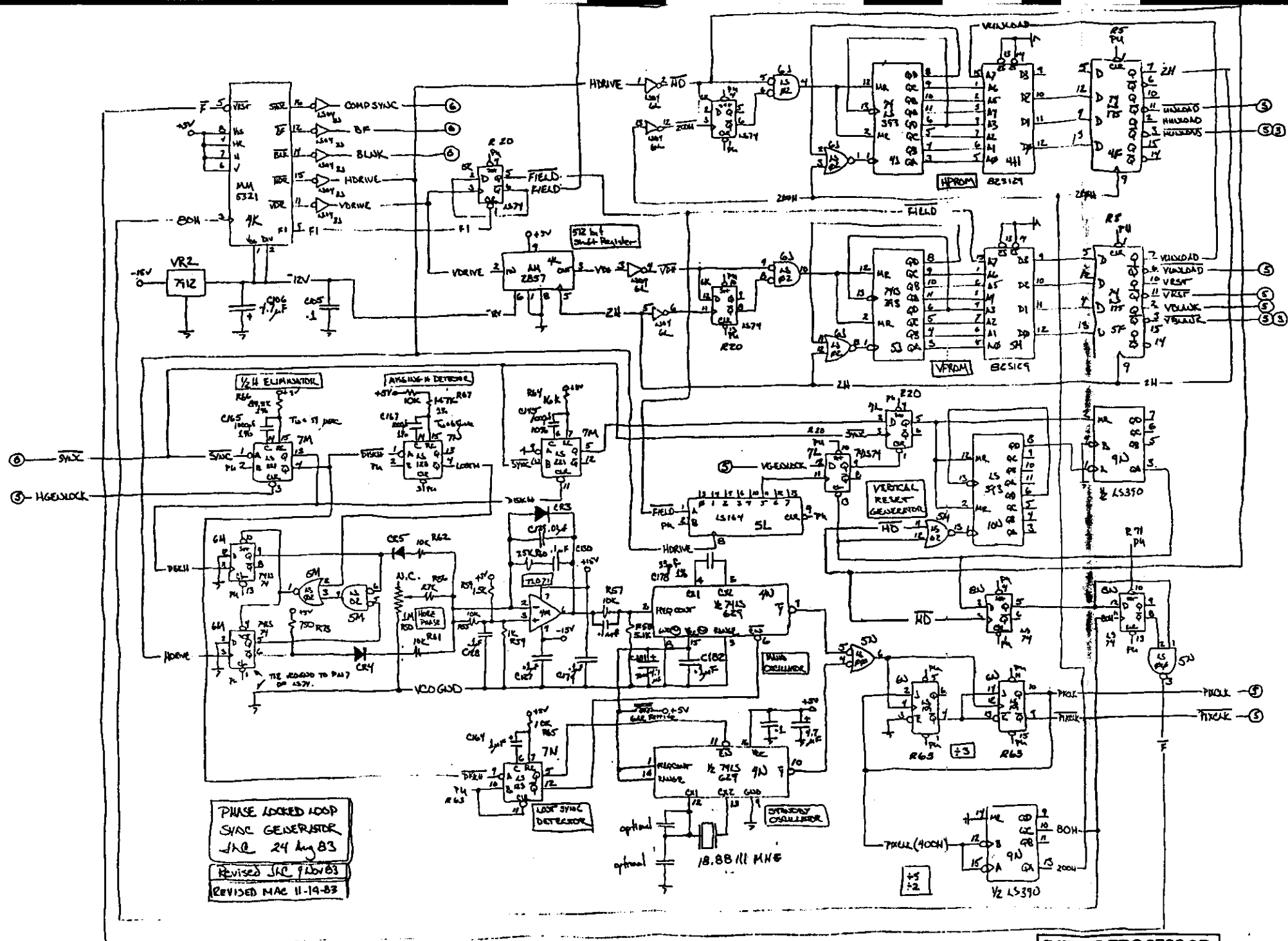
ROTATE PROCESSOR
 010030
 SHT 4 OF 7 REV. A



COLOR MAP
 Rotate/Video
 MC 51183
 Revised Jul 1983
 Revised MC 9 Nov 83
 Revised MAC 11-14-83

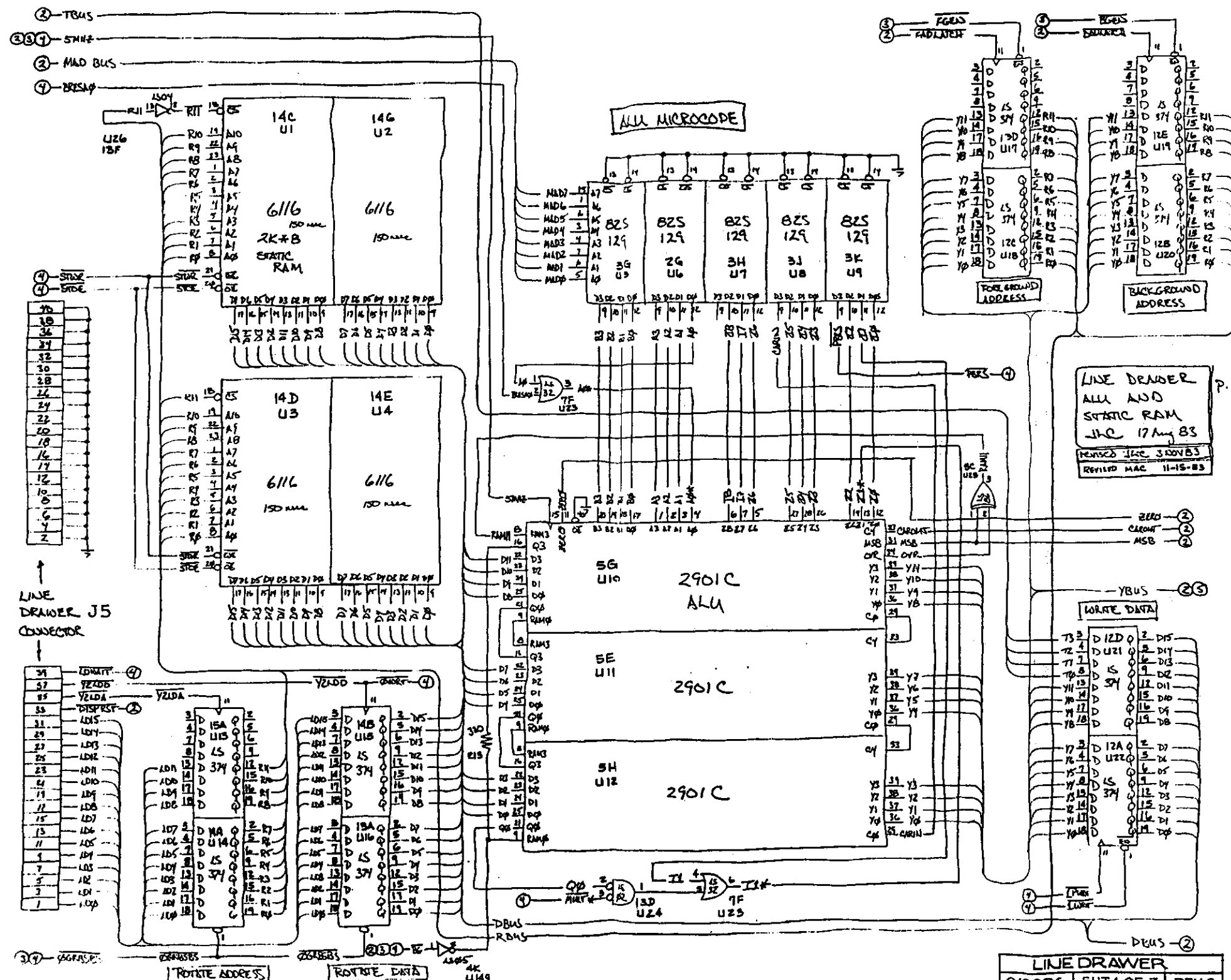
ROTATE PROCESSOR
 010030
 SHT 5 OF 7 REV. A





PHASE LOCKED LOOP
 SYNC GENERATOR
 JAC 24 Aug 83
 REVISED JAC 9/25/83
 REVISED MAC 11-19-83

ROTATE PROCESSOR
 010030
 SHT 7 OF 7 REV. B



LINE DRAWER
 ALL ADD
 STATIC RAM
 JIC 17 Aug 83
 Revised JIC 300V83
 Revised MAC 11-18-83

LINE DRAWER
 010026 / 011057 / REV. 5

- ② TBUS
- ③ ④ 5MHz
- ② MAD BUS
- ④ DBUS

- ④ SHAR
- ④ STDR

LINE DRAWER J5 CONNECTOR

- 34 LDWRT
- 37 YZODS
- 35 YZLDA
- 33 DISPRST
- 31 LNS
- 29 LNS
- 27 LNS
- 25 LNS
- 23 LNS
- 21 LNS
- 19 LNS
- 17 LNS
- 15 LNS
- 13 LNS
- 11 LNS
- 9 LNS
- 7 LNS
- 5 LNS
- 3 LNS

- ③ ④ ⑥ ⑧ ⑩ ⑫ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕ ㉖ ㉗ ㉘ ㉙ ㉚ ㉛ ㉜ ㉝ ㉞ ㉟ ㊱ ㊲ ㊳ ㊴ ㊵ ㊶ ㊷ ㊸ ㊹ ㊺

- ③ FGWS
- ② FADLWRT
- ④ EGWS
- ③ EADLWRT

FORGND ADDRESS

BACKGND ADDRESS

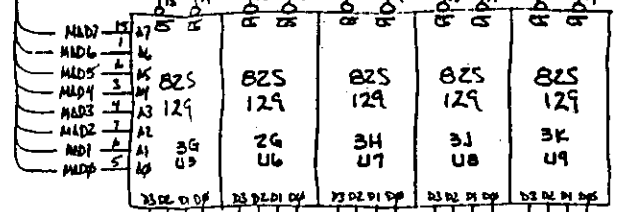
- ② ZERO
- ③ CARRY
- ④ MSB

YBUS ③

WRITE DATA

- ② DBUS

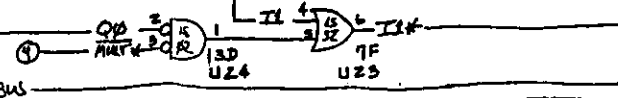
ALL MICROCODE



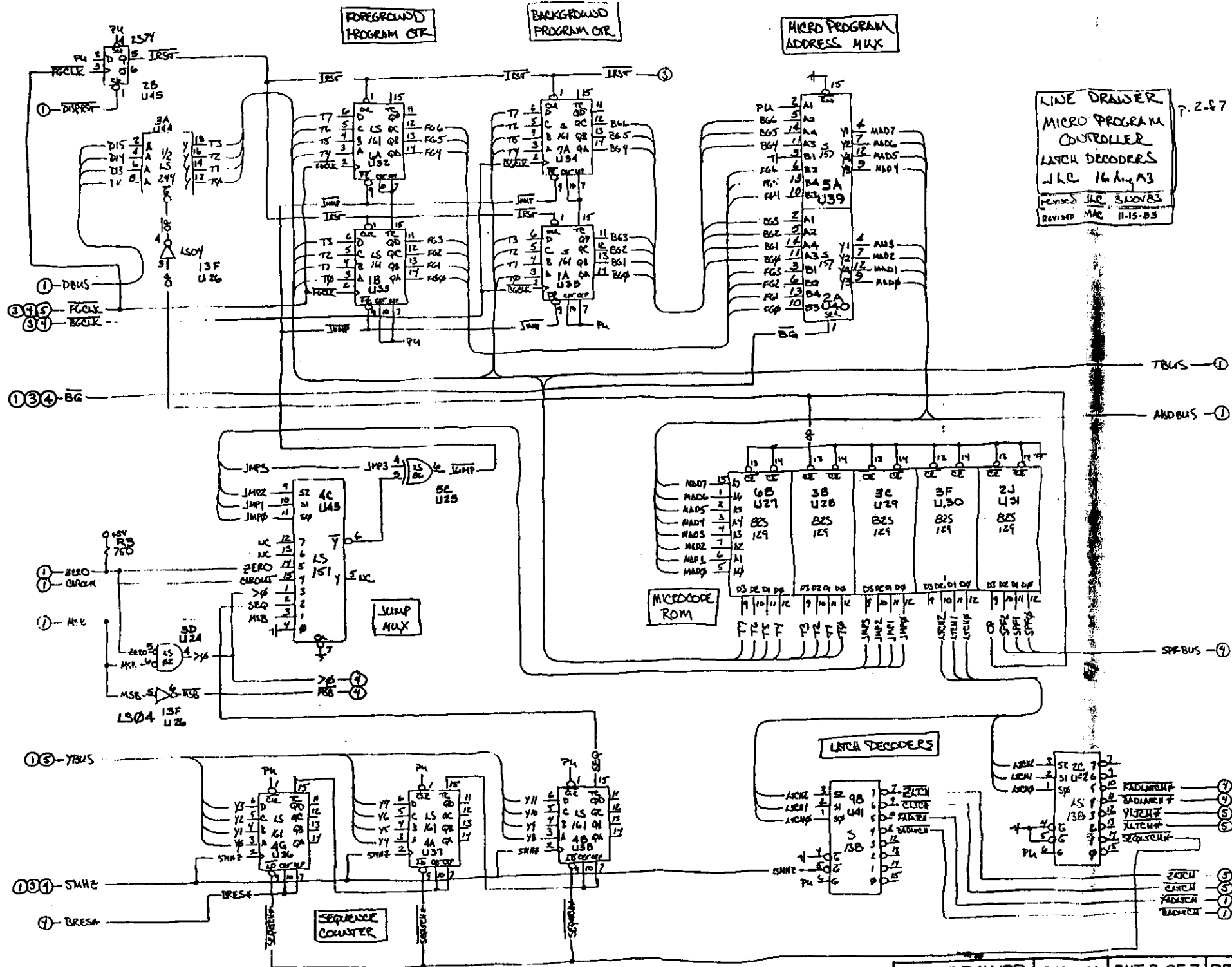
2901C ALU

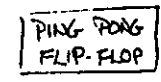
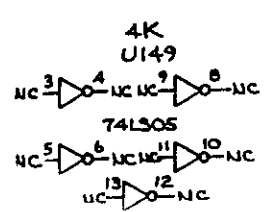
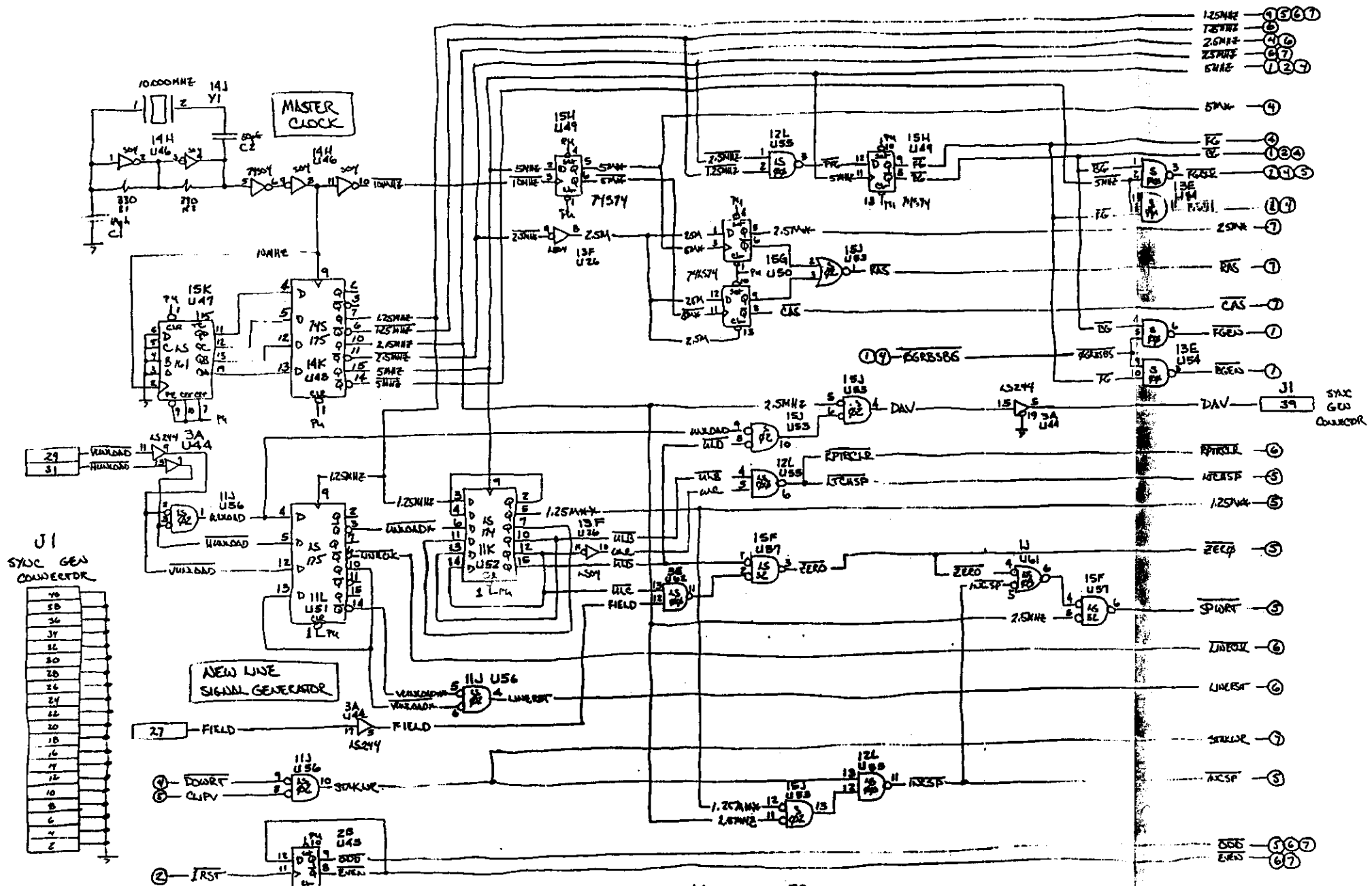
2901C

2901C



DBUS ②





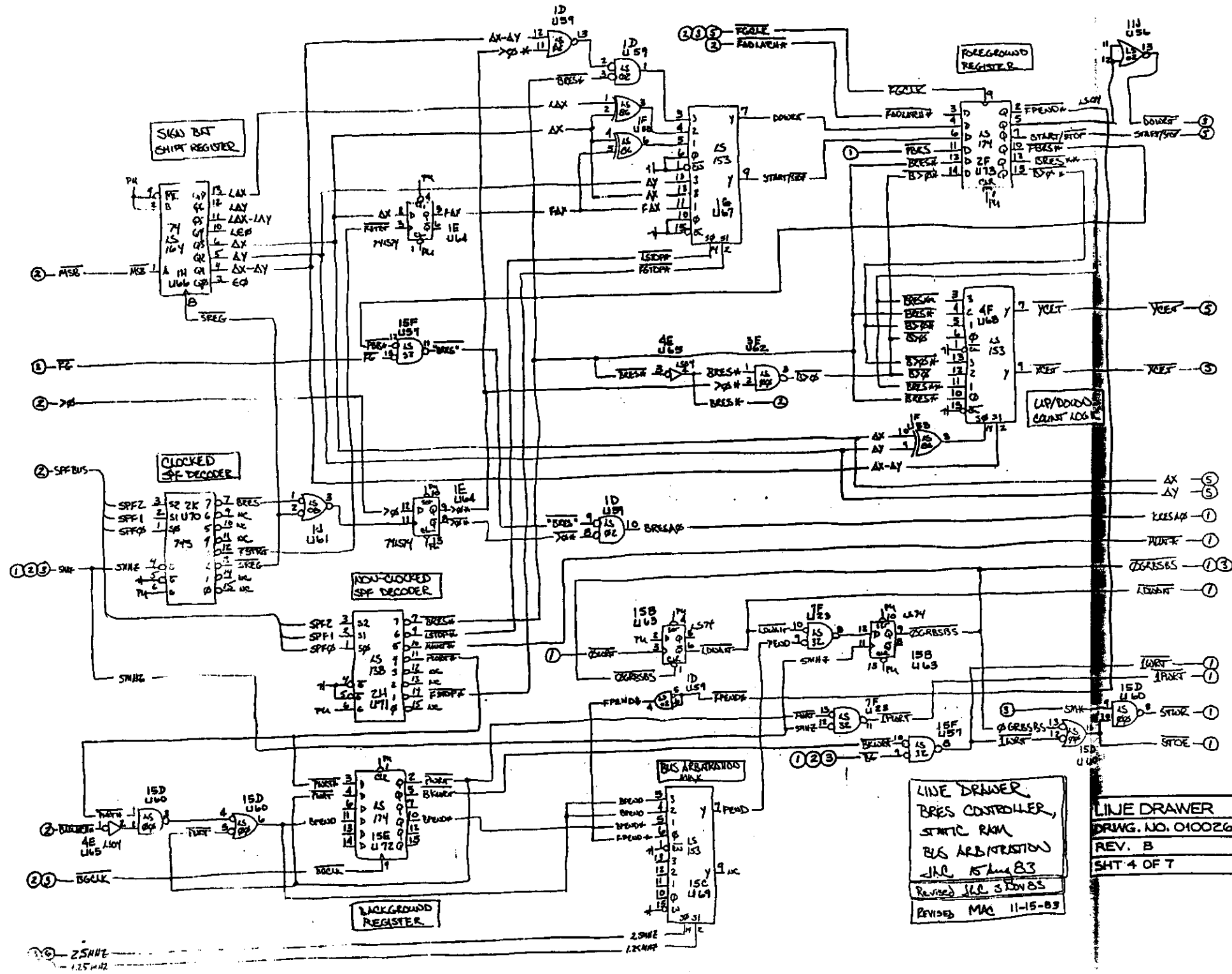
SPARES

LINE DRAWER
 CLOCKS AND
 DYNAMIC RAM
 CONTROLLER
 LNC 14 Aug 83
 REVISED LNC 30005
 REVISED MAR 11-13-83

LINE DRAWER
 DRWG. NO. 010026
 REV. B
 SHEET 3 OF 7

- 1.25MHz 1561
- 7.5MHz 5
- 2.6MHz 46
- 2.5MHz 87
- 5MHz 127

- 5VW 4
- FC 4
- FC 124
- FC 243
- FC 29
- 2.5MHz 7
- RAS 7
- CAS 7
- FGES 7
- FGES 7
- J1 SYNC GEN CONNECTOR
- DAV 39
- RPTCLK 6
- ACRSP 5
- 1.25MHz 5
- ZEEP 5
- SPURF 5
- LINEV 6
- LINEV 6
- SPURF 7
- ACRSP 3
- SSS 367
- ERS 67

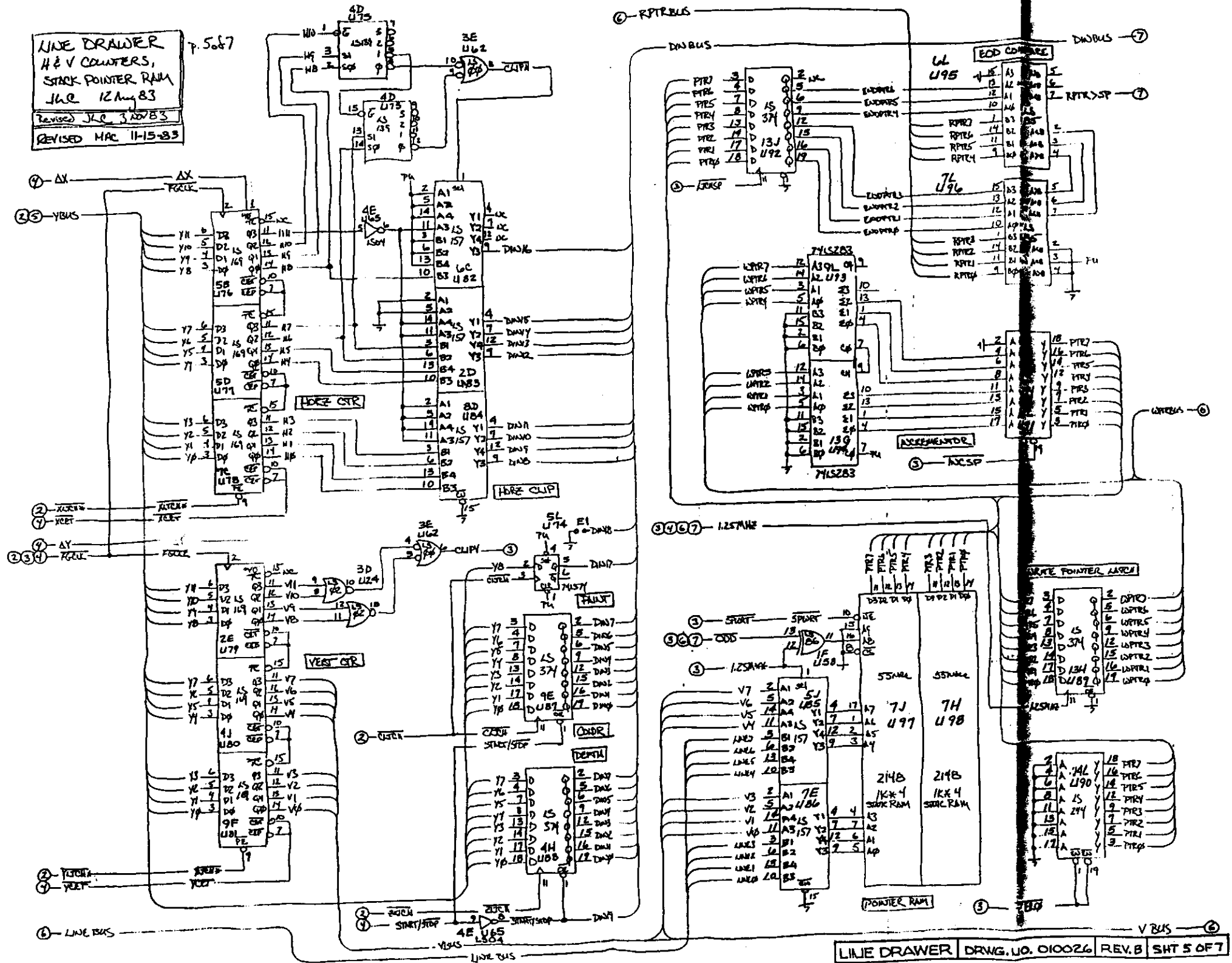


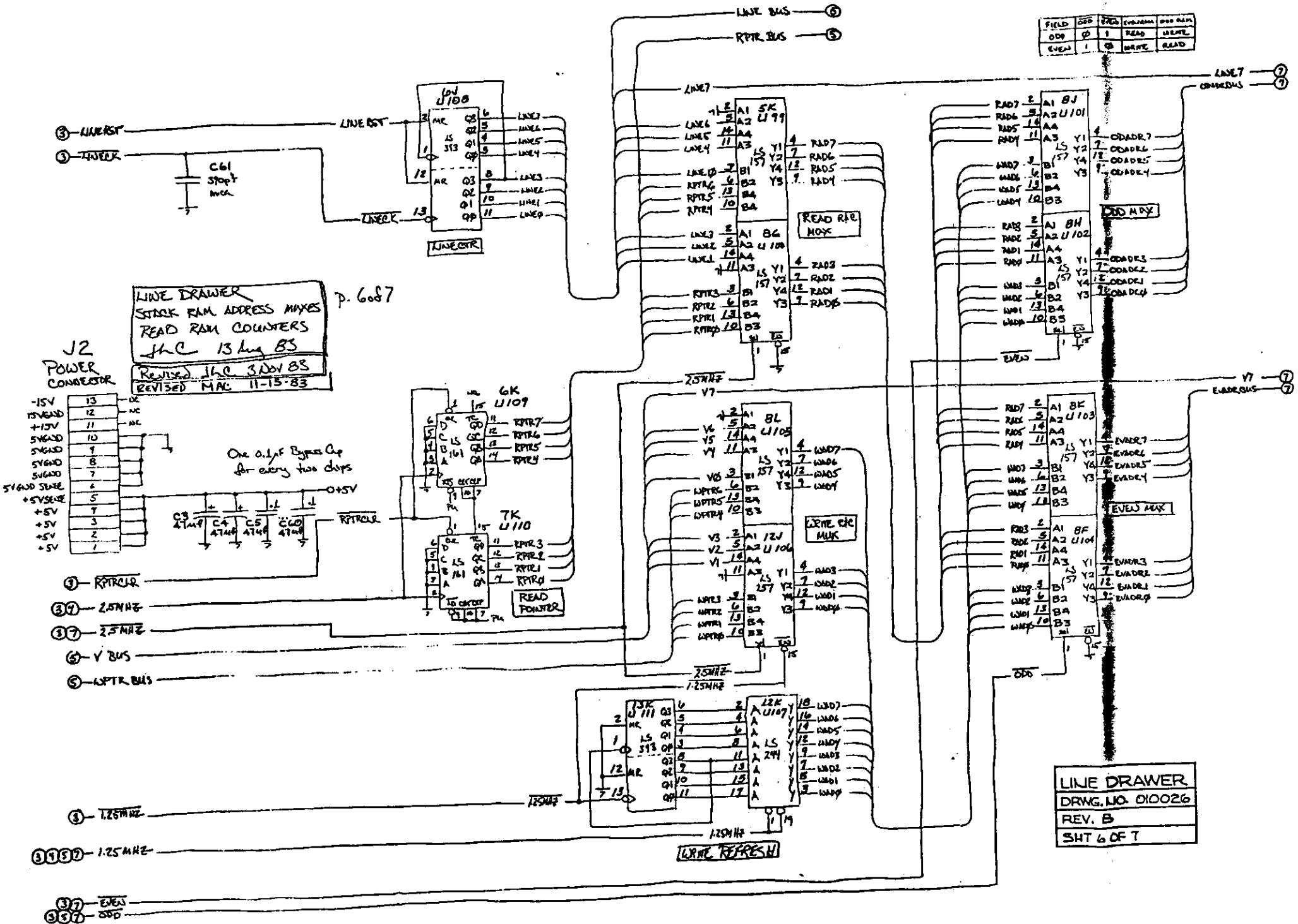
LINE DRAWER
 BRES CONTROLLER,
 STATIC RAM
 BUS ARBITRATION
 AND 15 AND 83
 Revised JLR 5/10/83
 REVISED MAC 11-15-83

LINE DRAWER
 DRWG. NO. 010026
 REV. B
 SHEET 4 OF 7

① 2.5MHz
 - 1.25μs

LINE DRAWER
H & V COUNTERS,
STACK POINTER RAM
JLR 12 Aug 83
Revised JLR 3 Nov 83
Revised MAC 11-15-83





| FIELD | ODD | EVEN | DATA | READ | WRITE |
|-------|-----|------|------|------|-------|
| ODD | 0 | 1 | DATA | READ | WRITE |
| EVEN | 1 | 0 | DATA | READ | WRITE |

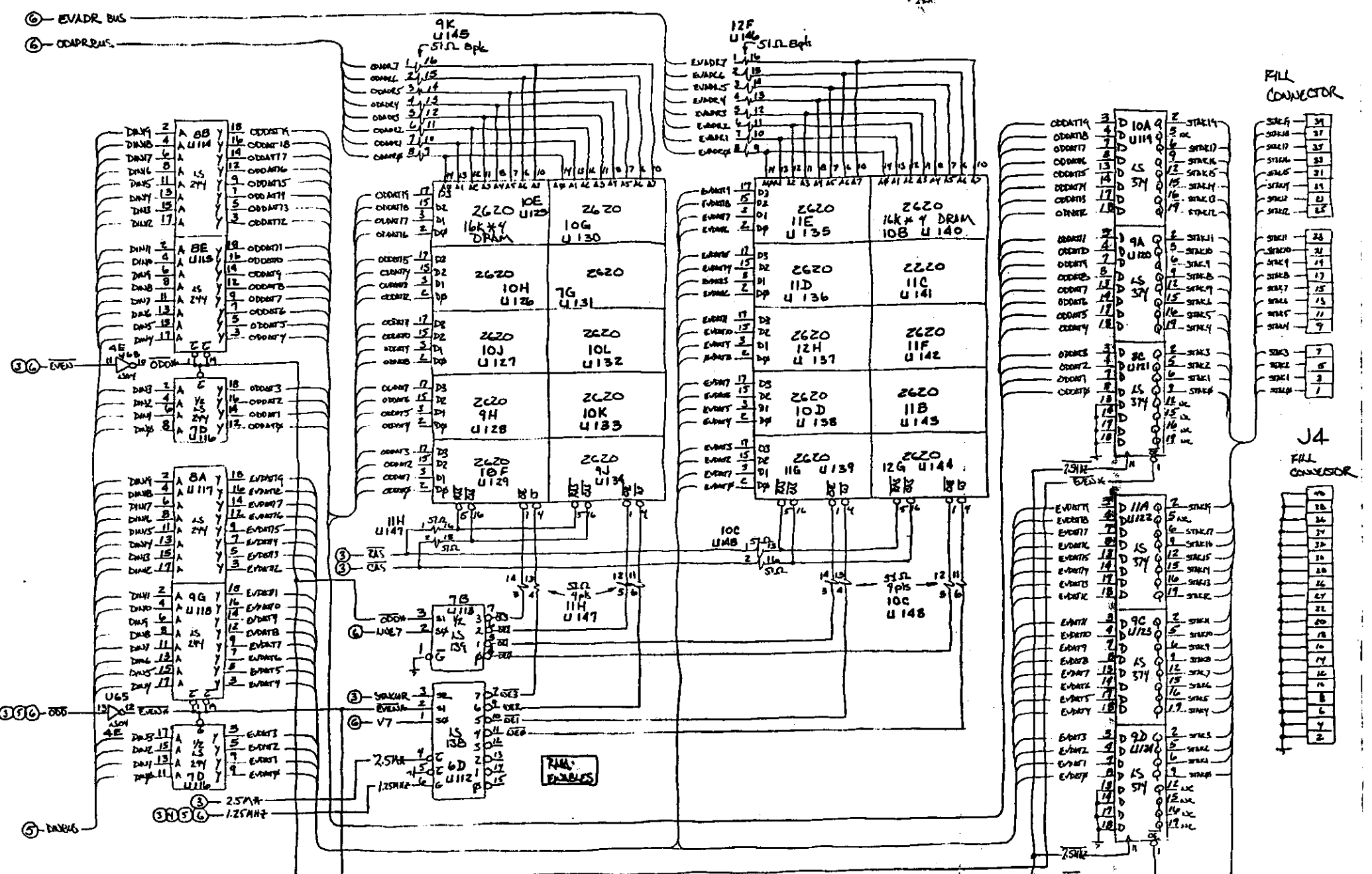
LINE DRAWER
 STRIP RAM ADDRESS MAXES
 READ RAM COUNTERS
 JHC 13 Aug 83
 REVISED JHC 3 NOV 83
 REVISED MAC 11-15-83

J2
 POWER CONNECTOR

| | |
|----|----|
| 13 | MR |
| 12 | MR |
| 11 | MR |
| 10 | MR |
| 9 | MR |
| 8 | MR |
| 7 | MR |
| 6 | MR |
| 5 | MR |
| 4 | MR |
| 3 | MR |
| 2 | MR |
| 1 | MR |

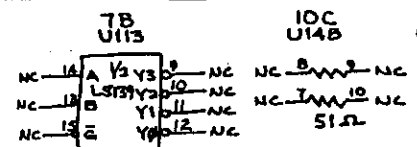
One 0.1µF Bypass Cap
 for every two chips

LINE DRAWER
 DRWG. NO. 010026
 REV. B
 SHT 6 OF 7

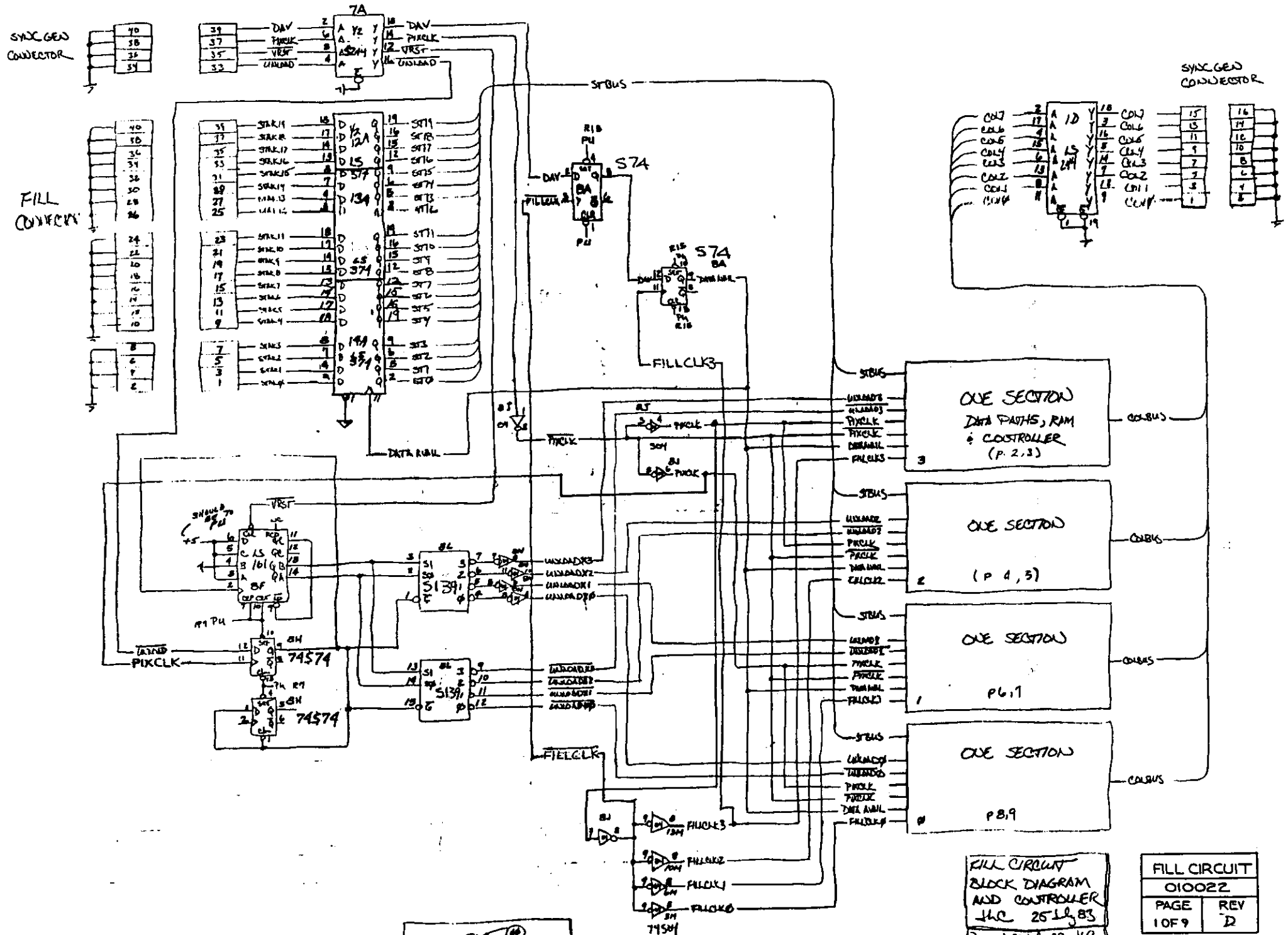


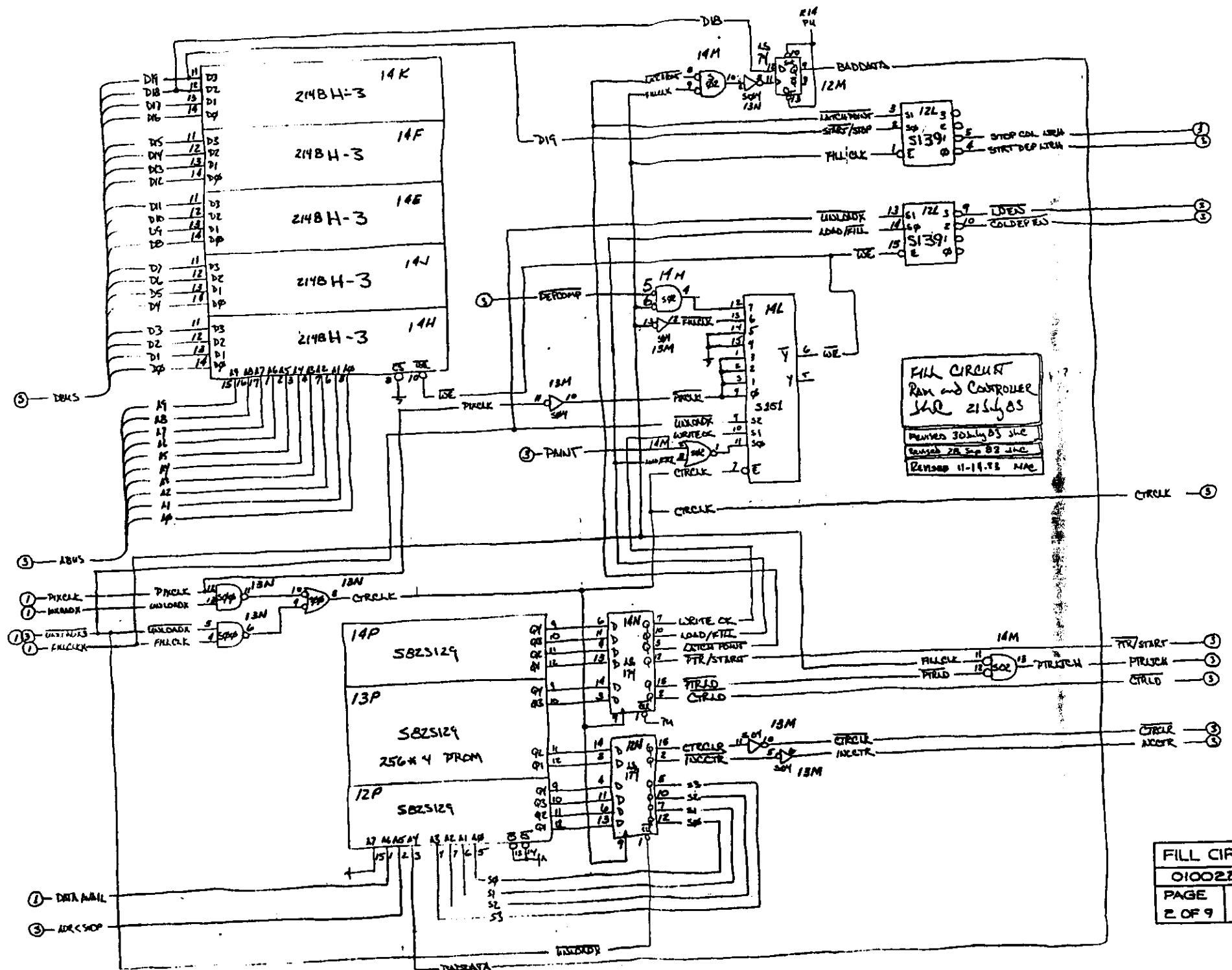
| FIELD | DATA | CONTROL | ADDRESS | DATA |
|-------|------|---------|---------|-------|
| ODD | 0 | 1 | READ | WRITE |
| EVEN | 1 | 0 | WRITE | READ |

LINE DRAWER
 STACK RAM
 DATA PATHS
 JHC 11 Aug 83
 REVISED JHC 30 Dec 83
 REVISED MAE 11-15-83



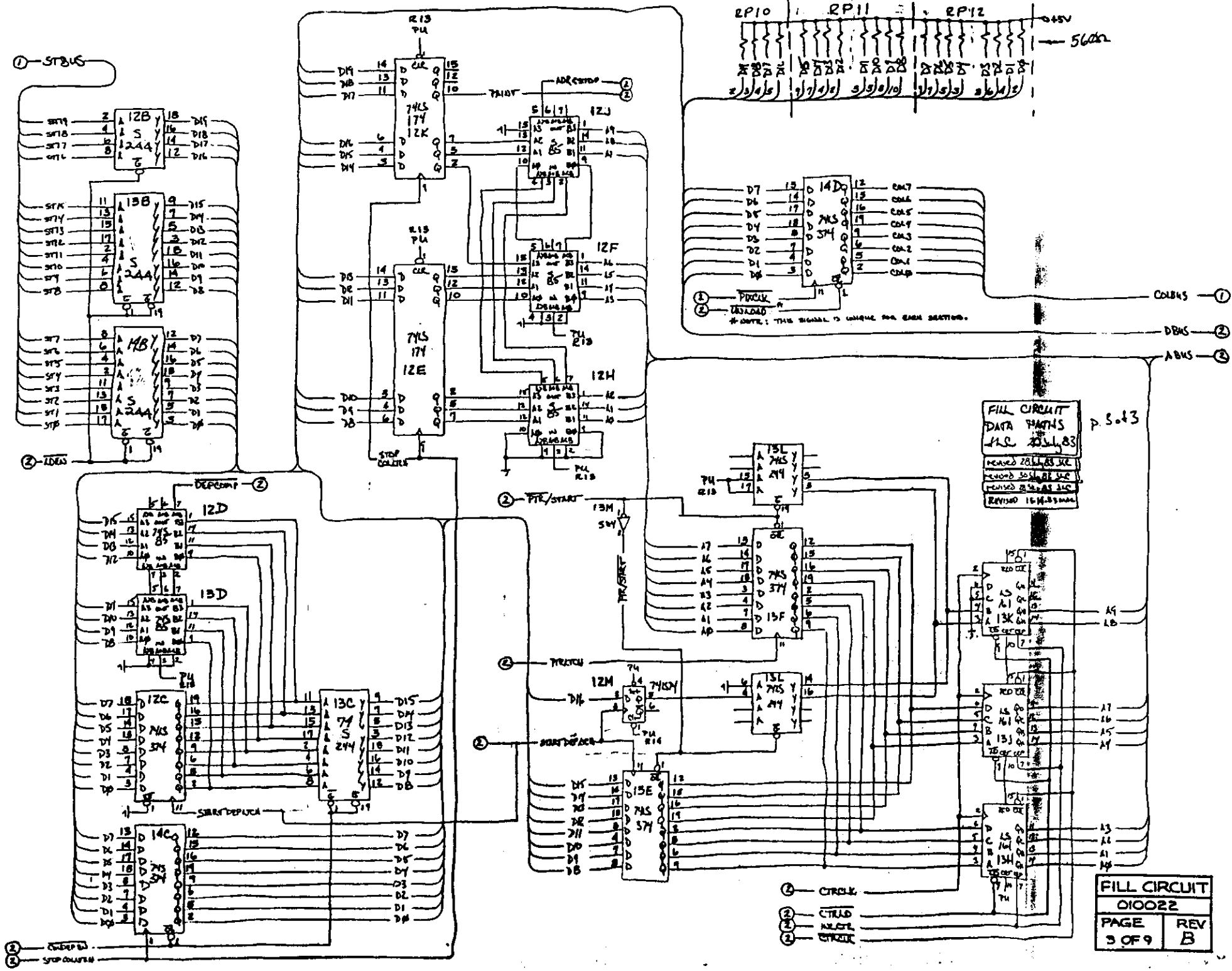
SPARE

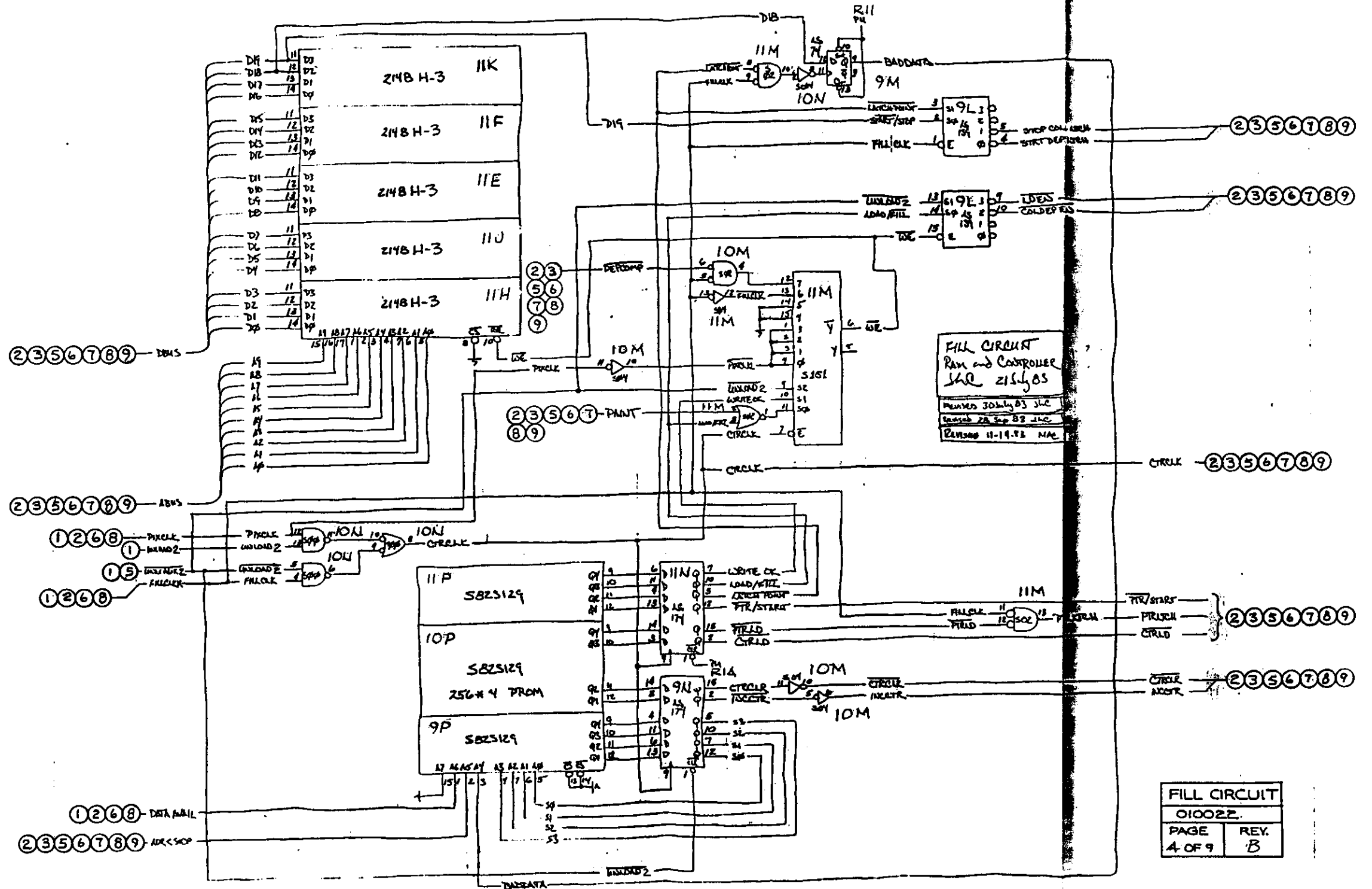




FILL CIRCUIT
RAM and CONTROLLER
for 215405
PRINTED 30 JULY 85 JMC
REVISED 28 SEP 82 JMC
REVISED 11-14-78 MAC

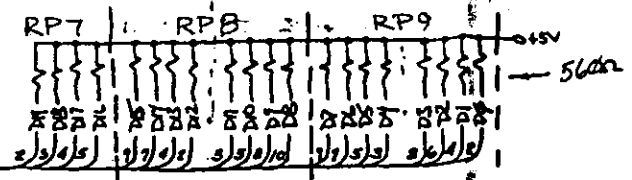
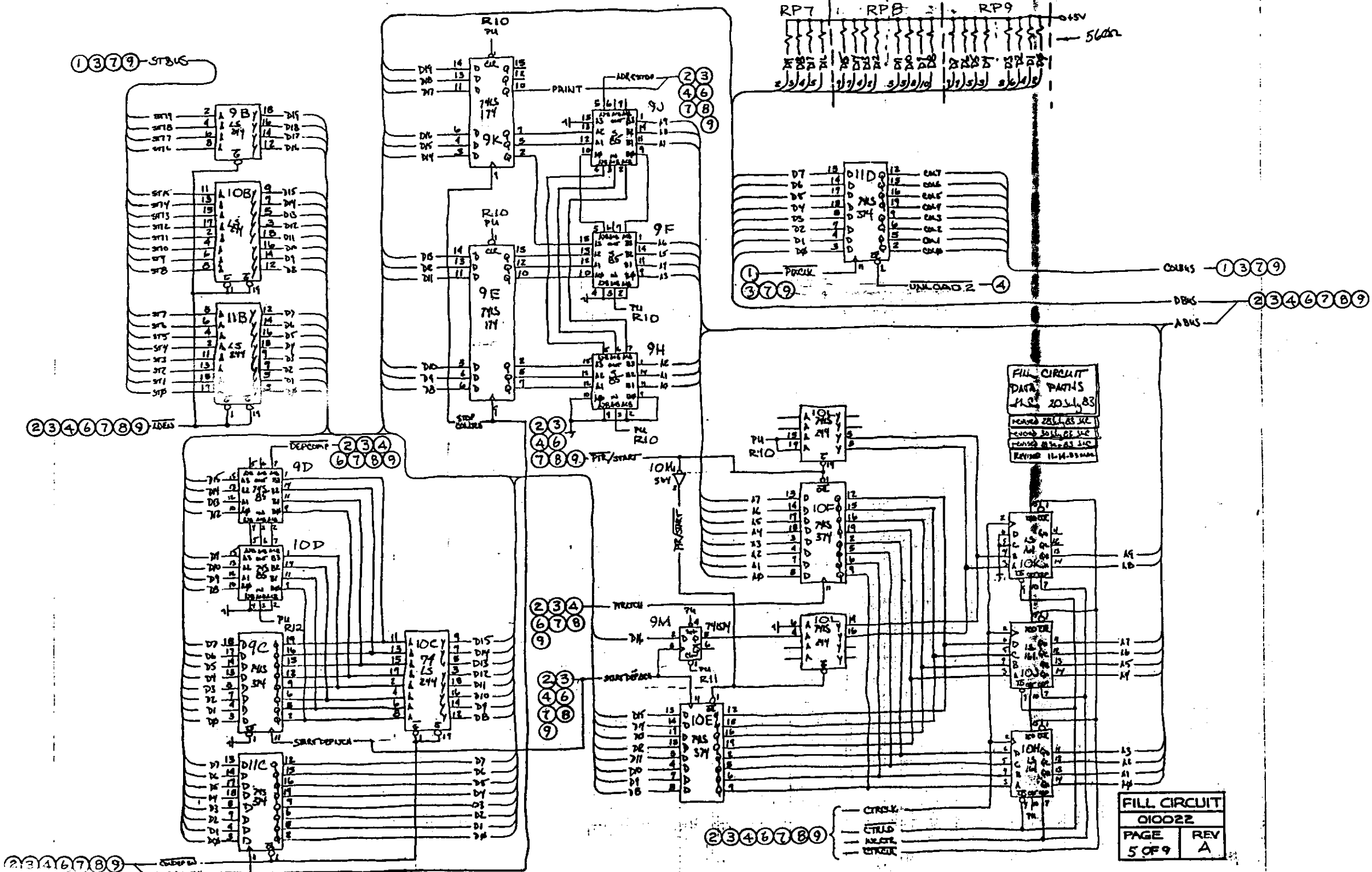
FILL CIRCUIT
010022
PAGE 2 OF 9
REV. C





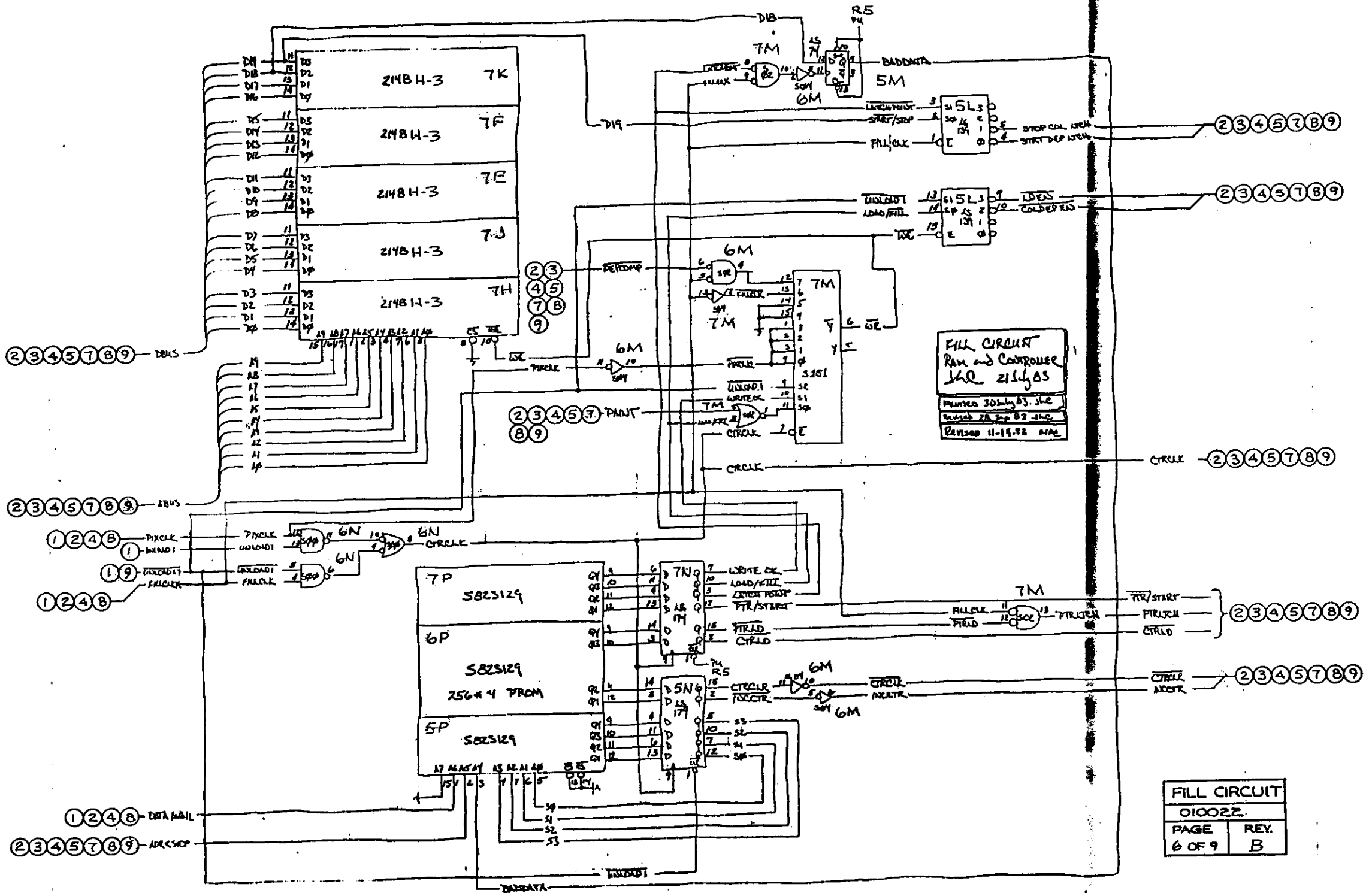
FILL CIRCUIT
RAM and Controller
Shir 215405
REVISED 30 July 83 JHC
REVISED 28 Sep 88 JHC
REVISED 11-14-83 NAC

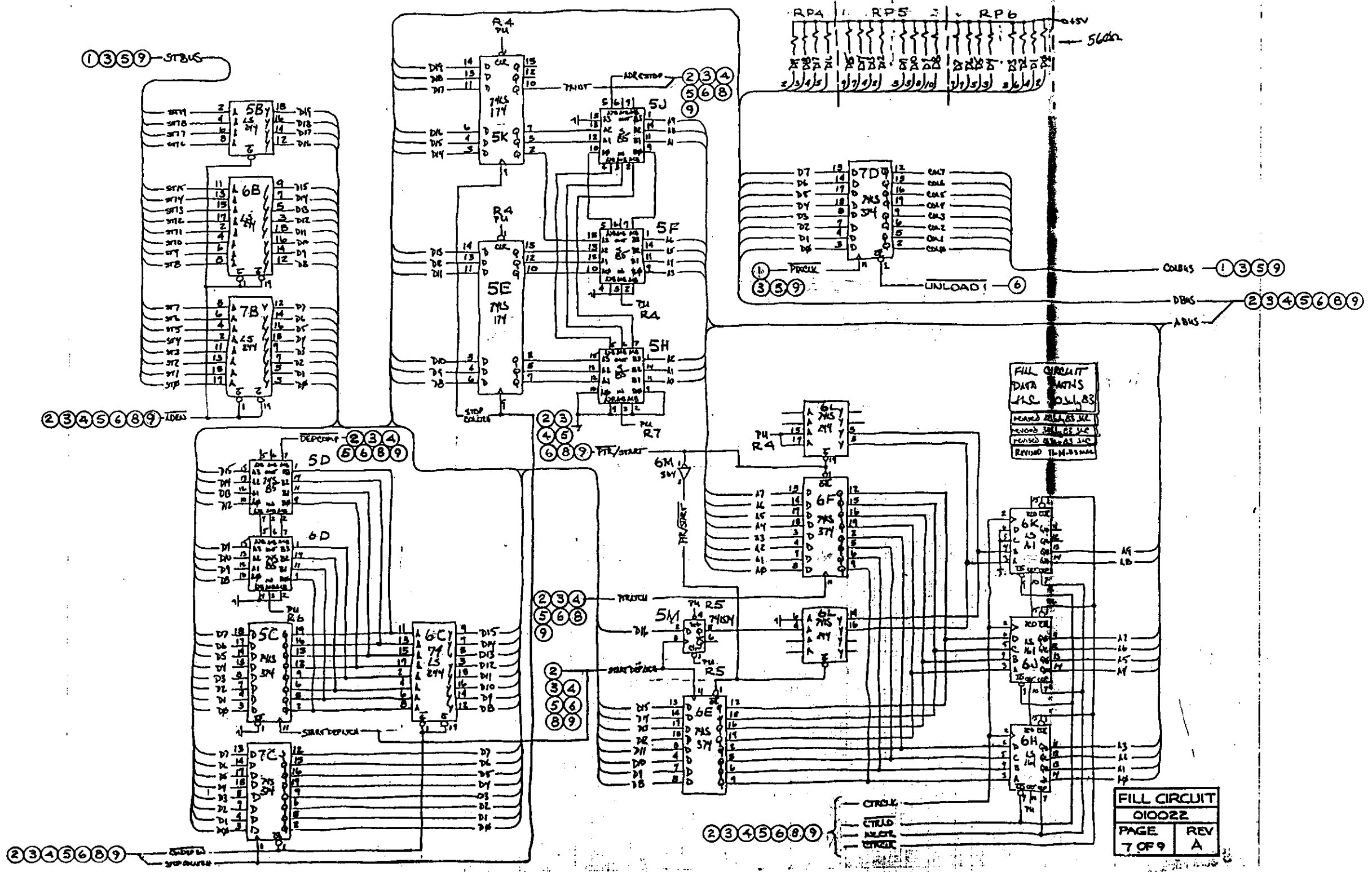
FILL CIRCUIT
010022
PAGE 4 OF 9
REV. B



FILL CIRCUIT
DATA PARTS
MS 2011, 83
REVISION 11-14-83

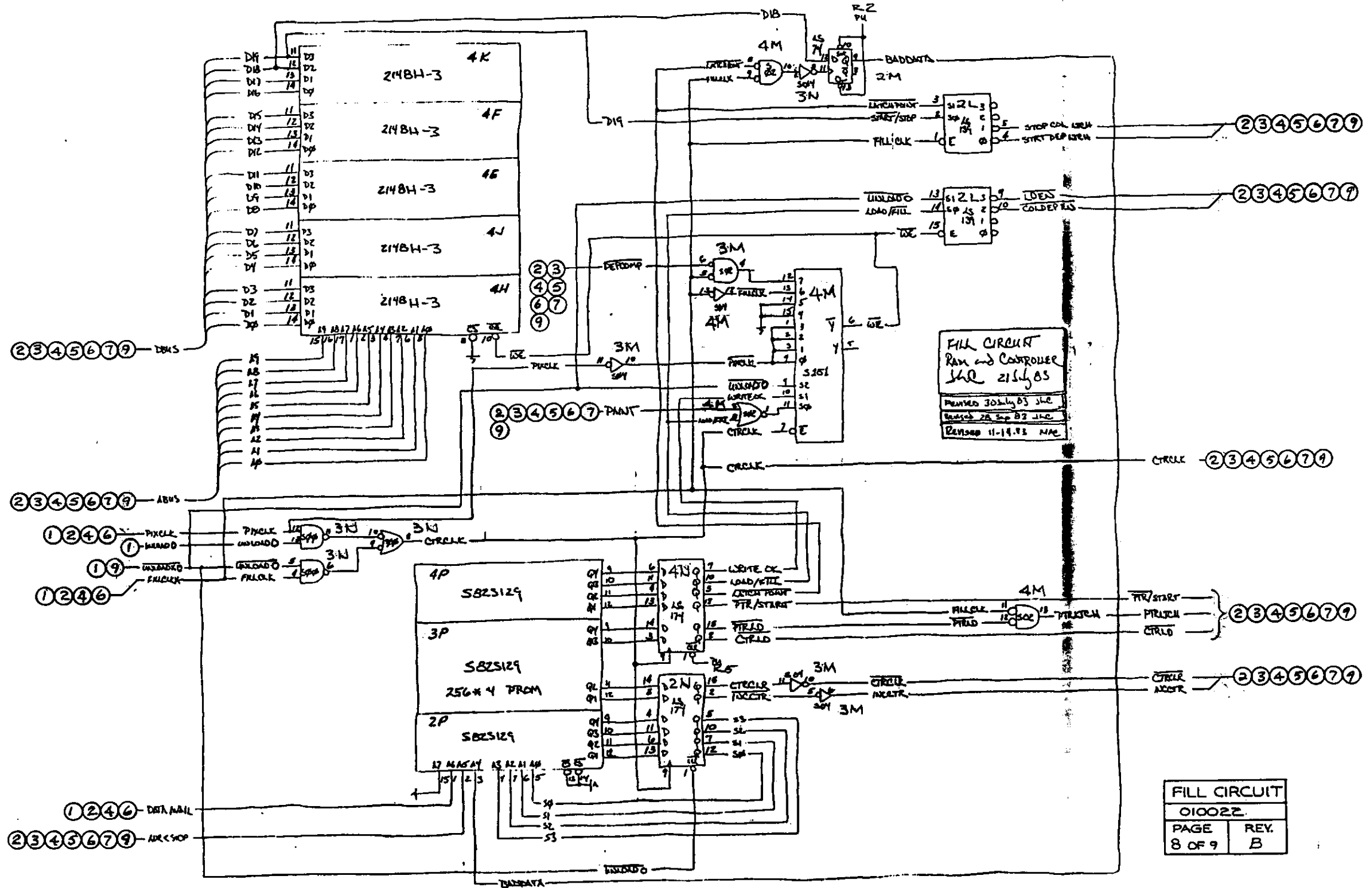
FILL CIRCUIT
A10022
PAGE 5 OF 9
REV A

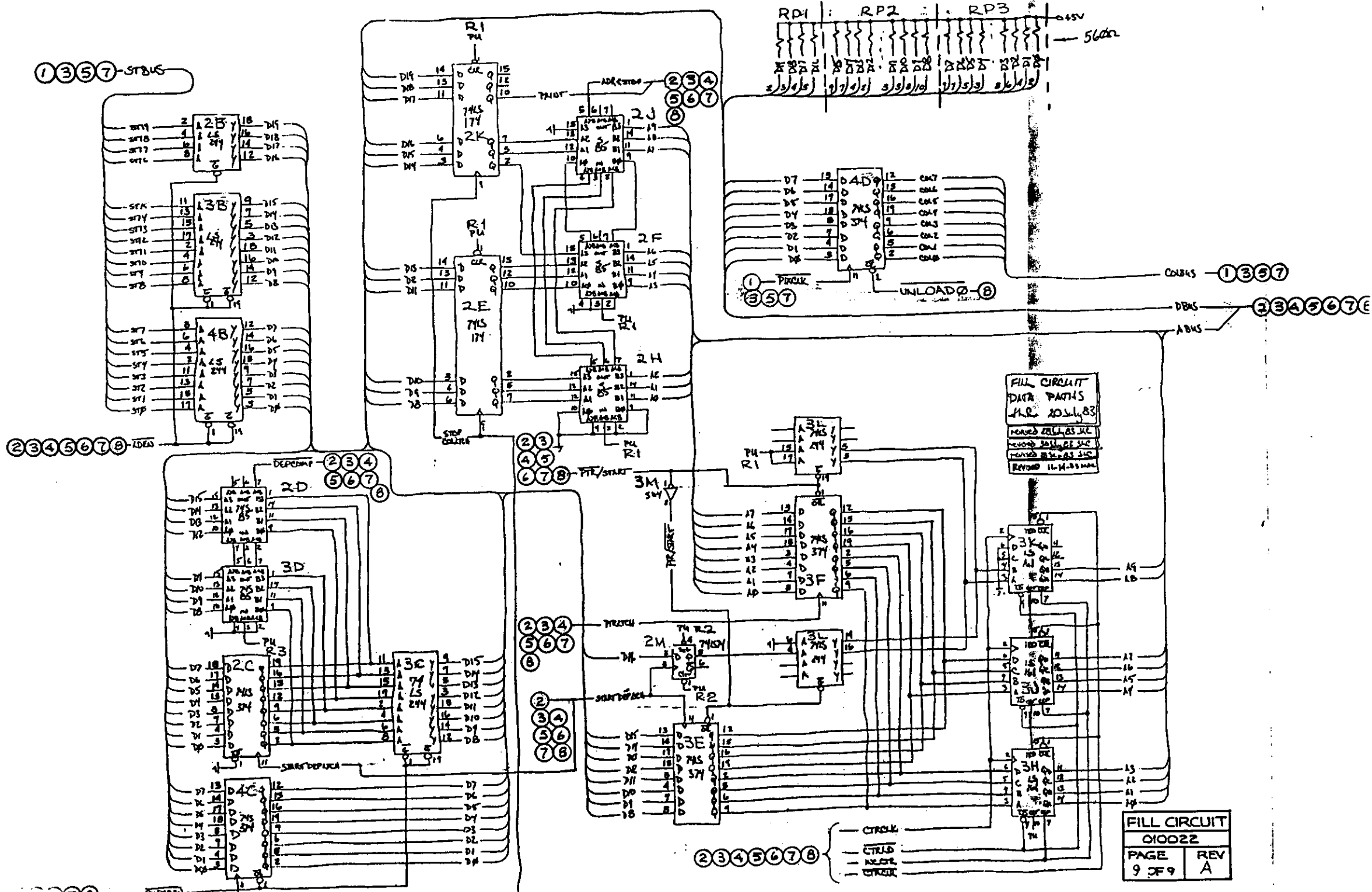




FILL CIRCUIT
 DATA PATHS
 MS 03.1.83
 REVISION 03.1.83
 REVISION 03.1.83
 REVISION 03.1.83
 REVISION 11-14-83

FILL CIRCUIT
 010022
 PAGE 7 OF 9
 REV A

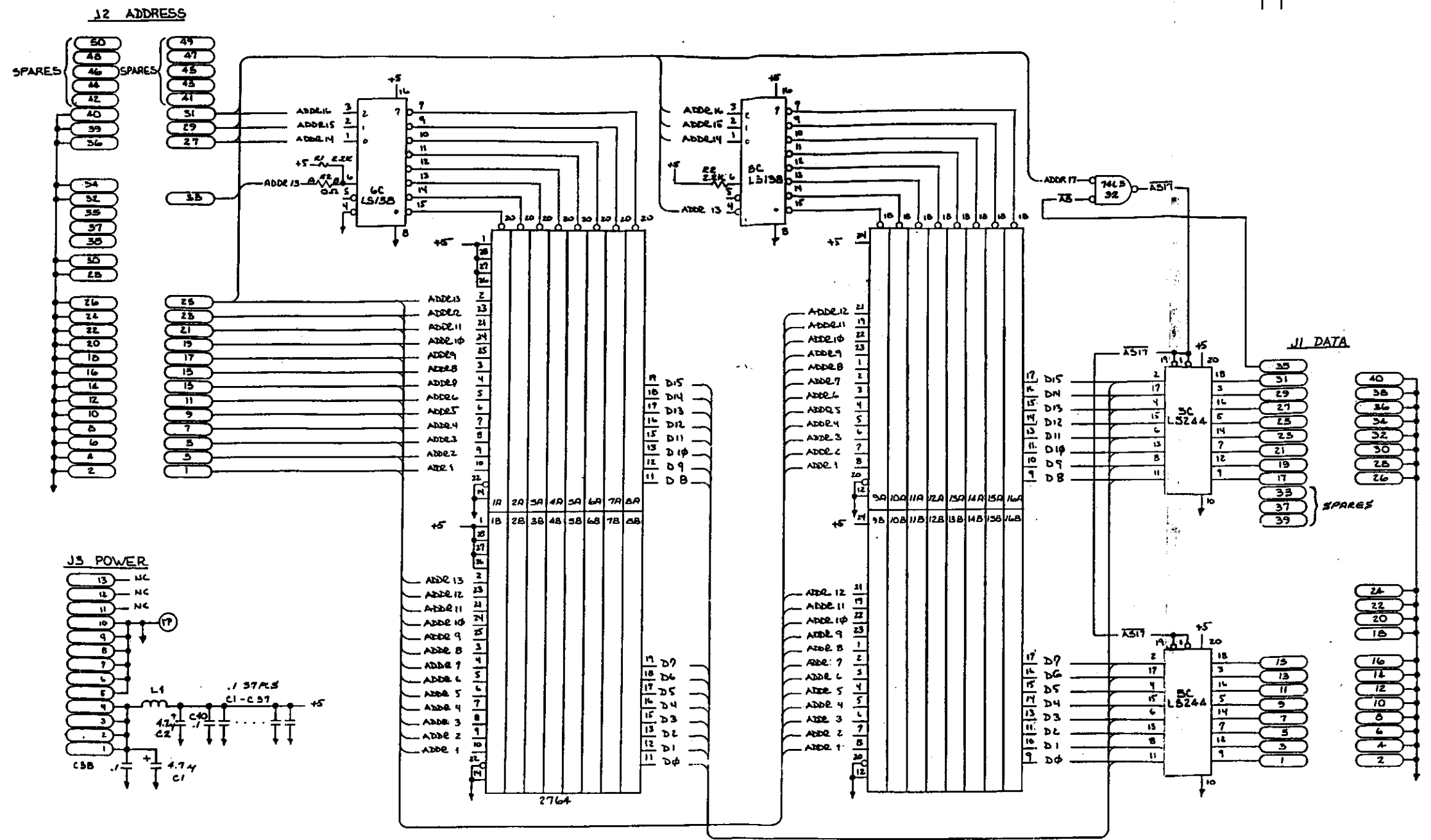




FILL CIRCUIT
 DATA PATH'S
 M.R. 20 JULY 83
 REVISED 11-14-83

FILL CIRCUIT
 010022
 PAGE 9 OF 9
 REV A

| REV | DESCRIPTION | DATE |
|-----|--------------------|---------|
| A | PRODUCTION RELEASE | 7-21-83 |



SHIMULTECH SHIMULTECH INC. CALIFORNIA

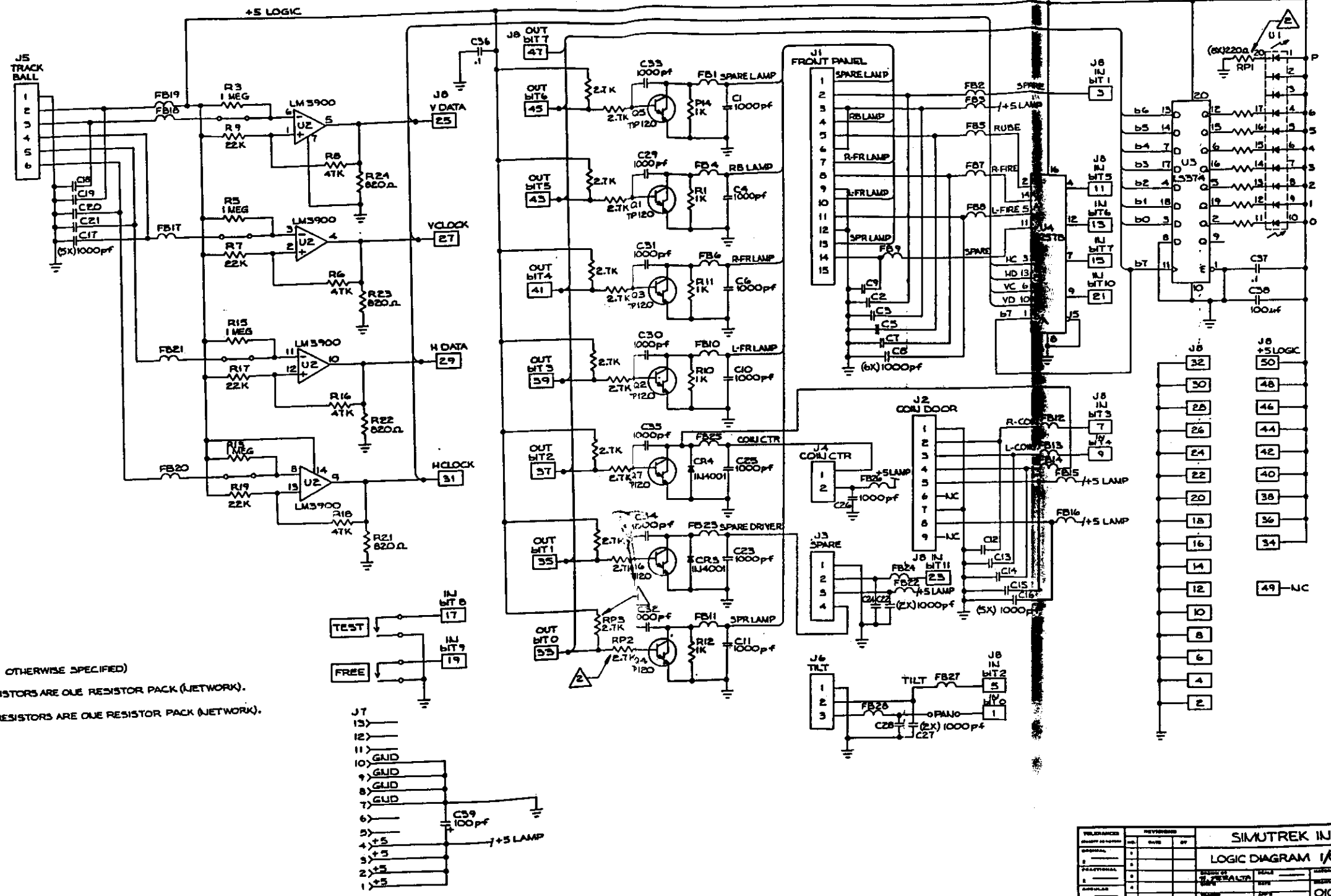
DESIGN: N/A APPROVED BY: DESIGNED BY: MRC

DATE: 7-21-83

LOGIC DIAGRAM - EPROM

00003 A

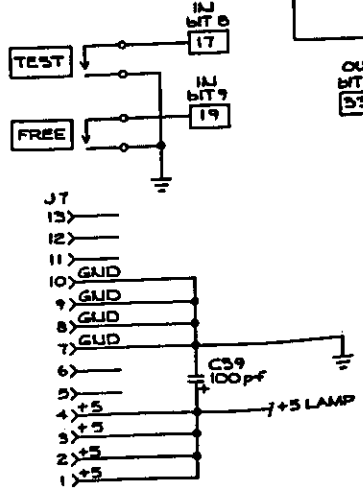
| REVISIONS | | | |
|-----------|--------------------|------|------|
| LTR | DESCRIPTION | DATE | APPO |
| A | PRODUCTION RELEASE | | |



NOTES: (UNLESS OTHERWISE SPECIFIED)

1 VERTICAL RESISTORS ARE ONE RESISTOR PACK (JNETWORK).

2 HORIZONTAL RESISTORS ARE ONE RESISTOR PACK (JNETWORK).



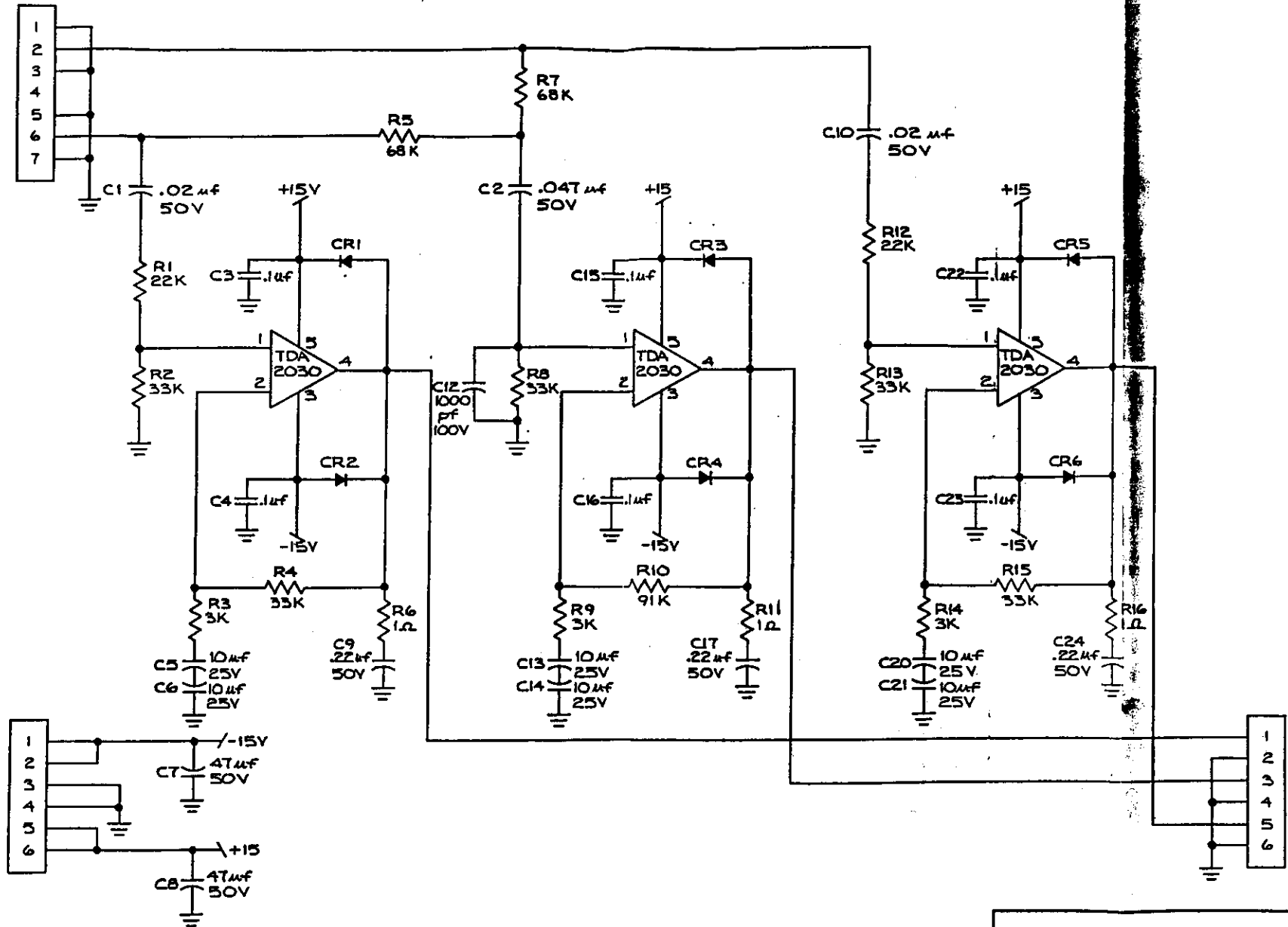
| REVISIONS | | REVISIONS | | REVISIONS | |
|-----------|------|-----------|------|-----------|------|
| NO. | DATE | BY | DATE | BY | DATE |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |

SIMUTREK INC.

LOGIC DIAGRAM 1/0

010233

| REVISIONS | | | |
|-----------|-----------------------------|------|------|
| LTR | DESCRIPTION | DATE | APPD |
| A | PRODUCTION RELEASE | | |
| B | REVISED PER EUG INSTRUCTION | | |



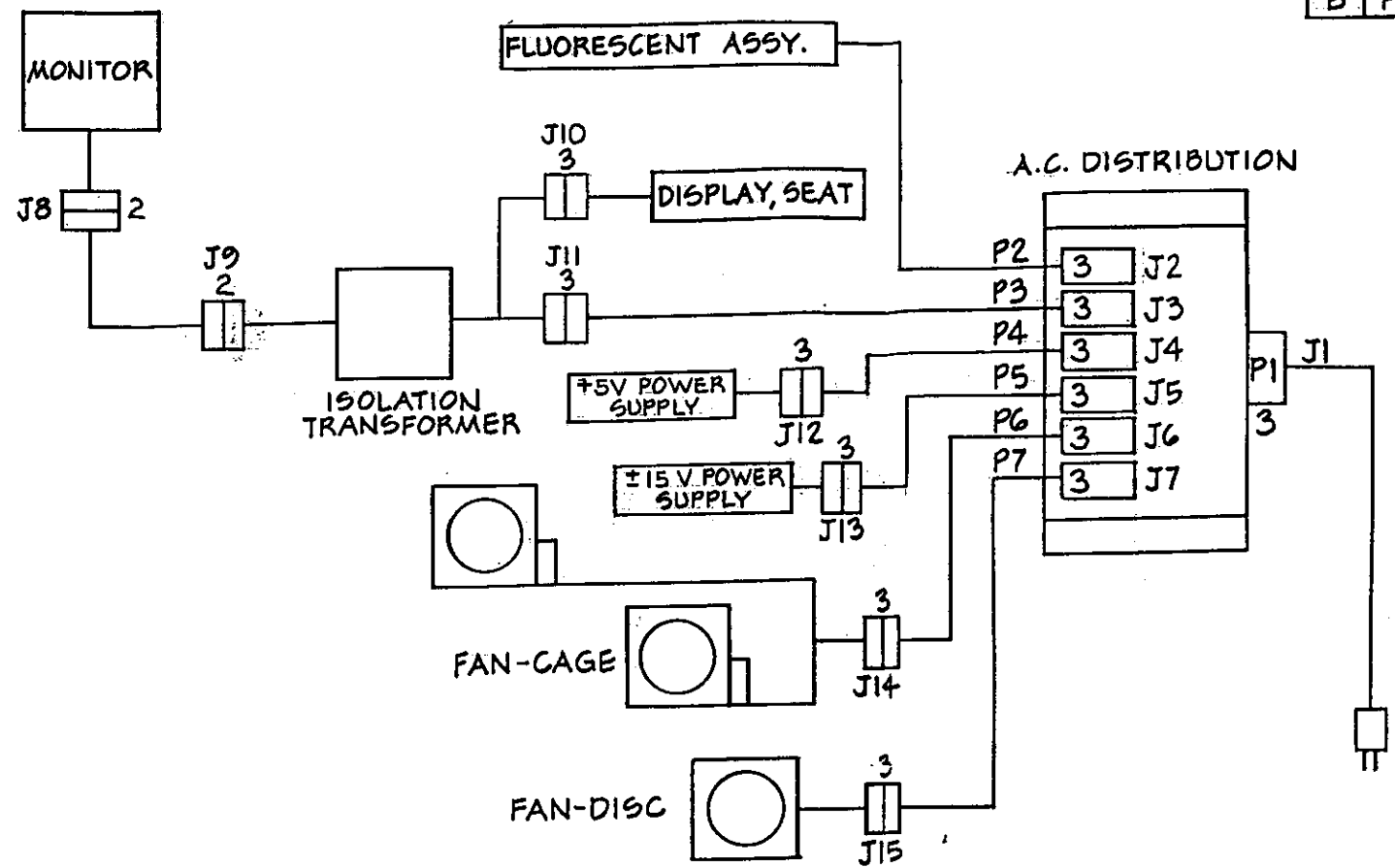
NOTES: (UNLESS OTHERWISE SPECIFIED)

1. ALL RESISTORS ARE 1/4W AND 5%.
2. ALL DIODES ARE 1N4002.
3. LM1875T MAYBE INTERCHANGE WITH TDA2030.

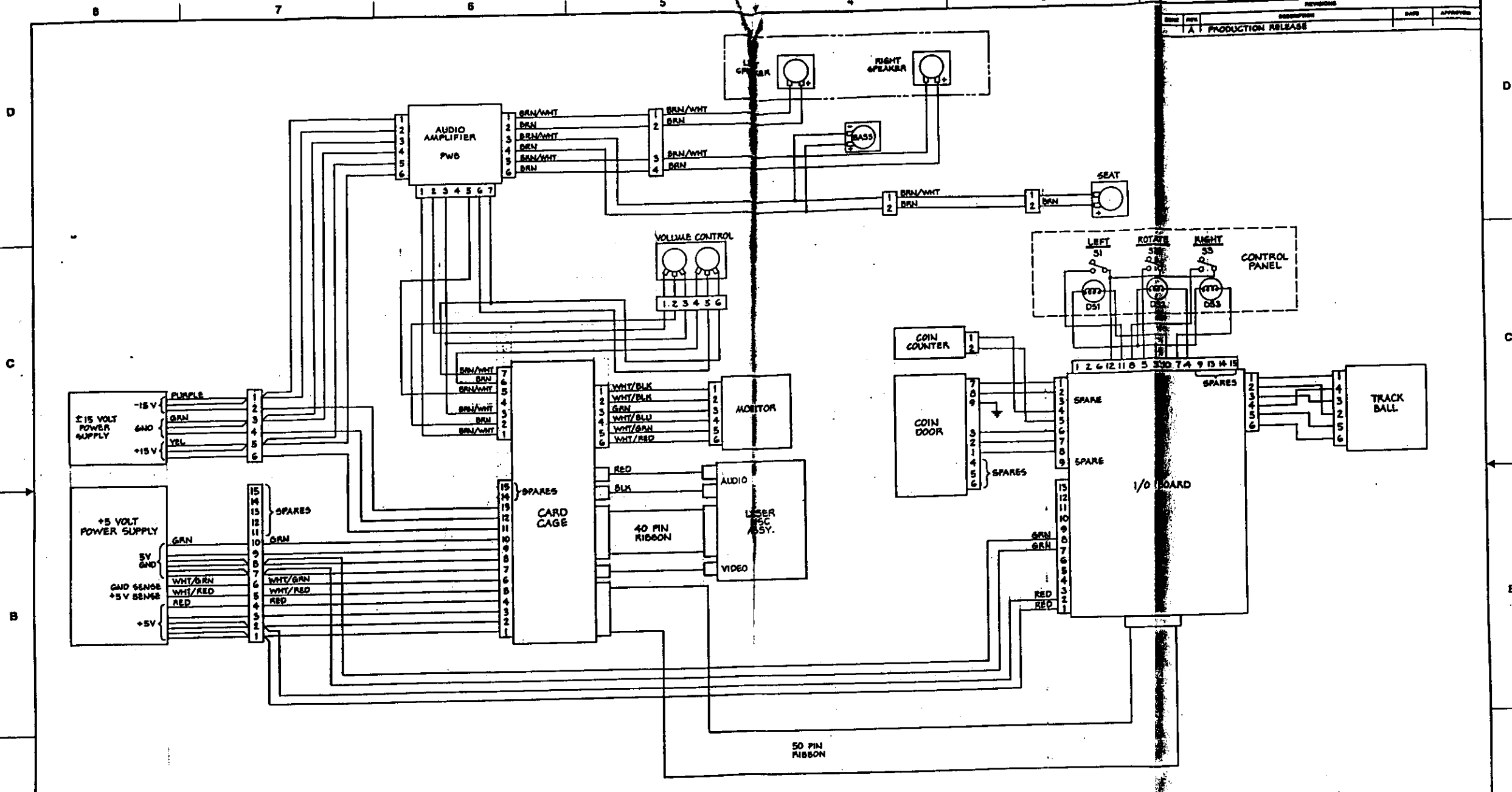
PRINTED WIRING MASTER 010031
 PRINTED WIRING ASSEMBLY 010033
 PRINTED WIRING BOARD 010032

| | | | |
|-----------------|-------------------|----------------|-----|
| SIMUTREK, INC. | | | |
| SCALE: _____ | APPROVED BY _____ | DRAWN BY _____ | |
| DATE: 11-27-83 | | N. PERALTA | |
| AUDIO AMPLIFIER | | | |
| N/A 010033 | | DRAWING NUMBER | REV |
| | | 010034 | B |

| REVISIONS | | | |
|-----------|--------------------|------|----------|
| REV. | DESCRIPTION | DATE | APPROVED |
| B | PRODUCTION RELEASE | | |

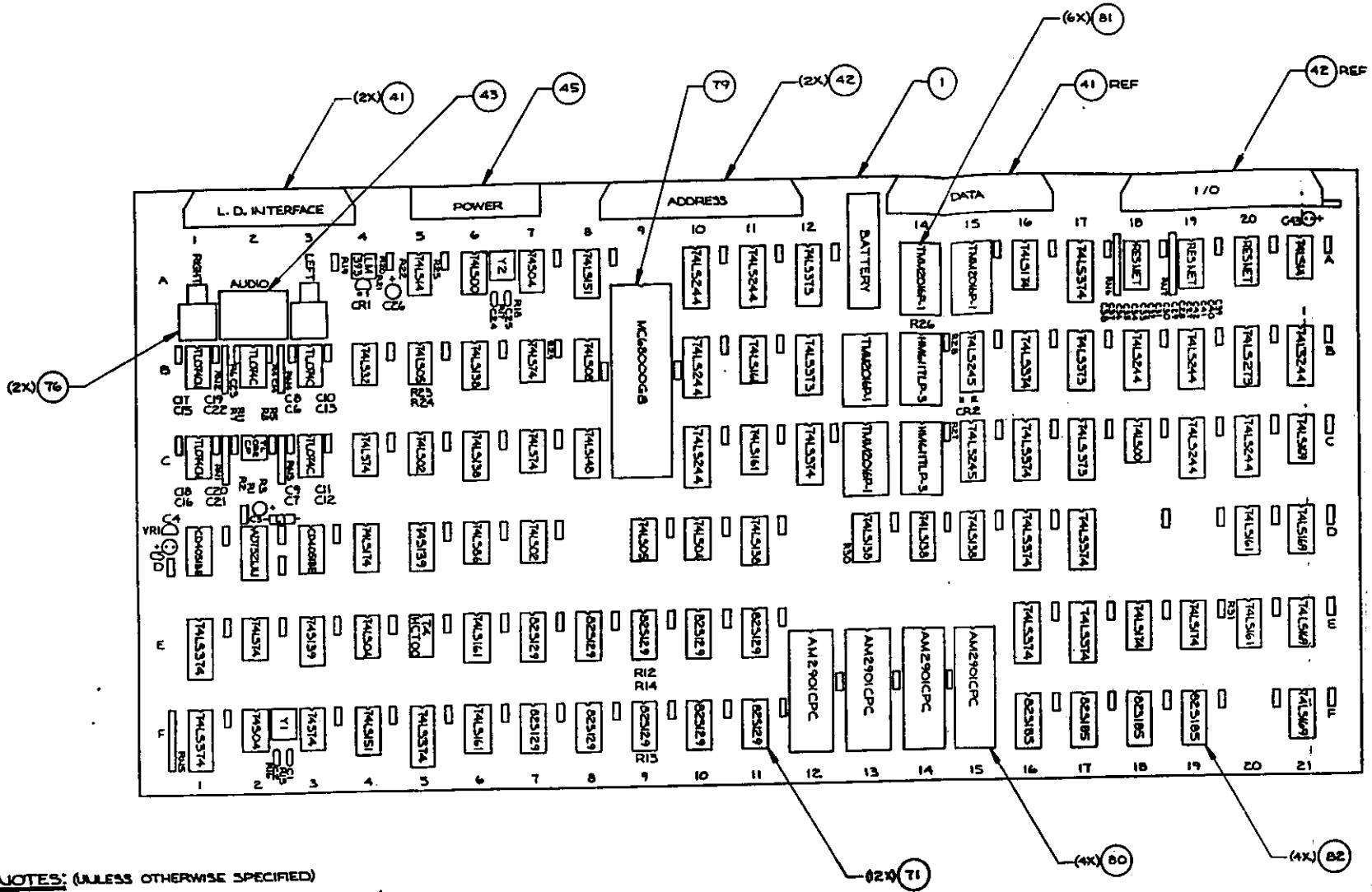


| QTY REQD | FSCM NO. | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | MATERIAL SPECIFICATION |
|---|----------|-------------------------|--|------------------------|
| PARTS LIST | | | | |
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: | | | CONTRACT NO. | |
| FRACTIONS DECIMALS ANGLES | | | APPROVALS DATE | |
| ± / .XX ± / ± / | | | DRAWN C & M 11-25-83 | |
| MATERIAL | | | CHECKED | |
| FINISH | | | ISSUED | |
| 01002 | | | SIZE B FSCM NO. DWG. NO. 010149 REV. B | |
| NEXT ASSY USED ON | | | SCALE NONE SHEET 1 OF 1 | |
| APPLICATION | | | DO NOT SCALE DRAWING | |



| QTY | | FROM | | PART OR IDENTIFYING NO. | | DESCRIPTION | | MATERIAL SPECIFICATION | |
|---|------|------|------|-------------------------|--|----------------------|--|------------------------|--|
| REQD | INVT | REQD | INVT | | | PARTS LIST | | | |
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE DECIMALS FRACTIONS DECIMALS ANGLES | | | | | | CONTRACT NO. | | SIMUTREK, INC. | |
| MATERIAL | | | | | | APPROVALS | | DATE | |
| PARTS | | | | | | DRAWN | | 11-22-83 | |
| NEXT ASMT | | | | | | CHECKED | | C & M | |
| DATE ON | | | | | | FOUND | | REV. A | |
| APPLICATION | | | | | | DO NOT SCALE DRAWING | | REV. NO. 010199 | |
| | | | | | | DRAWN BY | | SHEET 1 OF 1 | |

| REVISIONS | | | |
|-----------|-------------------------------------|------|------|
| LTR | DESCRIPTION | DATE | APPD |
| A | PRODUCTION RELEASE | | |
| B | REVISED PER ENGINEERING INSTRUCTION | | |
| C | REVISED PER ENGINEERING INSTRUCTION | | |
| D | REVISED PER ENGINEERING INSTRUCTION | | |



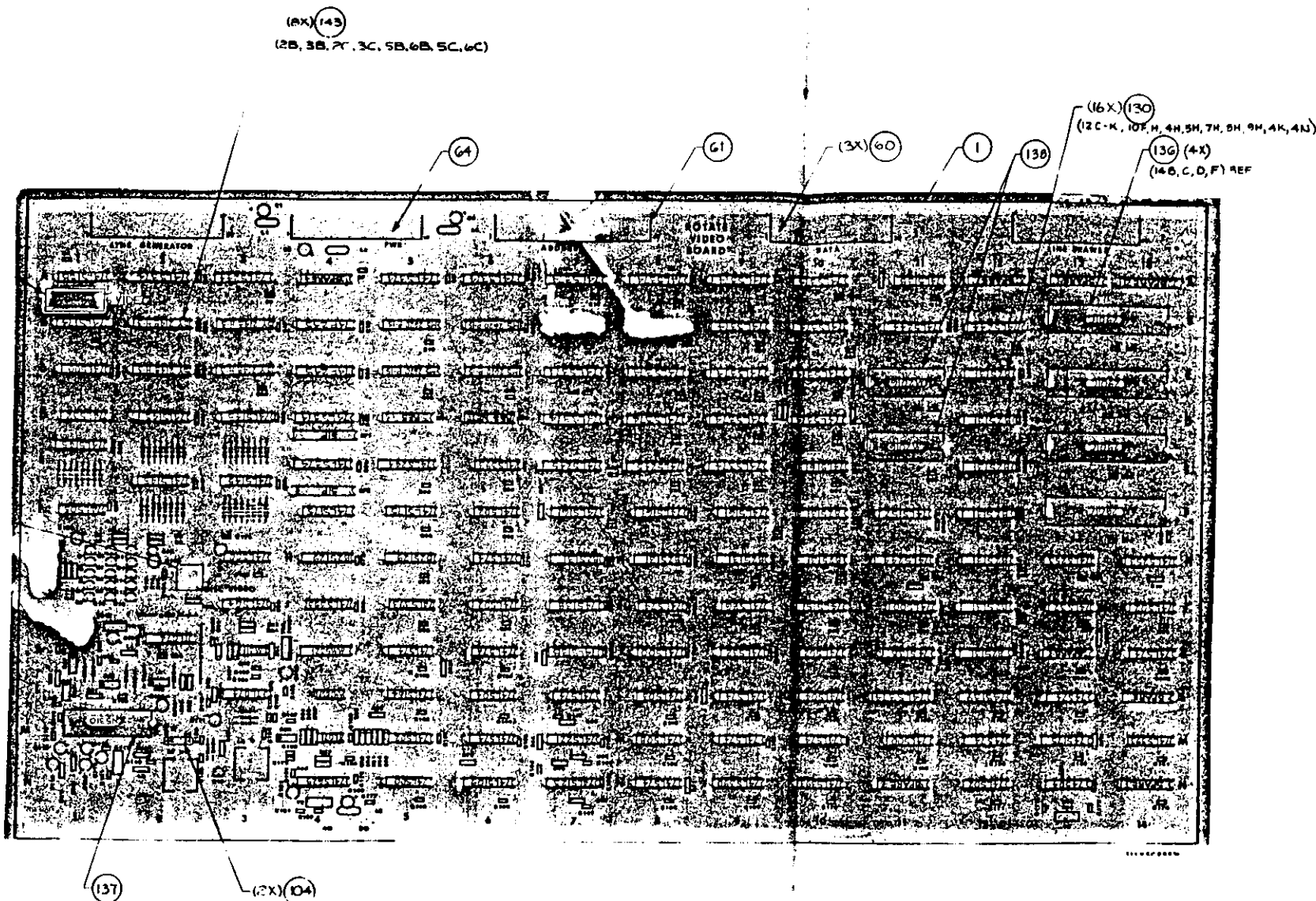
NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RELATED DOCUMENTS ARE: 1. COMPONENT REFERENCE LIST 010017
 2. PARTS LIST 010017
 3. PRINTED WIRING MASTER 010015
 4. PRINTED WIRING BOARD 010016
 5. LOGIC DIAGRAM 010018
2. "DRILLS" ARE TO BE DONE PRIOR TO ANY ASSEMBLY.

FOR LIST OF MATERIAL SEE PL 010017

| | | |
|--|------------|------------------------|
| <small>DATE: 11-25-83</small> <small>BY: J. J. [Signature]</small> <small>REV: 1</small> | | <small>PERALIA</small> |
| MOTHER / SOUNDS | | |
| N/A 010014 | REV A00017 | REV D |
| SHT 1 OF 3 | | |

| | | | | | |
|-----------|-------------------------------------|---------|----------|---|--|
| REV NO | | A010029 | | 1 | |
| REVISIONS | | | | | |
| REV | DESCRIPTION | DATE | APPROVED | | |
| A | PRODUCTION RELEASE | | | | |
| B | REVISED PER ENGINEERING INSTRUCTION | | | | |
| C | REVISED PER ENGINEERING INSTRUCTION | | | | |

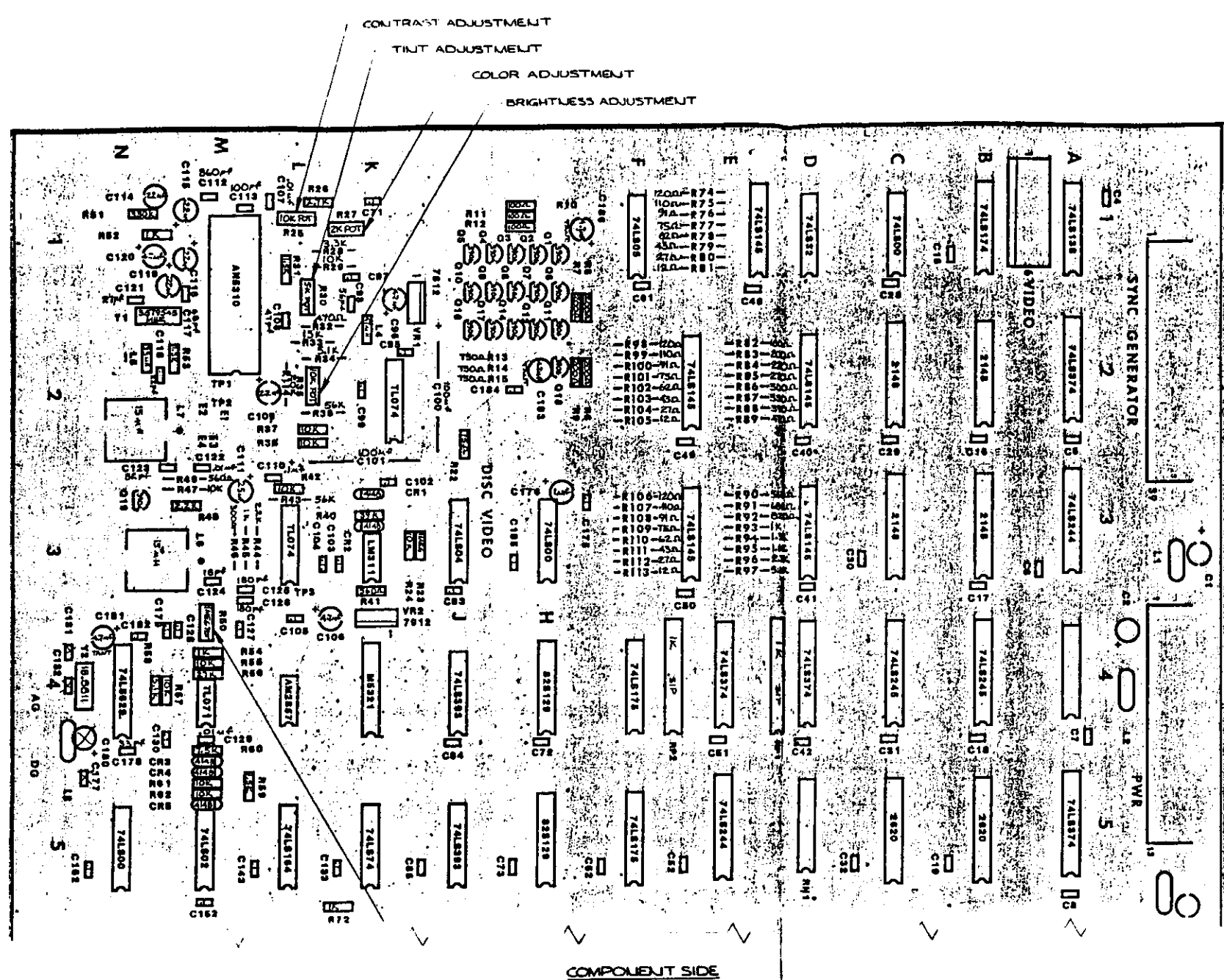


NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RELATED DOCUMENTS ARE:
 1. COMPONENT REFERENCE LIST 010029
 2. PARTS LIST 010029
 3. PRINTED WIRING BOARD 010029
 4. LOGIC DIAGRAM 010029

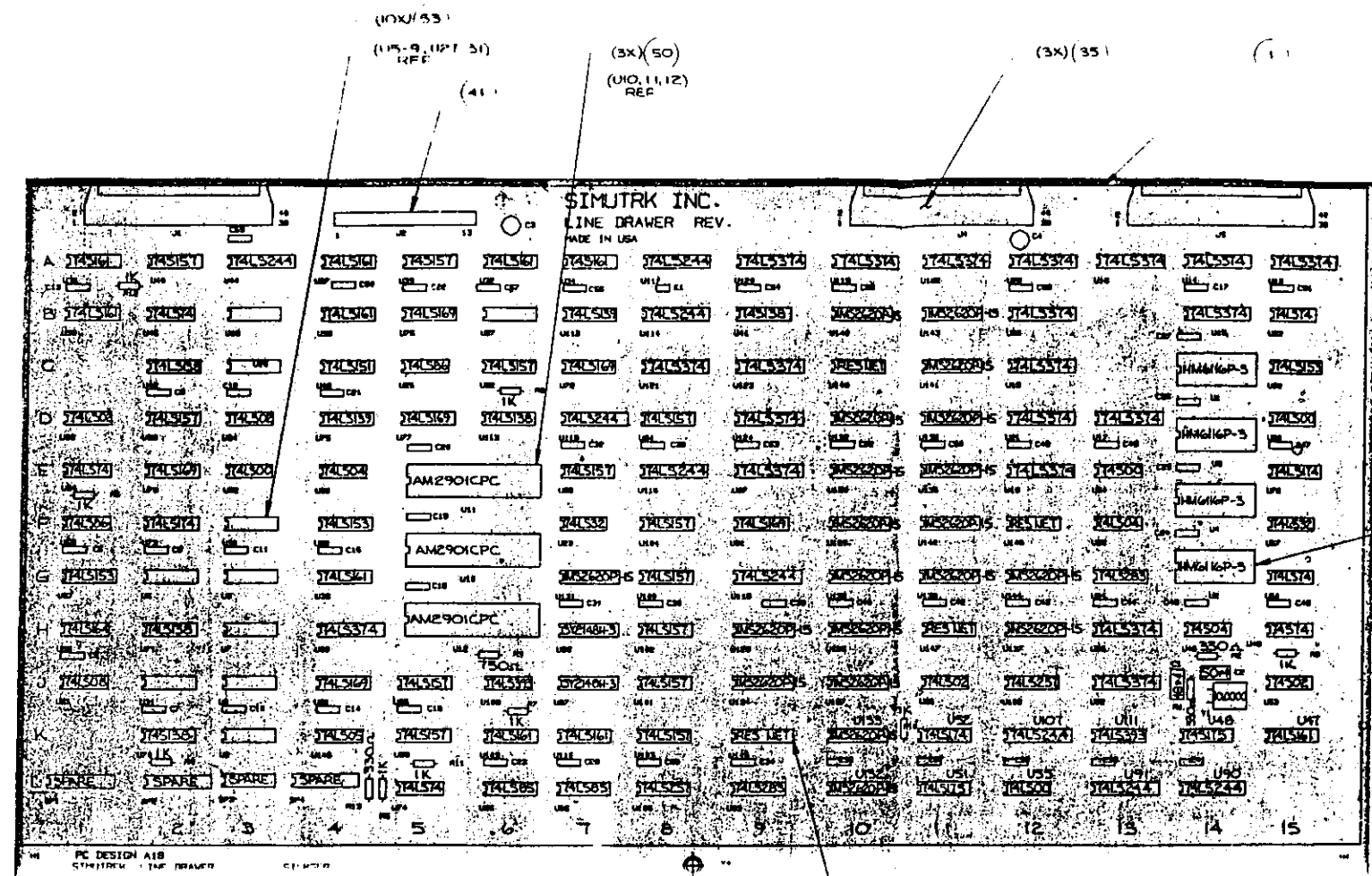
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|---|------|-------------|--------------|------|----------|
| QUANTITY | UNIT | DESCRIPTION | REVISIONS | DATE | APPROVED |
| | | | | | |
| PARTS LIST | | | | | |
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES FRACTIONS DECIMALS ANGLES | | | CONTINUED ON | | |
| MATERIAL | | | APPROVALS | | |
| SEE PARTS LIST | | | DATE | | |
| FORM | | | 11-26-69 | | |
| NEXT ASSY | | | 12 | | |
| USED ON | | | 1969 | | |
| APPLICATION | | | D | | |
| DO NOT SCALE DRAWING | | | A010029 | | |
| | | | PAGE 1 OF 3 | | |

| REVISIONS | | | |
|-----------|---------------------------------|------|------|
| LTR | DESCRIPTION | DATE | APPD |
| X | FOR REVISION STATUS SEE SHEET 1 | | |



| DRAWING | | REVISIONS | | SIMUTREK, INC. | |
|---------------------|------|------------------|------|--------------------------------------|----|
| NO. | DATE | NO. | DATE | REV. | BY |
| | | | | PRINTED WIRING ASSY. ROTATE VIDEO | |
| DRAWN BY: M. KHALTA | | CHECKED BY: FULL | | REV. C | |
| DATE: 7/11/58 | | DATE: 7/11/58 | | A010029 | |
| SHT 2 OF 3 | | | | | |

| REVISIONS | | | |
|-----------|-------------------------------------|--------|------|
| LTR | DESCRIPTION | DATE | APPD |
| A | PRODUCTION RELEASE | 4/1/83 | JF |
| B | REVISED PER ENGINEERING INSTRUCTION | | |



NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RELATED DOCUMENTS ARE: 1. COMPONENT REFERENCE LIST 01002;
2. PARTS LIST 010025
3. LOGIC DIAGRAM 010026
4. PRINTED WIRING MASTER 010023
5. PRINTED WIRING BOARD 010024

FOR LIST OF MATERIAL SEE PL 010025

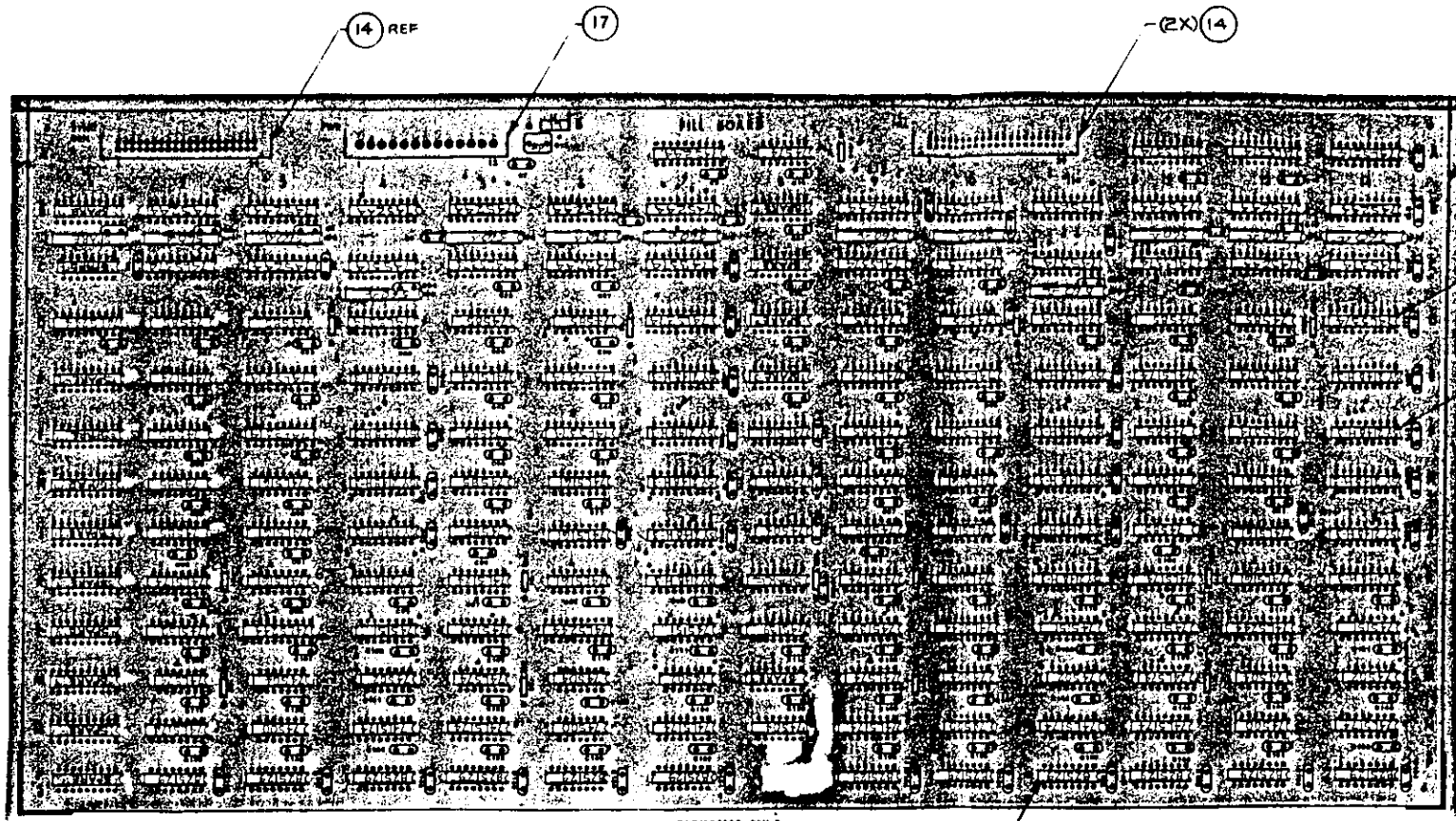
| PART NUMBER | REVISIONS | | DATE | BY |
|-------------|-----------|-------------|------|----|
| | NO. | DESCRIPTION | | |
| N/A 010006 | | | | |

SIMUTREK INC.

**PRINTED WIRING ASSEMBLY
LINE DRAWER**

| | | | |
|----------------------|-----------------------|------|-------------|
| U. PERALTA AW7088 | REV. FULL 12-14-83 | DATE | REV |
| | | | A010025 (A) |

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|-----------|----|-------------------------------------|---|------|----------|
| REV NO | | REV | | REV | |
| A010021 | | 1 | D | | |
| REVISIONS | | | | | |
| REV | NO | DESCRIPTION | | DATE | APPROVED |
| X | A | PRODUCTION RELEASE | | | |
| X | B | REVISED PER ENGINEERING INSTRUCTION | | | |
| X | C | REVISED PER ENGINEERING INSTRUCTION | | | |
| X | D | REVISED PER ENGINEERING INSTRUCTION | | | |



NOTES: (UNLESS OTHERWISE SPECIFIED)

1. RELATED DOCUMENTS ARE: 1. COMPONENT REFERENCE LIST 010021
2. PARTS LIST 010021
3. PRINTED WIRING MASTER 010019
4. PRINTED WIRING BOARD 010020
5. LOGIC DIAGRAM 010022

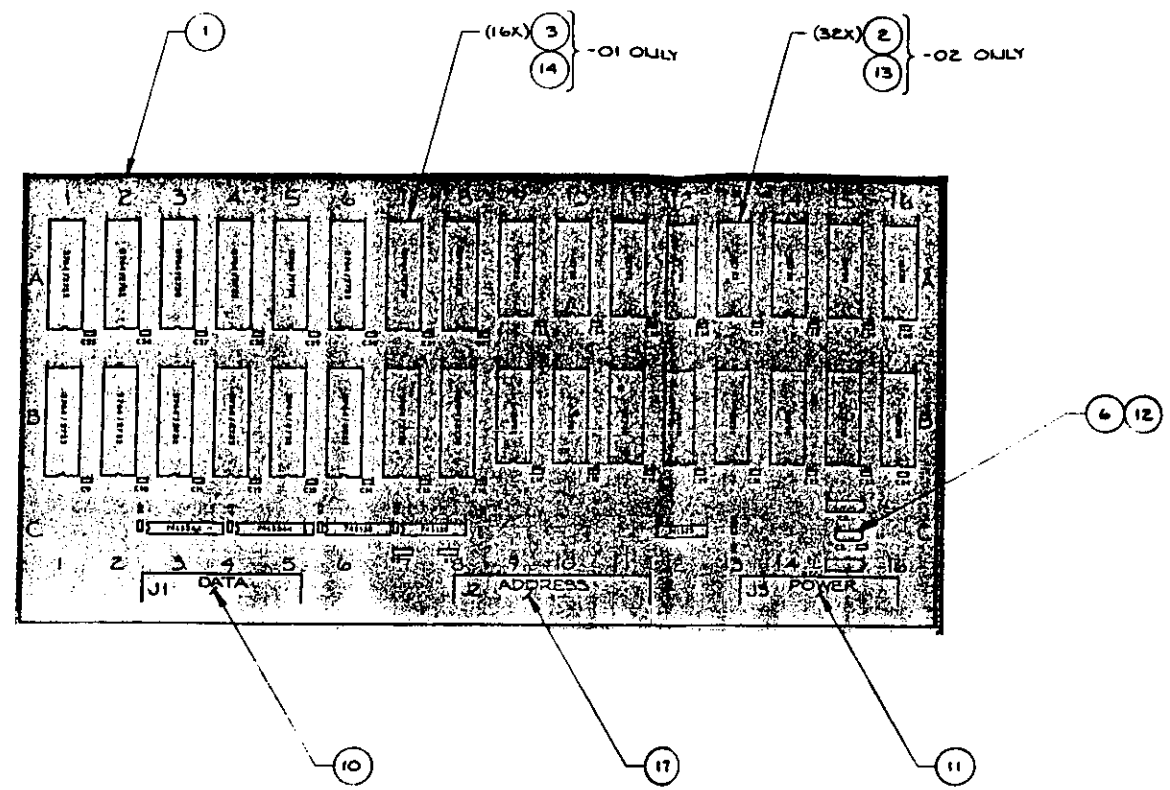
(2X) (30)
(2P-7P, 9P-14P)
REF

FOR LIST OF MATERIAL SEE PL 010021

| | | | | | |
|--|--------|-------------------------|--------------|------------------------|--|
| REV NO | 010006 | PART OR IDENTIFYING NO. | | MATERIAL SPECIFICATION | |
| PARTS LIST | | | | | |
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS AND/EE | | | CONTRACT NO. | | |
| MATERIAL | | | APPROVALS | | |
| FORM | | | DATE | | |
| APPLICATION | | | 11-26-53 | | |
| DO NOT SCALE DRAWING | | | 12-14-53 | | |
| | | | WFT TCM NO. | | |
| | | | REV NO | | |
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| | | | SCALE NONE | | |
| | | | SHEET 1 OF 3 | | |

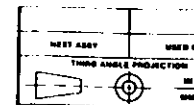
SIMUTREK, INC.
PRINTED WIRING ASSEMBLY
FILL

| REV | DESCRIPTION | DATE | APPROVED |
|-----|--------------------|------|----------|
| A | PRODUCTION RELEASE | | |




NOTES: (UNLESS OTHERWISE SPECIFIED)

- 1. RELATED DOCUMENTS ARE RELATED WIRING MASTER 010010
- 2. RELATED WIRING BOARD 010011
- 3. LOGIC DIAGRAM 010013
- 4. PARTS LIST 010012

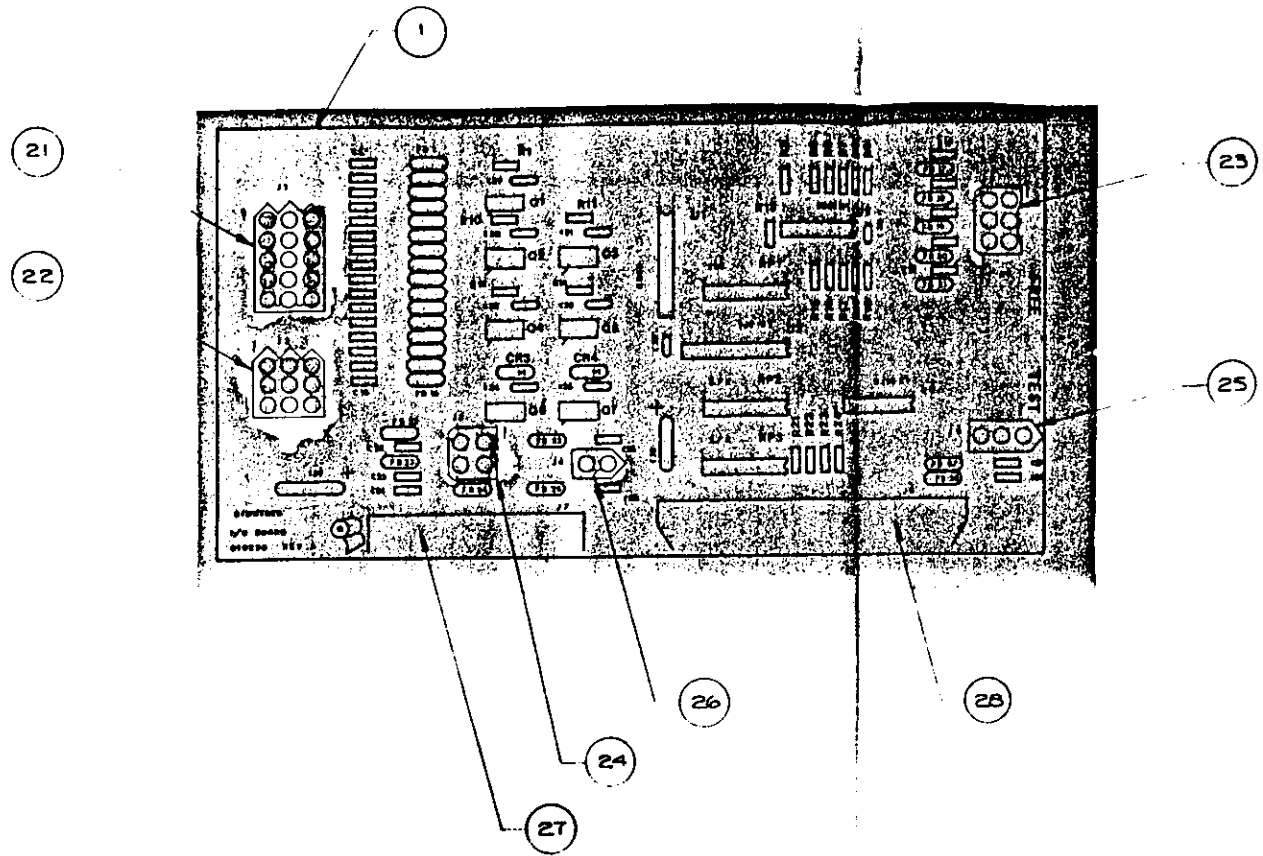


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| | | | | |
|--|--|--|--|----------|
| VERSION/ITY | FABRIC NUMBER | DESCRIPTION | | ITEM NO. |
| PARTS LIST | |  PRINTED WIRING ASSEMBLY EPROM BOARD | | |
| UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES | APPROVALS DESIGNED BY: J. PERALTA CHECKED BY: PROJECT ENGINEER: | DATE: 12-23-85 | DWT: D DRAWING NO: A010012 SCALE: FULL SHEET 1 OF 3 | |

DO NOT SCALE DRAWING

| REVISIONS | | | |
|-----------|--------------------|------|------|
| LTR | DESCRIPTION | DATE | APPD |
| A | PRODUCTION RELEASE | | |



NOTES: (UNLESS OTHERWISE SPECIFIED)

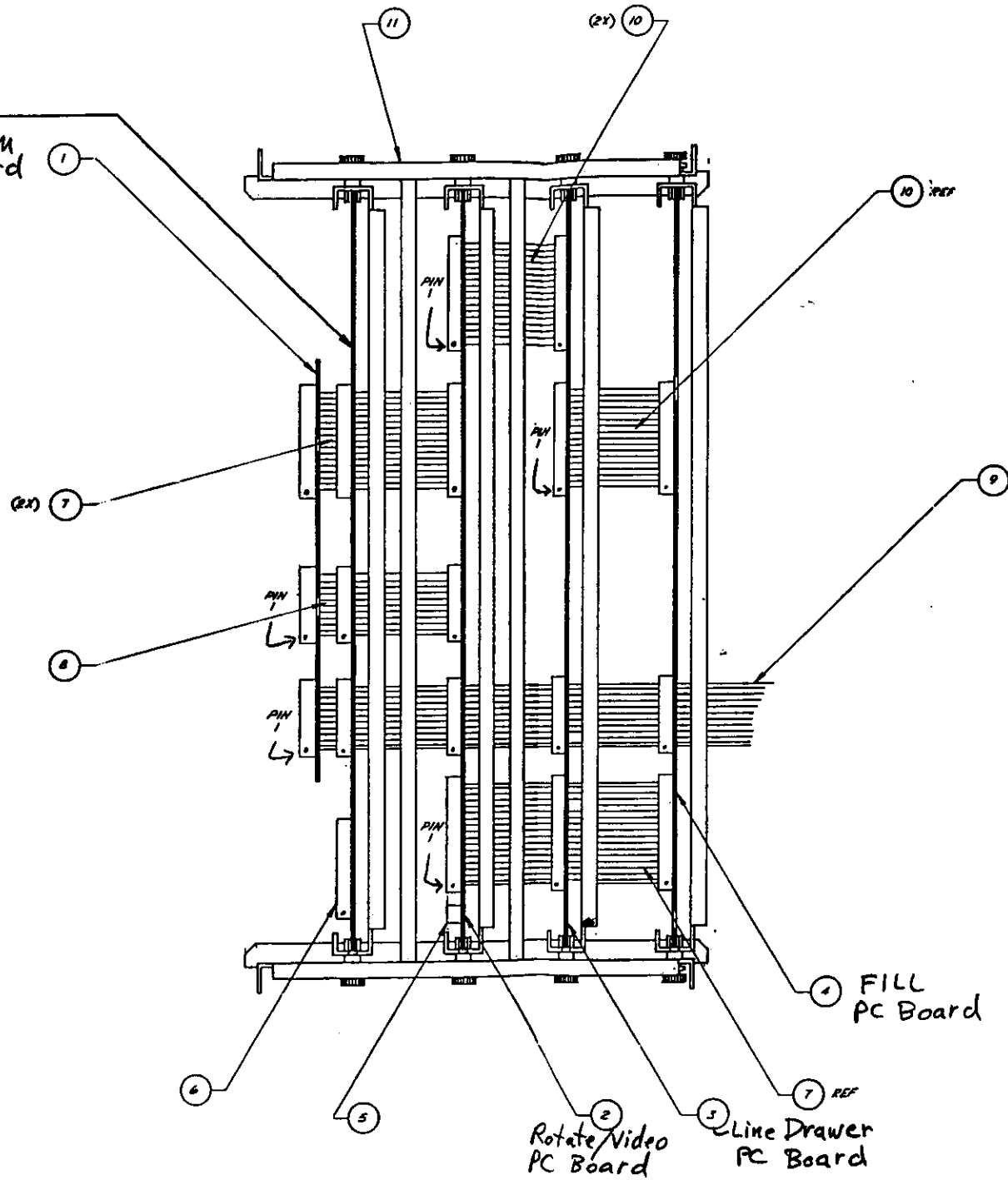
1. RELATED DOCUMENTS ARE:
 1. PRINTED WIRING MASTER 010230
 2. PRINTED WIRING BOARD 010231
 3. LOGIC DIAGRAM 010233
 4. PARTS LIST 010232
2. DO NOT STUFF C1 THRU C35

FOR LIST OF MATERIAL SEE PL 010232

| | | | |
|-----------------------------------|-------------|----------------|-----|
| SIMUTREK, INC. | | | |
| SCALE: FULL | APPROVED BY | DRAWN BY | |
| DATE: 11-30-83 | | N. PERALTA | |
| PRINTED WIRING ASSEMBLY <i>ip</i> | | | |
| | SHT 1 OF 1 | DRAWING NUMBER | REV |
| | | A010232 | A |

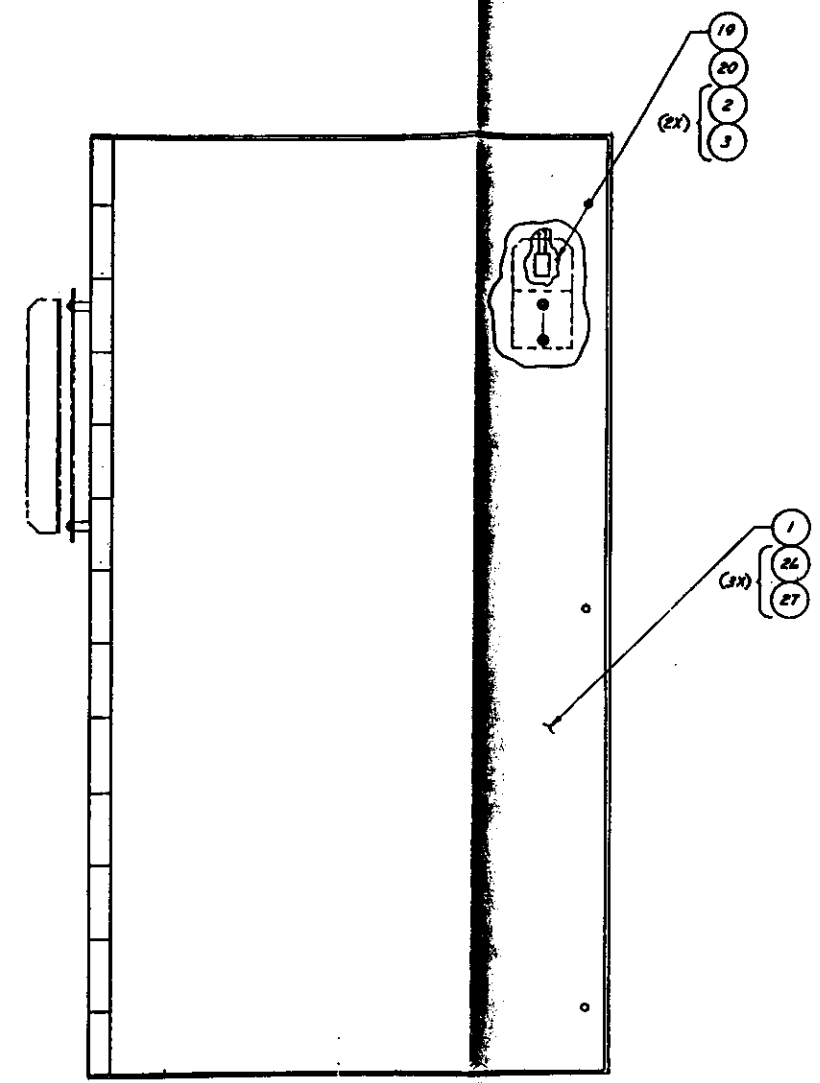
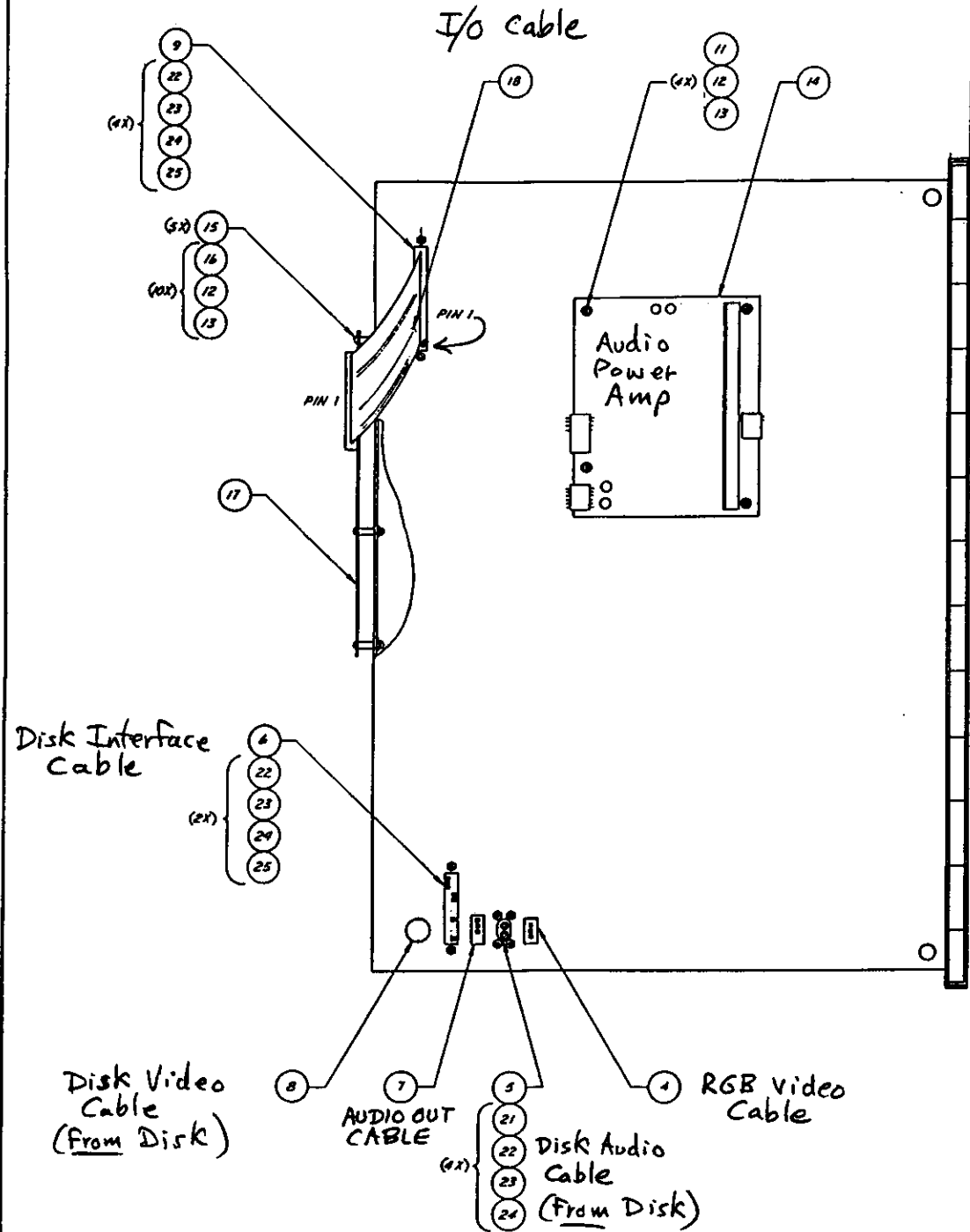
Mother/Sounds
PC Board

EPROM
PC Board



FOR LIST OF MATERIAL SEE PL 010006

| TOLERANCES | AS SHOWN | | | MATERIAL |
|------------|----------|-------|-----|------------------|
| | MIN | NOM | MAX | |
| GENERAL | A | | | ELECTRONICS ASSY |
| FRACTIONAL | | | | |
| DECIMAL | | | | |
| PERCENT | | | | |
| | | DATE | BY | REVISION NO. |
| | | 16-82 | | 010006 |
| | | 100% | | |



FOR LIST OF MATERIAL SEE PL 010253

| REVISED | REVISIONS | | | DATE | BY |
|-----------------------|-----------|------|---------|--------------|--------|
| | NO. | DATE | BY | | |
| 1 | A | | | | |
| ENCLOSURE ASSY | | | | | |
| DESIGNED BY | TD | DATE | 12-8-83 | REVISION NO. | 010253 |
| DRAWN BY | | DATE | | REVISION NO. | |
| CHECKED BY | | DATE | | REVISION NO. | |
| APPROVED BY | | DATE | | REVISION NO. | |

TITLE: Mother SoundsDWG. NO.: 010017 Rev BSHEET 1 OF 3

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|--------------------|---|
| 2 | 74LS00 | 6A, 18C |
| 3 | 74LS02 | 5C, 7D |
| 4 | 74LS04 | 4E, 10D |
| 5 | 74LS08 | 8B |
| 6 | 74LS32 | 4B |
| 7 | 74LS74 | 2E, 4C, 7B, 7C, |
| 8 | 74LS86 | 6D |
| 9 | 74LS139 | 3E, 5D |
| 10 | 74LS148 | 8C |
| 11 | 74LS151 | 4F, 8A, |
| 12 | 74LS161 | 6E, 6F, 11B, 11C, 20D, 20E |
| 13 | 74LS169 | 21C, 21D, 21E, 21F |
| 14 | 74LS174 | 16A, 18E, 19E, 4D |
| 15 | 74LS244 | 10A, 10B, 10C, 11A, 18B, 19B, 19C, 20C, 21B |
| 16 | 74LS245 | 15B, 15C |
| 17 | 74LS374 | 1E, 1F, 5F, 12C, 16B, 16C, 16D, 16E, 17A, 17D, 17E, |
| 18 | TMM2016P-1 | 15A, 14A 13B, 13C |
| 19 | MC68000G8 | 9B |
| 20 | 10.00000 MHZ | Y1 |
| 21 | LM393 | 4A |
| 22 | AM2901CPC | 12F, 13F, 14F, 15F |
| 23 | 79L05 | VR1 |
| 24 | CD4051BE | 1D, 3D |
| 25 | 16.00000 MHZ | Y2 |
| 27 | BATTERY | 13A |

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|-----------------------------------|------------------------------------|
| 26 | 74S74 | 3F |
| 28 | 330 OHMS | RL7, 18 |
| 29 | RES. NETWORK 1K | RN5 |
| 30 | RES. NETWORK 10 K | RN1-4 |
| 31 | 100 PF | C2 |
| 32 | .1 MF | ALL LOCATIONS MARKED BY * |
| 33 | 47 MF | C26 |
| 34 | 1500 PF | C6-13, C15-22 |
| 35 | 470 OHM | RL5, 16 |
| 36 | 1 K | R23, 24, 29, 30, 31 |
| 37 | 1 MEG | R1 |
| 38 | 2.2 K | R5, 7 |
| 39 | 3.3 K | RL9, 4, 6 (SEE REWORK INSTRUCTION) |
| 40 | 10 K | R22 SEE REWORK INSTRUCTIONS |
| 46 | HM6117LP-3 (OR EQUIV. HM6116LP-3) | 14B, 14C |
| 47 | 10 MF | C3, 43 |
| 48 | .02 MF | C4 |
| 49 | 4.7 MF | C5 |
| 50 | 6800 PF | C14, 23 |
| 51 | 1000 PF | C27, -42 |
| 52 | 18 PF | C1, 24 |
| 53 | TL074CN (OR EQUIV. LF347N) | 1B, 1C, 2B, 3B, 3C |
| 54 | 74LS373 | 12A, 12B, 17B, 17C |
| 55 | 82S185 | 16F, 17F, 18F, 19F |
| 56 | 74LS138 | 6B, 6C, 11D, 13D, 14D, 15D |
| 57 | 74LS05 | 5B, 9D 6, 0, 1 |

TITLE: Mother SoundsDWG. NO.: 010017 Rev. DSHEET 3 OF 3

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|-----------------------------|--|
| 58 | 82S129 | 7E, 7F, 8E, 8F, 9E, 9F, 10E, 10F, 11E, 11F |
| 59 | AD752LJN | 2D |
| 60 | SOCKET 18 PIN | 16F, 17F, 18F, 19F |
| 61 | 9.09 K \pm 1% | R20 |
| 62 | 10K \pm 1% | R2, 3, 21 |
| 63 | LM336B | CR1 |
| 64 | 750 OHM | R25, R12, R13, R14 |
| 65 | 1N4002 | (SEE REWORK INSTRUCTIONS) |
| 66 | RES NETWORK 100 OHM | A18, 19 |
| 67 | RES NETWORK 220 OHM | A20 |
| 69 | 74LS14 | 5A, 21A |
| * 71 | SOCKET 16 PIN | 7E, 7F, 8E, 8F, 9E, 9F, 10E, 10F, 11E, 11F, D1, D2 |
| 72 | TL072CP (OR EQUIV. LF353) | 2C |
| 73 | 100 OHMS | R8, 11 |
| 74 | RES. NETWORK 3.3K | RN6, 7 |
| 75 | FERRITE BEAD | L1 |
| 77 | 47 PF | C25 |
| 78 | 27 PF | SEE REWORK INSTRUCTIONS |
| **70 | 74S04 | 2F, 7A |
| 79 | SOCKET 64 PIN | 9 B |
| 80 | SOCKET 40 PIN | 12E, 13E, 14E, 15E |
| 81 | SOCKET 24 PIN | 14A, 15A, 13B, 13C, 14B, 14C |
| 82 | 74LS273 | 20B |
| 83 | 10 K | (SEE REWORK INSTRUCTIONS) |
| 84 | 74HC100 | 5E |
| 85 | 180 OHM | R26 |
| 86 | 1N5817 | CR2 (SEE REWORK INSTRUCTIONS) |

TITLE: Rotate Video

DWG. NO.: 010029

Rev C

SHEET 1 OF 6

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|--------------------|---|
| 2 | 74LS00 | 11J, 11M, 8K, 5N, 3H, 1C |
| 3 | 74LS02 | 14J, 12N, 10K, 6F, 6J, 5M |
| 4 | 74LS04 | 10L, 6L, 3J |
| 5 | 74LS08 | 8M |
| 6 | 74LS32 | 13J, 9K, 1D |
| 7 | 74LS74 | 14K, 10M, 9L, 9M, 8N, 7L, 6H, 6K, 6M, 5K, 8J |
| 8 | 74LS86 | 9J |
| 9 | 74LS123 | 7N |
| 10 | 74LS138 | 11A, 1A, 7K |
| 11 | 74S139 | 12L |
| 12 | 74LS145 | 3D, 3E, 2D, 2E, 1E |
| 13 | 74LS151 | 10J |
| 14 | 74LS157 | 11F |
| 15 | 74LS161 | 10E, 9F, 8F, 7F |
| 16 | 82S129 | 5H, 4H |
| 17 | 74S175 | 13M |
| 18 | 74LS175 | 4F, 5F |
| 19 | 74LS244 | 12B, 11B, 11H, 5E, 3A |
| 20 | 74LS245 | 8E, 7E |
| 21 | 74LS253 | 14H, 13H |
| 22 | 74LS629 | 4N |
| 23 | 74LS374 | 11L, 10A, 10B, 10C, 10D, 9A, 9B, 9C, 9D, 9E, 8A, 8C, 8D, 7A, 7C, 7D, 6A, 5A, 4D, 4E, 2A |
| 24 | 82S131 | 12C, 12D, 12E, 12F, 12H, 12J, 12K, 10F, 10H, 9H, 8H, 7H |
| 25 | TL071 | 4M |

TITLE: Rotate/Video

DWG. NO.: 010029 Rev B

SHEET 2 OF 6

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|--------------------|--|
| 26 | TL074 | 3L, 2K |
| 27 | LM311 | 3K |
| 28 | POTENTIOMETER 2K | R27 |
| 29 | 3,579545 MHZ | Y1 |
| 30 | 2N3904 | Q3, 4, 8, 9, 14, 17, 19 |
| 31 | 2N3906 | Q1, 2, 5, 6, 7, 10, 11, 12, 16, 18 |
| 32 | 1N4148 | CR1-5 |
| 33 | TMM2016P-1 | 11C, 11D |
| 34 | AM2901CPC | 14B, 14C, 14D, 14F |
| 35 | 1MS2620P-15 | 6B, 6C, 5B, 5C |
| 36 | 74LS393 | 14M, 10N, 6E, 5J, 4J |
| 37 | 74LS05 | 1F |
| 38 | 10.00000 MHZ | Y3 |
| 39 | 18PF | C124, 172 |
| 40 | 56PF | C98 |
| 41 | .01MF | C107, 122, 129 |
| 42 | 1000 PF 5% | C145 |
| 43 | 4.7 MF TANTALUM | C181, 183, 186 |
| 44 | 22PF | C118 |
| 45 | 75 OHMS | R22, 77, 101, 109 |
| 46 | 560 OHMS | R41, 49, 90 |
| 47 | 330 OHMS | R68, 69, 87 |
| 48 | 390 OHMS | R88 |
| 49 | 1 MEG | R23 |
| 50 | 100 OHMS | R10-12 |
| 51 | 1K | R1-5, R21, R45, R52, R54, R63, R70-72, R93, R16-20 |

TITLE: Rotate/VideoDWG. NO.: 010029 Rev BSHEET 3 OF 6

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|--------------------|---|
| 52 | 330K | R51 |
| 53 | 1.5K | R31, 53, 59 |
| 54 | 1.8K | R95 |
| 55 | 39K | R40 |
| 56 | 2.7K | R26, 96 |
| 57 | 10K | R24, 29, 37, 38, 42, 47, 55, 57, 61, 62, 65 (SEE REWORK INSTRUCTION) |
| 58 | 27K | R56 |
| 59 | 56K | R36, 43 |
| 63 | POTENTIOMETER 10K | R25, 35 |
| 66 | 74LS109 | 6N |
| 67 | 74LS164 | 5L |
| 68 | 74LS174 | 1B |
| 69 | SY2148H-3 | 3B, 3C, 2B, 2C |
| 70 | 74LS221 | 7M |
| 71 | MM5321 | 4K |
| 72 | 74LS390 | 9N |
| 74 | AM2857DC | 4L |
| 75 | AN5310 (OR CN5310) | 1M |
| 76 | 33PF | C178 |
| 77 | 1000PF \pm 1% | C165, 167 |
| 78 | 4.7MF | C96, 106, 120 |
| 79 | 25MF | C111 |
| 80 | .22MF | C114-116, 119 |
| 81 | 1MF | C164, 176 |
| 82 | 180PF | C125, 126 |
| 83 | 360PF | C112 |

TITLE: Rotate/VideoDWG. NO.: 010029 Rev BSHEET 4 OF 6

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|---------------------|------------------------------|
| 84 | 68PF | C117 |
| 85 | 27PF | C121 |
| 86 | 47PF | C108, 173 |
| 87 | 100PF | C113 |
| 88 | 82PF | C123 |
| 89 | 15 MH | L6, L7 |
| 90 | 33 MH | L5 |
| 91 | 47 MH | L4 |
| 92 | 2.2K | R48, 44 |
| 93 | 5.1K | R34, 58 |
| 94 | 84.5K \pm 1% | R66 |
| 95 | 147K \pm 1% | R67 (SEE REWORK INSTRUCTION) |
| 96 | 16K | R64 |
| 97 | 3.3K | R28 |
| 98 | 20K | R114 |
| 99 | POTENTIOMETER 5K | R30 |
| 100 | POTENTIOMETER 1 MEG | R50 |
| 101 | 12 OHMS | R81, 105, 113 |
| 102 | 27 OHMS | R80, 104, 112 |
| 103 | 43 OHMS | R79, 103, 111 |
| 105 | 62 OHMS | R78, 102, 110 |
| 106 | 91 OHMS | R76, 100, 108 |
| 107 | 110 OHMS | R75, 99, 107 |
| 108 | 120 OHMS | R74, 98, 106 |
| 109 | 180 OHMS | R82 |
| 110 | 200 OHMS | R6-9, 83 |

TITLE: Rotate/Video

DWG. NO.: 010029 Rev C

SHEET 5 OF 6

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|--------------------|--|
| 111 | 220 OHMS | R84 |
| 112 | 270 OHMS | R85 |
| 113 | 300 OHMS | R46, 86 |
| 114 | 470 OHMS | R32, 89 |
| 115 | 680 OHMS | R91 |
| 116 | 750 OHMS | R13-15, 73 |
| 117 | 820 OHMS | R92 |
| 118 | 1.3K | R94 |
| 119 | 5.6 K | R97 |
| 120 | 7.5K | R60 |
| 121 | 1K SIP | RPI, 2 |
| 122 | 2.2 MF | C109 |
| 123 | 18.88111 MHZ | Y2 |
| 124 | 7812 | VRI |
| 125 | 7912 | VR2 |
| 127 | 74LS03 | 8L |
| 128 | 74S74 | 13L, 12M |
| 129 | 74S138 | 11K, 7J, |
| 130 | SOCKET 16 PIN | 4H, 5H, 7H, 8H, 9H, 10F, 10H, 12C-12K, 4K, 4N |
| 131 | 74S04 | 13N |
| 132 | 100 MF | C100, 101 |
| 133 | FERRITE BEAD | L1-3 |
| 134 | FERRITE BEAD | BASE OF ALL TRANSISTORS |
| 135 | 51 OHM DIP | RN3, 4 |
| 139 | .1 MF | C4-95, 97, 99, 102-105, 110, 114-116, 119, 127, 128, 130, 133-144, 146-163, 166, 168-171, 174, 175, 179, 183, 185 (SEE REWORK INSTRUCTION) |

TITLE: Rotate/Video

DWG. NO.: 010029 Rev B

SHEET 6 OF 6

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|--------------------|-------------------------|
| 141 | 47 MF | C1-3 |
| 142 | 15K | R33 |
| 136 | SOCKET 40 PIN | 14B, 14C, 14D, 14F |
| 137 | SOCKET 28 PIN | 1 M |
| 138 | SOCKET 24 PIN | 11C, 11 D |
| 143 | SOCKET 18 PIN | 2B,3B,2C,3C,5B,5C,6B,6C |
| 144 | 74F245 | 4B,4C |

TITLE: Line DrawerDWG. NO.: 010025 Rev BSHEET 1 OF 3

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION IN () |
|----------|--------------------|--|
| 2 | 74LS00 | U60, U55, U62, (15D, 12L, 3E) |
| 3 | 74LS02 | U56, U24, U59, (11J, 3D, 1D) |
| 4 | 74LS04 | U26, U65, (13F, 4E) |
| 5 | 74LS08 | U61, (1J) |
| 6 | 74LS257 | U106, U105, (12J, 8L) |
| 7 | 74LS32 | U57, U23, (15F, 7F) |
| 8 | 74LS74 | U63, U50, U74, U45, U64, (15B, 15G, 5L, 2B, 1E) |
| 9 | 74LS174 | U72, U52, U73, (15E, 11K, 2F) |
| 10 | 74LS85 | U96, U95, (7L, 6L) |
| 11 | 74LS86 | U25, U58, (5C, 1F) |
| 12 | 74LS283 | U94, U93, (13G, 9L) |
| 13 | 74LS138 | U112, U42, U71, (6D, 2C, 2H) |
| 14 | 74LS139 | U113, U75, (7B, 4D) |
| 15 | 74LS151 | U43, (4C) |
| 16 | 74LS153 | U69, U68, U67, (15C, 4F, 1G) |
| 17 | 74S04 | U46, (14H) |
| 18 | 74LS157 | U84, U104, U100, U102, U101, U103, U86, U82, U85, U99, U83, (8D, 8F, 8G, 8H, 8J, 8K, 7E, 6C, 5J, 5I, 2D) |
| 19 | 74LS161 | U110, U32, U109, U37, U38, U47, U36, U33, (7K, 6K, 4A, 4B, 15K, 4G, 1B) |
| 20 | 74LS164 | U66 (1H) |
| 21 | 74LS159 | U81, U78, U76, U77, U80, U79, (9F, 7C, 5B, 5D, 4E, 2E) |
| 22 | 74LS175 | U51, (11L) |
| 23 | 74S00 | U54, (13E) |
| 24 | 74LS244 | U90, U91, U107, U118, U117, U114, U115, U116, U4 (14L, 13L, 12K, 9G, 8A, 8B, 8E, 7D, 3A) |

TITLE: Line DrawerDWG. NO.: 010025 Rev BSHEET 2 OF 3

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|--------------------|--|
| 25 | 74S74 | U49 (15H) |
| 26 | 74S138 | U41, U70, (9B, 2K) |
| 27 | 74LS374 | U13, U14, U15, U16, U17, U89, U92, U22, U20, U18 U21, U19, U122, U119, U120, U123, U124, U87, U12 U88, (15A, 14A, 14B, 13A, 13D, 13H, 13J, 12A, 12 12C, 12D, 12E, 11A, 10A, 9A, 9C, 9D, 9E, 8C, 4H) |
| 28 | 74LS393 | U111, U108, (13K, 6J) |
| 29 | 74S157 | U39, U40, (5A, 2A) |
| 30 | HM6116P-3 | U1, U3, U4, U2, (14C, 14D, 14E, 14G) |
| 31 | AM2901CPC | U11, U10, U12, (5E, 5G, 5H) |
| 32 | 330 OHMS | R1, 2, 13 |
| 33 | 51 OHM DIP | U146-148, (12F, 11H, 10C) |
| 34 | 750 OHM | R3 |
| 36 | 74S161 | U35, U34, (1A, 7A) |
| 37 | .01 MF | C5-60 |
| 38 | 18PF | C1 |
| 39 | 50PF | C2 |
| 42 | 10.00000 MHZ | Y1 |
| 43 | 74S175 | U48, (14K) |
| 44 | 82S129 | U5-9, U27-31, (3G, 2G, 3H, 3J, 3K, 6B, 3B, 3C, 2J) |
| 45 | 1MS2620P-15 | U144, U137, U143, U141, U135, U142, U139, U13, U138, U125, U129, U130, U126, U127, U133, U12, U131, (12G, 12H, 11B, 11C, 11D, 11E, 11F, 11G, 1 10B, 10D, 10E, 10F, 10G, 10H, 10J, 10K, 9H, 9J, |
| 46 | SY2148H-3 | U98, U97, (7H, 7J) |
| 47 | 74LS05 | U149, (4K) |
| 48 | 1K | R4-12 |
| 49 | 47MF | C3, C4 |

TITLE: Line Drawer

DWG. NO.: 010025 Rev B

SHEET 3 OF 3

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|-----------------------------|--|
| 50 | SOCKET 40 PIN | (5E, 5G, 5H) |
| 51 | SOCKET 24 PIN | (14C, 14D, 14E, 14G) |
| 52 | 74S02 | U53, (15J) |
| 53 | SOCKET 16 PIN | (3G, 2G, 3H, 3J, 3K, 6B, 3B, 3C, 3F, 2J) |
| 54 | 390 PF | C61 |
| 55 | 010300 (HEADER ASSY-18 PIN) | U145 |

TITLE: F111

DWG. NO.: 010021 Rev: D

SHEET 1 OF 2

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|----------------------------|--|
| 2 | 74LS74 | 2M, 5M, 9M, 12M |
| 3 | 74S151 | 4L, 7L, 11L, 14L |
| 4 | 74LS161 | 3H, 3J, 3K, 6H, 6J, 6K, 8F, 10H, 10J, 10K, 13H, 13K |
| 5 | 74LS244 | 1D, 3L, 6L, 10L, 13L |
| 6 | 74LS374 | 2C, 3E, 3F, 4D, 5C, 6E, 6F, 7D, 9C, 10E, 10F, 11D, 12A, 12C, 13A, 13E, 13F, 14A, 14D |
| 7 | 74S00 | 3N, 6N, 10N, 13N |
| 8 | 74S85 | 2D, 2F, 2H, 2J, 3D, 5D, 5F, 5H, 5J, 6D, 9D, 9F, 9J, 10D, 12D, 12F, 12H, 12J, 13D |
| 9 | 74S139 | 2L, 5L, 9L, 12L, 8L |
| 10 | 82S129 (PROGRAMMED ROMS) | 2P, 3P, 4P, 5P, 6P, 7P, 9P, 10P, 11P, 12P, 13P, |
| 11 | SY2148H-3 | 4E-4K, 7E-7K, 11E-11K, 14E-14K |
| 12 | 74LS174 | 2E, 2K, 2N, 4N, 5E, 5K, 5N, 7N, 9E, 9K, 9N, 11N, 12E, 12K, 12N, 14N |
| 13 | .1MF | C1-10, C12-137, C139-151, C153-164 |
| 15 | 74S244 | 7A, 13C, 10C, 6C, 3C, 14B, 11B, 7B, 4B, 13B, 10E, 6B, 3B, 12B, 9B, 5B, 2B |
| 19 | 74S04 | 3M, 6M, 8J, 8N, 10M, 13M |
| 20 | 74S02 | 4M, 7M, 11M, 14M |
| 21 | 1K, $\frac{1}{2}W \pm 5\%$ | R1-7, R10-16 |
| 23 | 47MF, 35VDC | C11 |
| 25 | 560 OHM SIP | RP1-12 |

TITLE: F111

DWG. NO.: 010021 Rev D

SHEET 2 OF 2

COMPONENT REFERENCE LIST

| ITEM NO. | DEVICE DESIGNATION | LOCATION |
|----------|--------------------|--------------------------------|
| 28 | FERRITE BEAD | L1 |
| 29 | 74S74 | 8A, 8H |
| 30 | SOCKET 16 PIN | 2P-7P, 9P-14P |
| 31 | 74S374 | 4C, 7C, 11C, 14C |
| 32 | SOCKET 18 PIN | 4E-4K, 7E-7K, 11E-11K, 14E-14K |
| 33 | SOCKET 20 PIN | 4D, 7D, 11D, 14D |



TITLE PRINTED WIRING BOARD
1/0 INTERFACE

DWG. NO. 010232

SHEET 1 OF 2

REV

A

| ITEM NO. | QTY | DRAWING NUMBER | DESCRIPTION | REMARKS |
|----------|-----|----------------------------------|-----------------------------------|-----------------------|
| 1 | 1 | 010231 | PWB - 1/0 INTERFACE | |
| 2 | 2 | CAK 8121-V3 | SWITCH, PUSH BUTTON | 51, 52 |
| 3 | 28 | STACKPOLE 57-3425 | FERRITE BEAD (OR 57-1423) | FBI THRU FB22 |
| 4 | 2 | | CAPACITOR, 100MF | C38, 39 |
| 5 | 2 | | CAPACITOR, CERAMIC, 50V | C36, 37 |
| 6 | 35 | MURATA ELECTRIC REPRODUCIBLES | CAPACITOR, MONO. 1000PF AKLD | C1 THRU C35 |
| 7 | 4 | | RESISTOR, FXD, 1 MEG 1/4W ±5% | R3, R5, R13, R15 |
| 8 | 4 | | RES, FXD, 22K, 1/4W ±5% | R7, R9, R17, R19 |
| 9 | 4 | | RES, FXD, 47K, 1/4W ±5% | R6, R8, R16, R18 |
| 10 | 4 | | RES, FXD, 820-Ω, 1/4W ±5% | R21 THRU R24 |
| 11 | 5 | | RES, FXD, 1K, 1/4W ±5% | R1, R10, R11, R12, R1 |
| 12 | 2 | 41162-001-272 | RES. NETWORK 2.7K X 5 DIP | RP2, RP3 |
| 13 | 1 | 41162-001-221 | RES. NETWORK 220-Ω X 5 DIP | RP1 |
| 14 | 2 | 1N4001 | DIODE, 50V | CR3, CR4 |
| 15 | 7 | TIP-120 | TRANSISTOR, POWER, NPN DARLINGTON | Q1 THRU Q5 |
| 16 | 1 | HP HDSP4830 | LED, DISPLAY | U1 |
| 17 | 1 | LM3900 | QUAD NOTON OP AMP | U2 |
| 18 | 1 | 74LS374 | INTEGRATED CIRCUIT | U3 |
| 19 | 1 | 74LS257B | INTEGRATED CIRCUIT | U4 |
| 20 | 39 | FOZ-09-1133 | CONTACT, FEMALE P.C. | |
| 21 | 1 | 03-09-1152 | CONNECTOR, RECEPT. 15 PIN | J1 |
| 22 | 1 | 03-09-1094 | CONNECTOR, RECEPT 9 PIN | J2 |
| 23 | 1 | 03-09-1064 | CONNECTOR, RECEPT 6 PIN | J5 |
| 24 | 1 | 03-09-1049 | CONNECTOR, RECEPT 4 PIN SQ. | J3 |
| 25 | 1 | 03-09-1032 | CONNECTOR, RECEPT 3 PIN | J6 |
| 26 | 1 | 03-09-1022 | CONNECTOR, RECEPT. 2 PIN | J4 |
| 27 | 1 | 09-75-1138 | CONNECTOR, R.A. 13 PIN | J7 |



TITLE PWA AUDIO AMPLIFIER

DWG. NO. A010033
SHEET 1 OF 1

RE Z

| ITEM NO. | QTY | DRAWING NUMBER | DESCRIPTION | REMARKS |
|----------|-----|----------------|--------------------------------------|------------------|
| 1 | 1 | 010032 | PWB AUDIO AMPLIFIER | |
| 2 | 2 | | CAP, ELECTROLYTIC .47MF, 25WVDC ±10% | |
| 3 | 6 | | CAP, ELECTROLYTIC 10MF, 25WVDC ±10% | |
| 4 | 1 | | CAP, CERAMIC, .047MF, 50V | |
| 5 | 6 | | CAP, CERAMIC .1MF, 25WVDC ±10% | |
| 6 | 5 | | RES, FXD, 33K 1/4W, ±5% | |
| 7 | 3 | | RES, FXD, 33K 1/4W ±5% | |
| 8 | 2 | | RES, FXD, 22K 1/4W ±5% | |
| 9 | 3 | | CAP, CERAMIC .22 MF, 25WVDC ±10% | |
| 10 | 3 | | RES, FXD 1 Ω 1/4W ±5% | |
| 11 | 6 | 1N4002 | DIODE | |
| 12 | 2 | | CONNECTOR, 6 PIN (MOLEX 09-75-1068) | |
| 13 | 1 | | CONNECTOR, 7 PIN (MOLEX 09-75-1078) | |
| 14 | 1 | 010139 | HEAT SINK | |
| 15 | REF | 010034 | ELECTRICAL SCHEMATIC - AUDIO AMPL | |
| 16 | 1 | | CAP, CERAMIC 500PF-1000PF, 50V | |
| 17 | 3 | LM1875T | POWER AUDIO AMPLIFIER 20WATT | |
| 18 | 3 | TDA 2030V | POWER AUDIO AMPLIFIER 20WATT | |
| 19 | 2 | | SCREW, PAN HD, PHIL. #6-32 X 1/2 LG | STAINLESS STEEL |
| 20 | 2 | | SPACER, 1/4 DIA, #6 CLEAR X 1/4 LG. | |
| 21 | 4 | | SPACER, NYLON | (RICHCO SR56-BN) |
| 22 | 2 | | RES, FXD, 68K, 1/4W ±5% | |
| 23 | 1 | | RES, FXD, 91K, 1/4W ±5% | |
| 24 | 3 | | SCREW, PAN HD, PHIL. #6-32 X 1/4 LG | |
| 25 | 2 | | CAPACITOR, CERAMIC, .02MF 50V | |

SPECIFICATIONS

INPUT: 105 to 125 VAC or 210 to 250 VAC at 47 to 63 Hz. Derate output current 10% for 50 Hz operation.

DC OUTPUT RATINGS: See Voltage/Current Rating Chart.

REGULATION: Line regulation is rated at 0.05% for a 10% input voltage change and load regulation is rated at 0.1% for a zero to full load change.

OUTPUT RIPPLE: Better than 1 mV RMS; 3 mV peak to peak typical.

OVERLOAD PROTECTION: Self restoring current limiting (foldback type) is standard.

OVERVOLTAGE PROTECTION: All 5-Volt output models with a V suffix are provided with built-in OVP as a standard feature. The OVP circuit is preset at 6.2 ± 0.4 Volts.

TEMPERATURE COEFFICIENT: ± 0.005%/°C typical. ± 0.02%/°C maximum.

COOLING: Convection cooled. Moving air is recommended when mounting in a confined area.

MOUNTING: The open frame mounts on any one of four surfaces.

OUTPUT VOLTAGE ADJUSTMENT: The output of all EconoMate II power supplies may be adjusted by means of a potentiometer located on the printed circuit board. The potentiometer is labeled "EO ADJ.". During the adjustment procedure, monitor the DC output voltage by connecting a meter across the output terminals.

INPUT CONNECTIONS: When operating with 115 VAC input, place a jumper between transformer terminals one (1) and two (2) and also between three (3) and four (4). Then connect the AC primary leads to terminals one (1) and four (4) as shown in Fig. 1. When operating with 230 VAC input, place a jumper between transformer terminals two (2) and three (3) and connect the AC primary leads to terminals one (1) and four (4) as shown in Fig. 2.

SECONDARY TRANSFORMER CONNECTIONS: On certain models it will be necessary to connect the transformer secondary to the PC board before adjusting the output voltage. This is accomplished by soldering the loose wire attached to the PC board to the appropriate tap on the transformer.

LOCAL SENSING: ECONOMATE II power supplies are factory wired for local sensing. Sensing terminals are located on the PC board. A jumper connecting the DC output and sensing terminals provides local sensing as shown in Fig. 3.

REMOTE SENSING: Remote sensing is a standard feature. To sense the output voltage directly at the load, disconnect the jumpers between the DC output terminals and sensing terminals. Connect the load to the DC output terminals. Then wire the (+) and (-) sensing terminals respectively across the load as shown in Fig. 4. This permits sensing directly at the load.

DUAL OUTPUT POWER MODELS

| MODEL | OUTPUT "A" | SCHEM. FIG.# | OUTPUT "B" | SCHEM. FIG.# | *PARTS LIST COLUMNS |
|------------|----------------------------|--------------|----------------------------|--------------|---------------------|
| ETA-5DV | 5V-6.0A | 5 | 5V-6.0A | 5 | A and A |
| ETA-515DV | 5V-6.0A | 5 | 15V-2.8A or 12V-3.0A | 6 | A and B |
| ETA-12/15D | 12V-3.0A or 15V-2.8A | 6 | 12V-3.0A or 15V-2.8A | 6 | B and B |
| ETA-524DV | 5V-6.0A | 5 | 24V-2.3A | 6 | A and C |

*Reference Parts List below for separate PCB components.

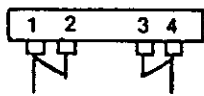


Fig. 1

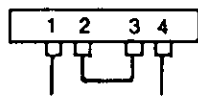


Fig. 2

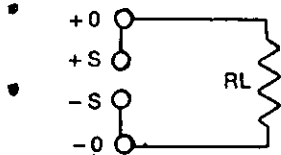


Fig. 3

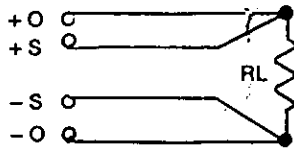


Fig. 4

OUTPUT CONNECTIONS

Positive and negative output terminals are marked and located on printed circuit boards. No connection is necessary for 5/6 or 24-volt outputs. 12/15 volt outputs have secondary leads which must be soldered to the appropriate transformer taps according to the output voltage required, as indicated in the following table:

| SERIES | OUTPUT VOLTAGE | OUTPUT A TAP NO. | OUTPUT B TAP NO. |
|--------|----------------|------------------|------------------|
| ETA-D | 12V | 6 | 9 |
| | 15V | 7 | 10 |

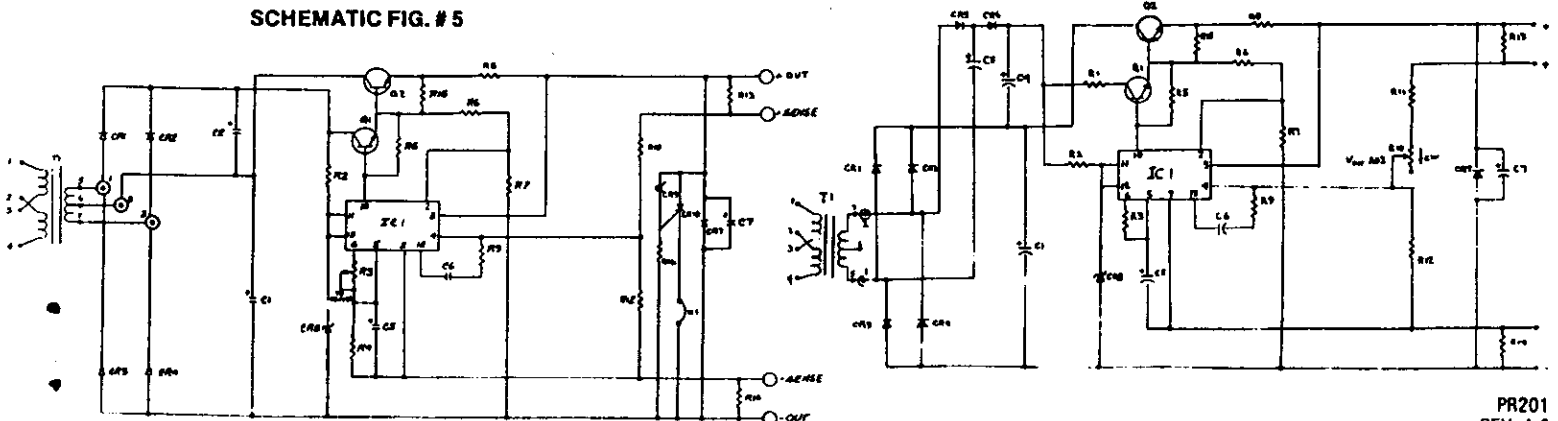
No connection is necessary for 5/6 or 24-volt outputs.

| SCM. REF. | PMC PART NO. | A | B | C | DESCRIPTION | SCM. REF. | PMC PART NO. | A | B | C | DESCRIPTION |
|-----------|--------------|---|---|---|--------------------------|-----------|--------------|---|---|---|---------------------|
| C1 | CE223015 | 1 | | | CAP. 22000 MFD, 15V | R4 | RC334800 | 1 | | | RES 3.48K OHMS, 1/4 |
| C1 | CE682035 | 1 | | | CAP. 6800 MFD, 35V | R5 | RB227200 | 1 | 1 | 1 | RES 2.7K OHMS, 1/4W |
| C1 | CE147263 | | 1 | | CAP. 4700 MFD, 50V | R6 | RB212100 | 1 | | | RES 120 OHMS, 1/4W |
| C2, 7 | CE410800 | 2 | | | CAP. 1000 MFD, 16V | R6 | RB210100 | 1 | | | RES 100 OHMS, 1/4W |
| C3, 4, 7 | CE233700 | | 3 | | CAP. 330 MFD, 35V | R6 | RB262100 | 1 | | 1 | RES 620 OHMS, 1/4W |
| C3, 4, 7 | CE825700 | | 3 | | CAP. 220 MFD, 50V | R7 | RB243100 | 1 | | | RES 430 OHMS, 1/4W |
| C5 | CE047350 | 1 | 1 | 1 | CAP. 4.7 MFD, 35V | R7 | RB210200 | 1 | | | RES 1K OHMS, 1/4W |
| C6 | CD310200 | 1 | 1 | 1 | CAP. 0.001 MFD, 500V | R7 | RB212300 | 1 | | 1 | RES 12K OHMS, 1/4W |
| CR1, 2 | DR003000 | 2 | | | DIODE 1 AMP 200V | R8 | RF050000 | 1 | | | RES 0.05 OHM, 3W |
| CR1-4 | DR039000 | | 4 | 4 | DIODE 5 AMPS 100V | R8 | RF200150 | 1 | | 1 | RES 0.15 OHM, 3W |
| CR3, 4 | DR085000 | 2 | | | DIODE 1 AMP 240V | R8 | RE200240 | 1 | | 1 | RES 0.24 OHM, 2W |
| CR5, 6 | DR003000 | 2 | 2 | 2 | DIODE 1 AMP 240V | R9 | RB233200 | 1 | 1 | 1 | RES 3.3K OHMS, 1/4W |
| CR7 | DR039000 | 1 | 1 | 1 | DIODE 5 AMPS 100V | R10 | RC386600 | 1 | | | RES 866 OHMS, 1/4W |
| CR8 | DZ211600 | 1 | 1 | 1 | DIODE 1N4752A | R10 | RF220201 | 1 | 1 | 1 | POT. 2K OHMS, 20% |
| CR9 | DZ231000 | 1 | | | DIODE 1N752A | R11 | RC310200 | 1 | | | RES 1K OHMS, 1/4W |
| CR10 | DS048000 | 1 | | | SCR 2N4441 | R11 | RC315001 | 1 | | 1 | RES 1.5K OHMS, 1/4W |
| IC1 | QK026300 | 1 | 1 | 1 | INT-CIR 723 | R12 | RC320500 | 1 | | | RES 2.05K OHMS, 1/2 |
| Q1 | QP001300 | 1 | | | XTOR 2N3055 | R12 | RC311500 | 1 | | 1 | RES 1.15K OHMS, 1/2 |
| Q1 | QS055000 | 1 | 1 | 1 | XTOR 2N2102 | R13, 14 | RB210000 | 1 | 1 | 1 | RES 10 OHMS, 1/4W |
| Q2 | QP001300 | 1 | 1 | 1 | XTOR 2N3055 | R15 | RB210100 | 1 | | | RES 100 OHMS, 1/4W |
| R1 | RF210100 | 1 | | | RES 100 OHMS, 3W, 5% | R15 | RB216100 | 1 | | | RES 180 OHMS, 1/4W |
| R1 | RE222100 | 1 | 1 | 1 | RES 220 OHMS, 2W, 10% | R15 | RB222100 | 1 | | 1 | RES 220 OHMS, 1/4W |
| R2 | RC215100 | 1 | | | RES 150 OHMS, 1/4W, 10% | T1 | TA2826602 | | | | TRANSFORMER ETA |
| R2 | RC227100 | 1 | | | RES 270 OHMS, 1/4W, 10% | T1 | TA2826601 | | | | TRANSFORMER ETA |
| R2 | RF215200 | 1 | 1 | 1 | RES 1.5K OHMS, 3W, 5% | T1 | TA2826603 | | | | TRANSFORMER ETA |
| R3 | PF220201 | 1 | | | POT. 2K OHMS, 20% | T1 | TA2826604 | | | | TRANSFORMER ETA |
| R3 | RC311500 | 1 | 1 | 1 | RES 1.15K OHMS, 1/4W, 1% | | | | | | |

NOTE: Reference "Dual Output Power Models" chart above for appropriate combination of two PCB's for each ETA-D model.

SCHEMATIC FIG. # 6

SCHEMATIC FIG. # 5





SPECIFICATIONS

- AC Input:** 85-to-132 or 170-to-264 VAC, at 47-440 Hz.
- DC Output:** See voltage and current rating chart.
- DC Output Adjustment:** ± 10 percent.
- Regulation:** Line, ± 0.1 percent, +1mV within the specified AC limits. Load, ± 0.1 percent, +1mV from no-load to full-load conditions.
- Noise and Ripple:** 50mV peak-to-peak maximum, 20Hz to 20MHz
- Efficiency:** 70-to-80 percent.
- Transient Response:** Recovery to 1.0 percent in 300 microseconds for a 50-to-100 percent load change.
- Remote or Local Sensing:** A provision is included for improved overall regulation.
- Overload and Short-Circuit Protection:** Solid-state short-circuit protection is a standard feature. An automatic current-limiting circuit limits the output current which provides protection for the load and supply. Units cannot be damaged by prolonged short circuits.
- Overshoot:** No voltage spikes on turn-on, turn-off, or during power failure.
- Logic Inhibit Function:** A 4.5 to 5.5. VDC command signal, referenced to the negative sense terminal, will inhibit the DC output. It may be used for control, sequencing, or maintenance.
- Enable Function (optional):** A command signal less than 0.8 VDC will turn supply off. A command signal greater than 2.5 VDC will turn supply on.
- Over-Voltage Protection:** Built-in, fixed.
- Energy-Storage Time:** The output voltage will remain within the regulation range for a minimum of 16 ms after the loss of AC power (from nominal line voltage).
- Polarity:** Positive, negative, or floating up to 300VDC.
- Soft Start:** Provides input current limiting at turn on.
- Parallel Operation:** Units may be paralleled for increased output current. Consult the factory for the proper procedures.
- Long-Term Stability:** 0.1 percent for 8 hours after a 20 minute warm up.

Ambient Operating Temperature: Continuous duty from 0 to +71°C, full rating from 0 to +50°C. Derate linearly to 60 percent of full rating at +71°C.

Storage Temperature: -55°C to +85°C.

Quality Control: In accordance with MIL-I-45208.

OPERATING INSTRUCTIONS

AC INPUT

Normally, the unit is shipped for 115 VAC input operation. If 230 VAC input is desired, cut jumper W1 on PC board shown in Fig. 1.

SENSING TERMINALS

For local sensing the supply can be used as delivered. For remote sensing, connect the load to the DC output terminals. Then wire the (+) and (-) sensing terminals respectively across the load. This permits sensing directly at the load. See Fig. 2.

VOLTAGE AND CURRENT ADJUSTMENTS

The voltage adjustment (VR2) is a precision multi-turn potentiometer which is accessible from the terminal end of the unit. The current adjustment potentiometer is factory set and no further adjustment is required.

COVERS

Covers for the ES units are included.

Power/Mate power supplies are designed for convection cooling, therefore, it's important not to impede the air flow across or through the power supply's case. Impeding the flow of air through your power supply may shorten its life. If there is doubt about the convection air flow through your Power/Mate supply's heat generating components, it's recommended that you use a small fan to insure satisfactory air flow.

CAUTION: High-voltage circuits present an electrical shock hazard. Do not handle the unit while it is operating.

ES-G Series

| MODEL | VOLTAGE | CURRENT |
|--------|----------|---------|
| ES-5G | 5 VOLTS | 30 AMPS |
| ES-12G | 12 VOLTS | 15 AMPS |
| ES-15G | 15 VOLTS | 12 AMPS |
| ES-24G | 24 VOLTS | 8 AMPS |
| ES-28G | 28 VOLTS | 7 AMPS |
| ES-36G | 36 VOLTS | 5 AMPS |

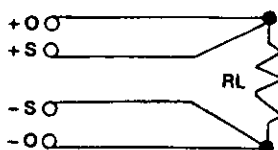


FIG. 2

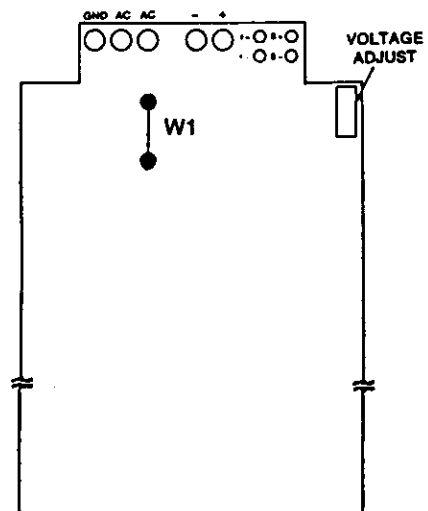


FIG. 1