

**FINAL REPORT  
CONTRACT NAS8-20833 PHASE II**

**CONSTRUCTION AND TESTING OF A  
SCANNING LASER RADAR (SLR)**

**APPENDIX**

(NASA-CR-123529) ELECTRONIC SCHEMATICS  
FOR CONSTRUCTION AND TESTING OF A  
SCANNING LASER RADAR (SLR), APPENDIX  
Final (ITT Gilfillan, Inc., San Fernando,  
Calif.) 66 p HC \$6.50

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**TO NASA  
MARSHALL SPACE FLIGHT CENTER  
HUNTSVILLE, ALABAMA 35812**

**PREPARED BY  
TERRY FLOM  
H. DEAN COOMBES**

**DECEMBER 1971**

**GILFILLAN/SAN FERNANDO, CALIFORNIA**

**ITT**



FINAL REPORT  
TO  
NASA  
MARSHALL SPACE FLIGHT CENTER  
HUNTSVILLE, ALABAMA 35812

APPENDIX

ELECTRONIC SCHEMATICS  
FOR  
CONSTRUCTION AND TESTING OF A SCANNING LASER RADAR

*1134/11*

CONTRACT NAS 8-20833  
PHASE II

PREPARED BY  
TERRY FLOM  
H. DEAN COOMBES

DECEMBER 1971

ITT GILFILLAN  
SAN FERNANDO  
15151 Bledsoe Street  
San Fernando, California 91342

## LIST OF DRAWINGS

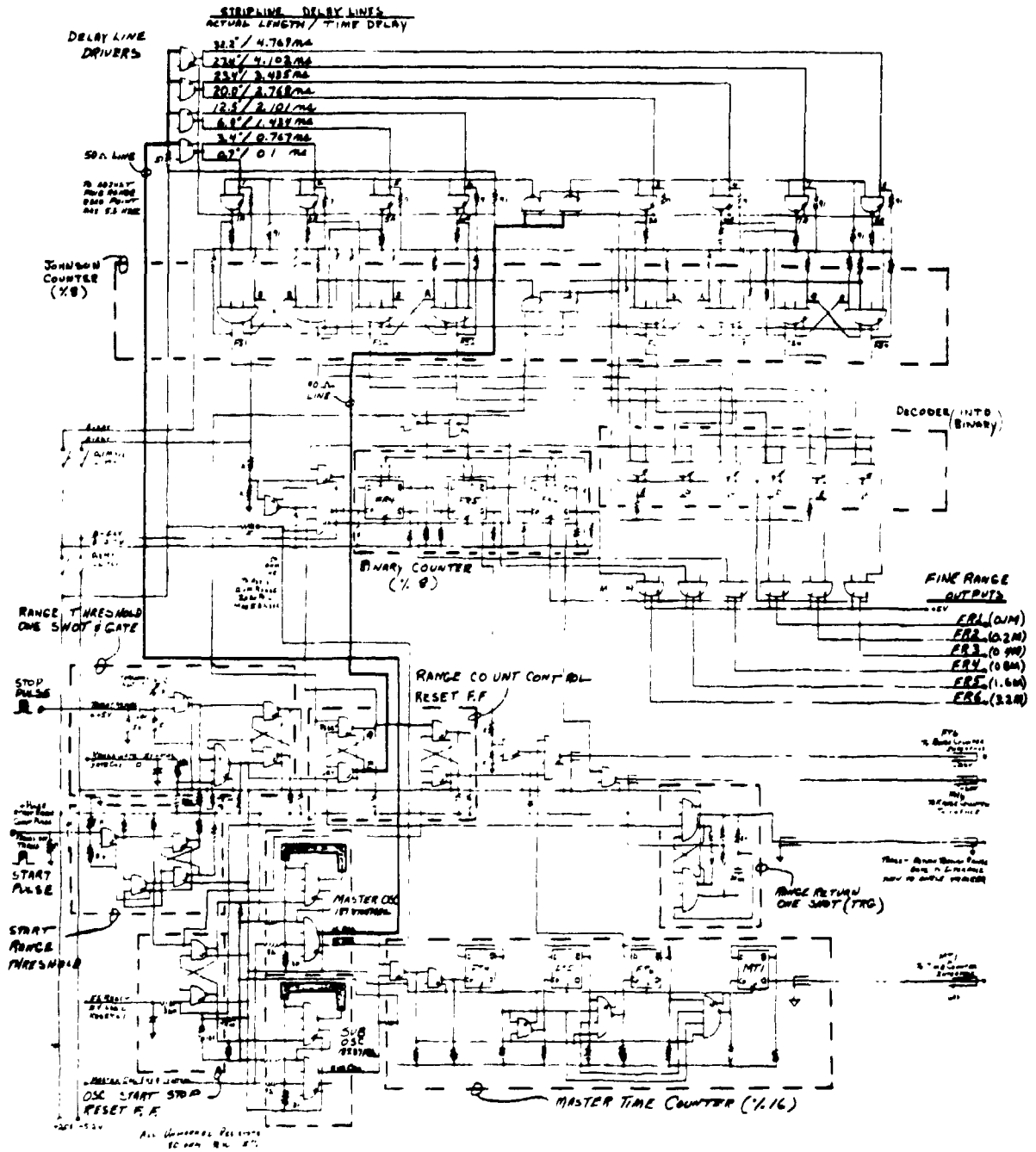
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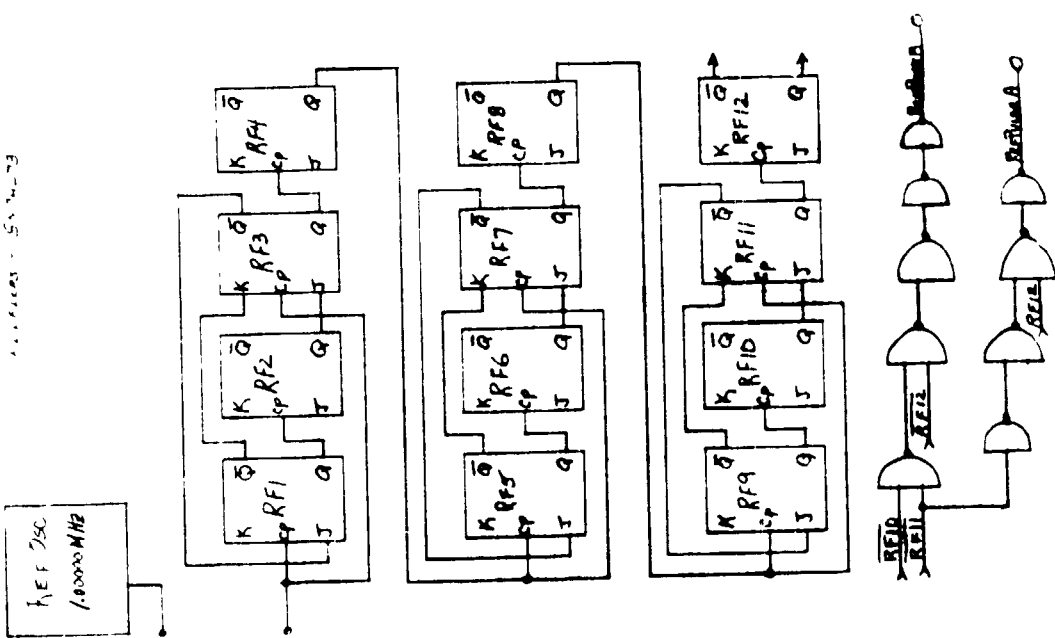
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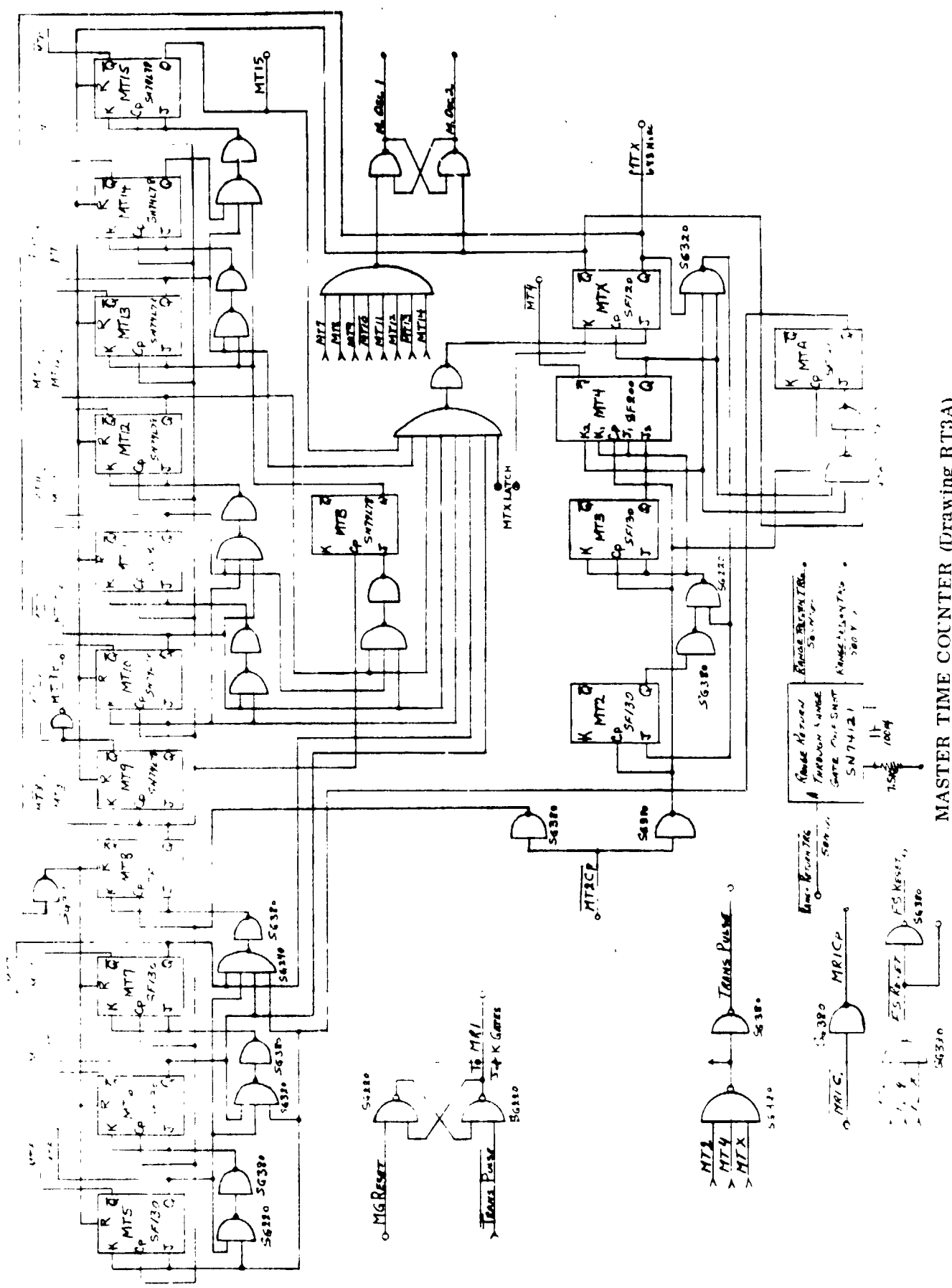
HIGH FREQUENCY (187 MHz) RANGING LOGIC (DRAWING RT1)



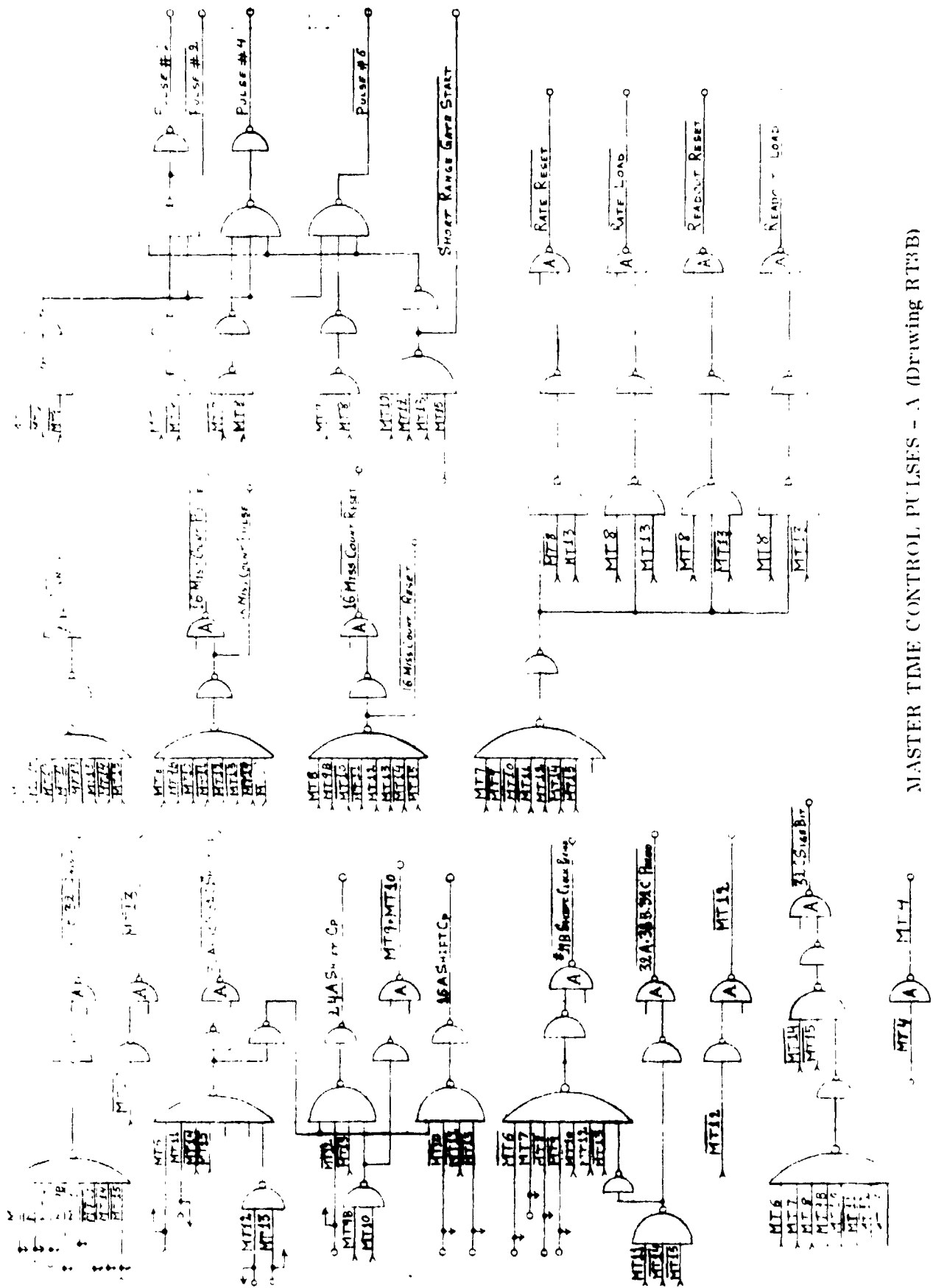


REFERENCE OSCILLATOR AND OSCILLATOR CONTROL (Drawing RT2B)



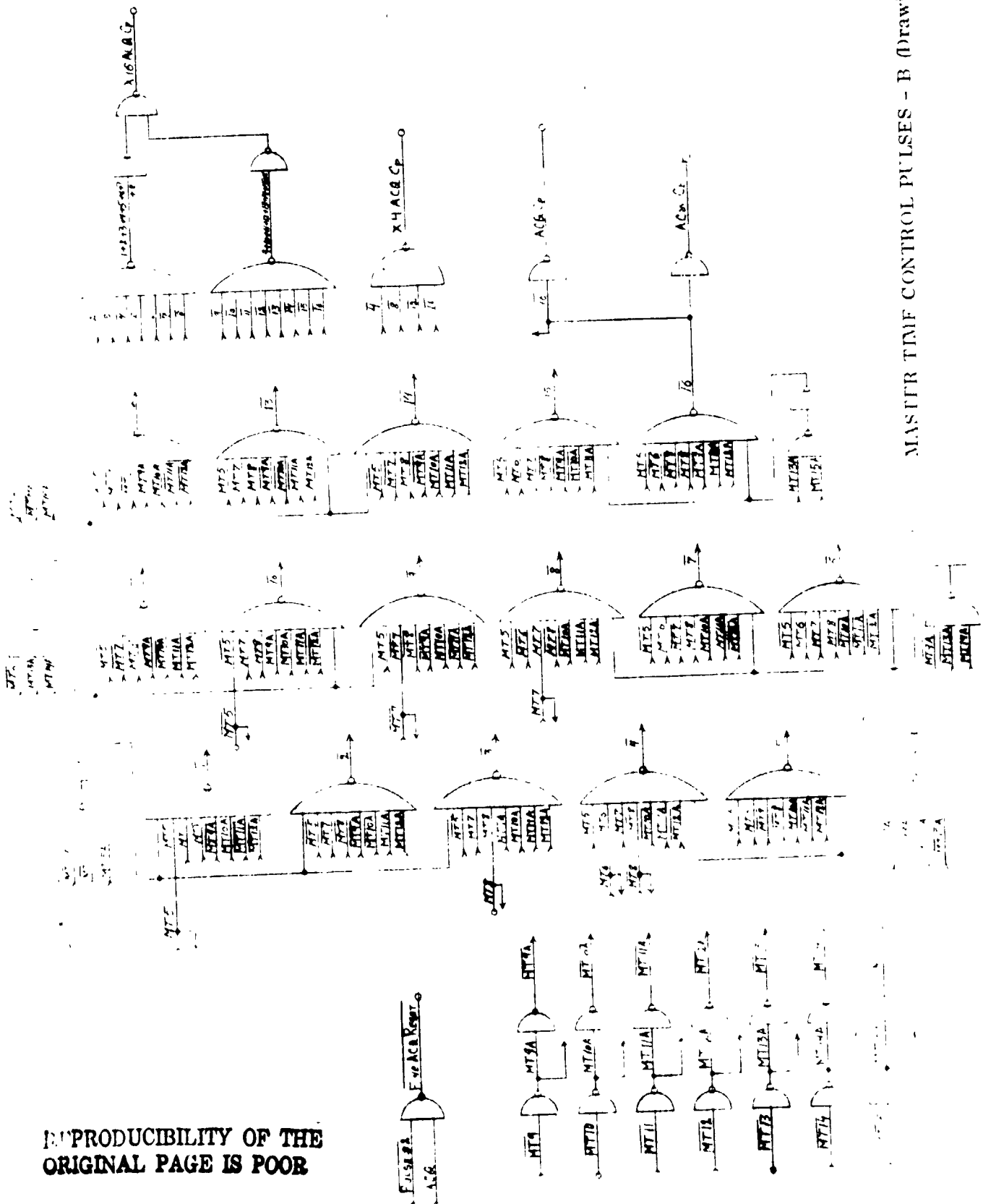


MASTER TIME COUNTER (Drawing RT3A)

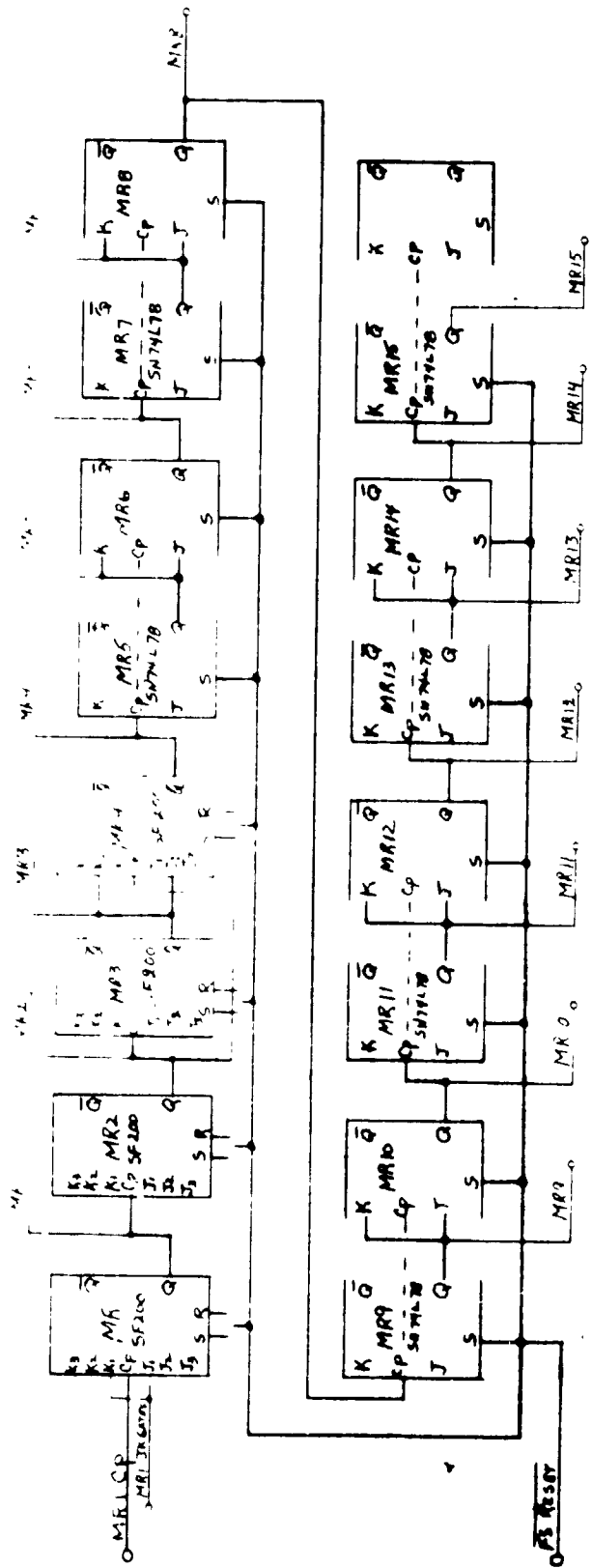


MASTER TIME CONTROL PULSES - A (Drawing RT3B)

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

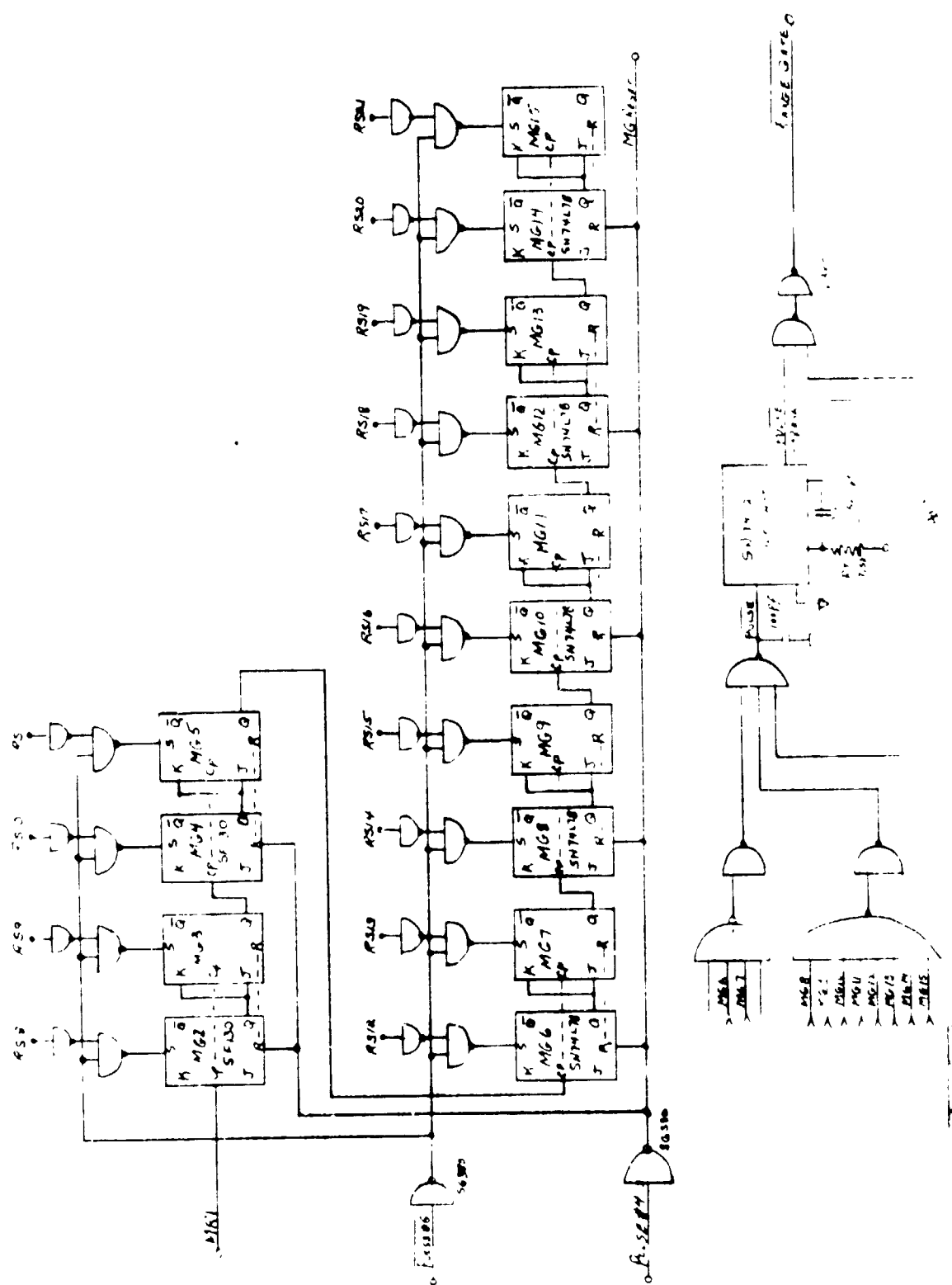


MASTER TIME CONTROL PULSES - B (Drawing RT-C)

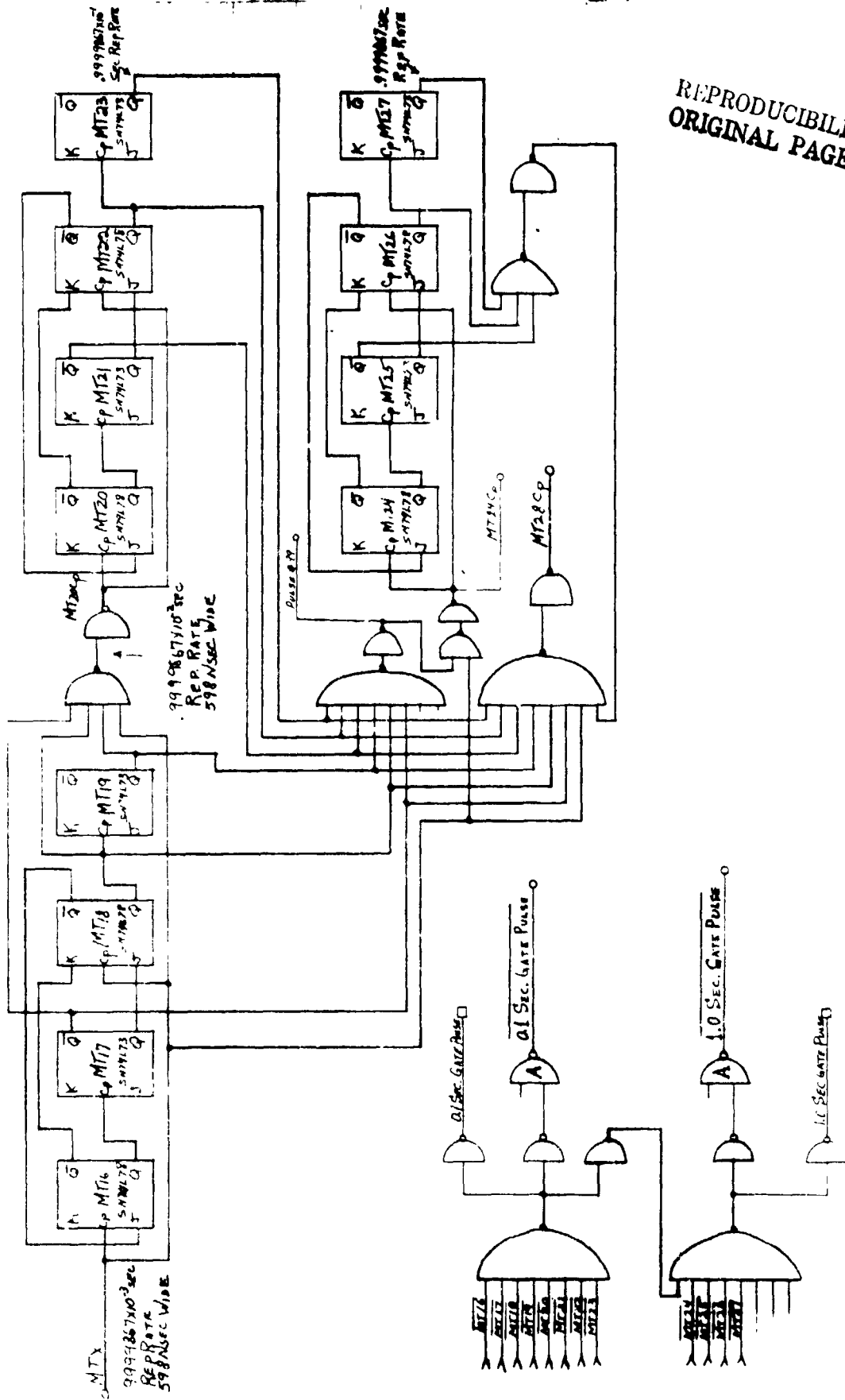


RANGE COUNTER (Drawing RT3D)

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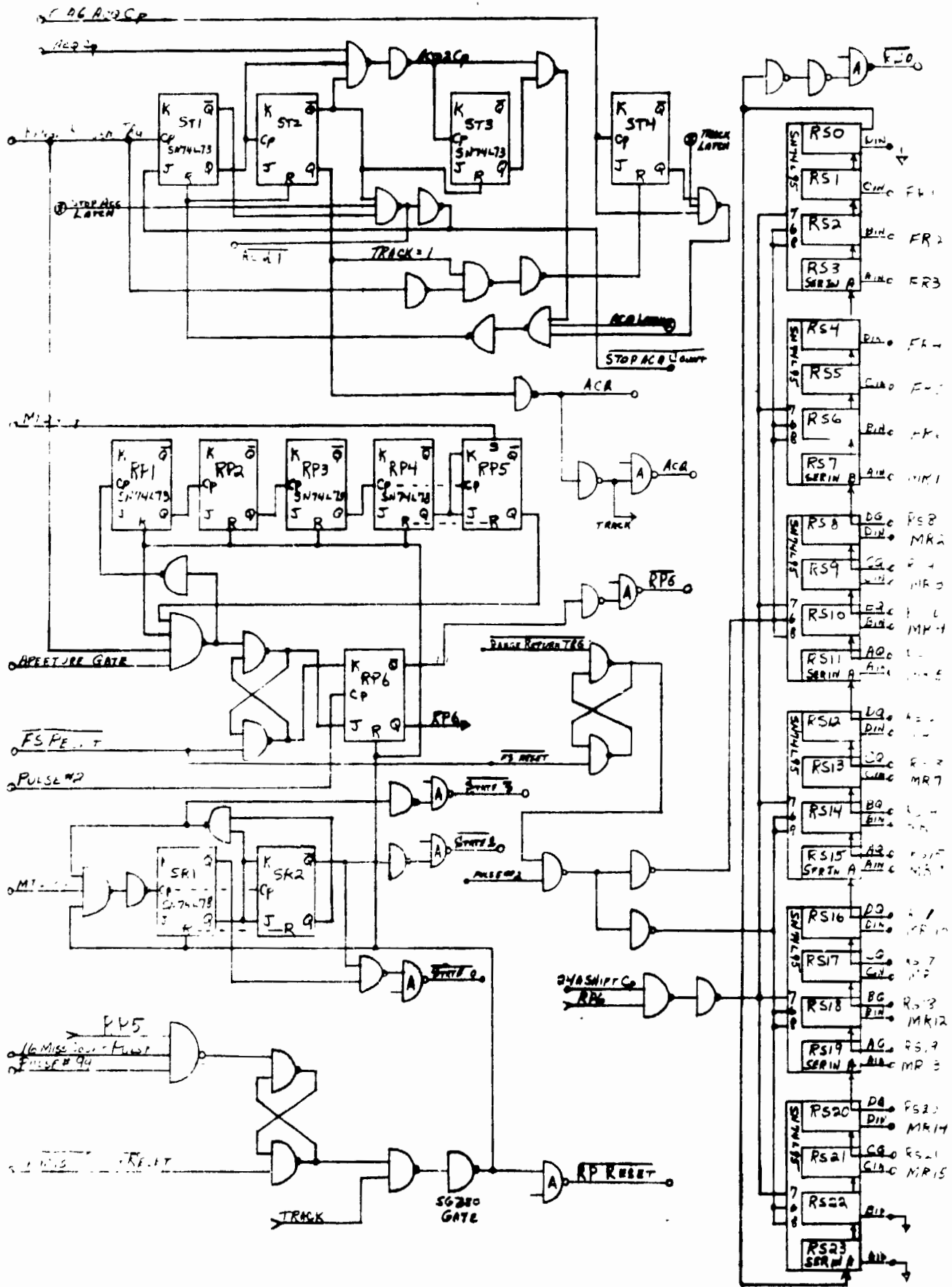


RANGE GATE COUNTER & CONTROL (DRAWING RTBF)

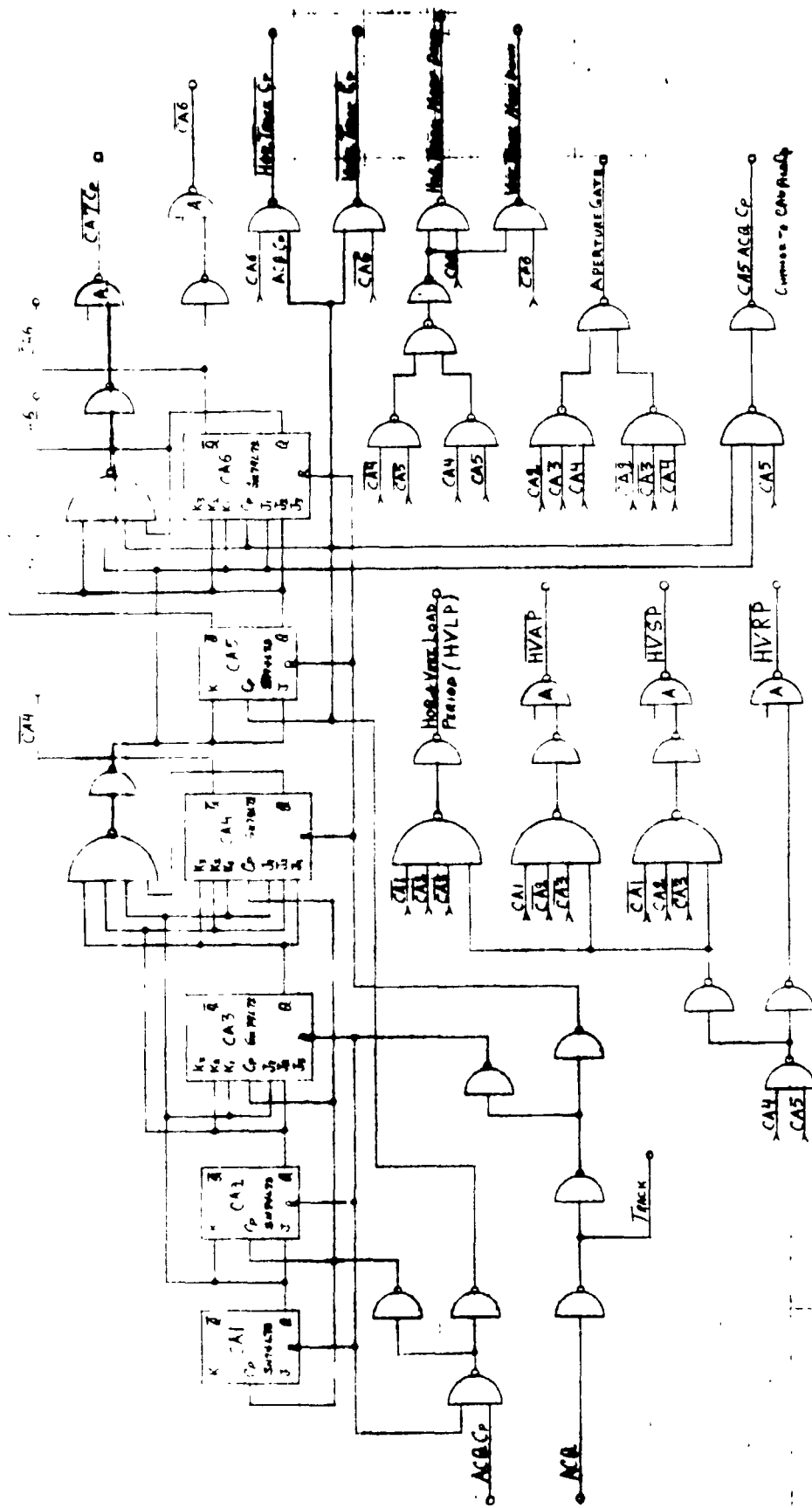


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.01 - 1.0 COUNTER (Drawing RT3F)

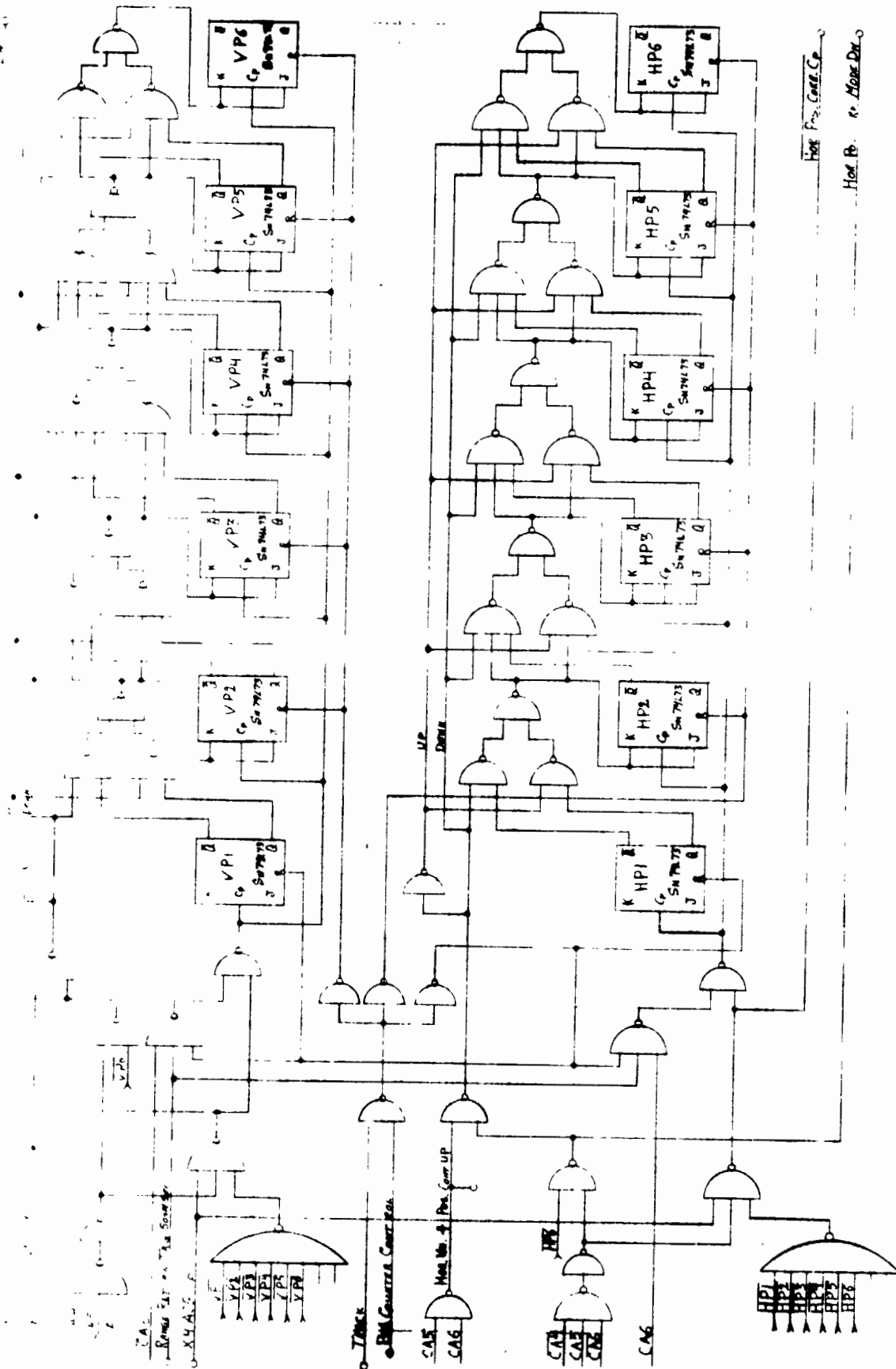


RANGE STORAGE REGISTERS AND CONTROL CIRCUITS (Drawing RT3G)



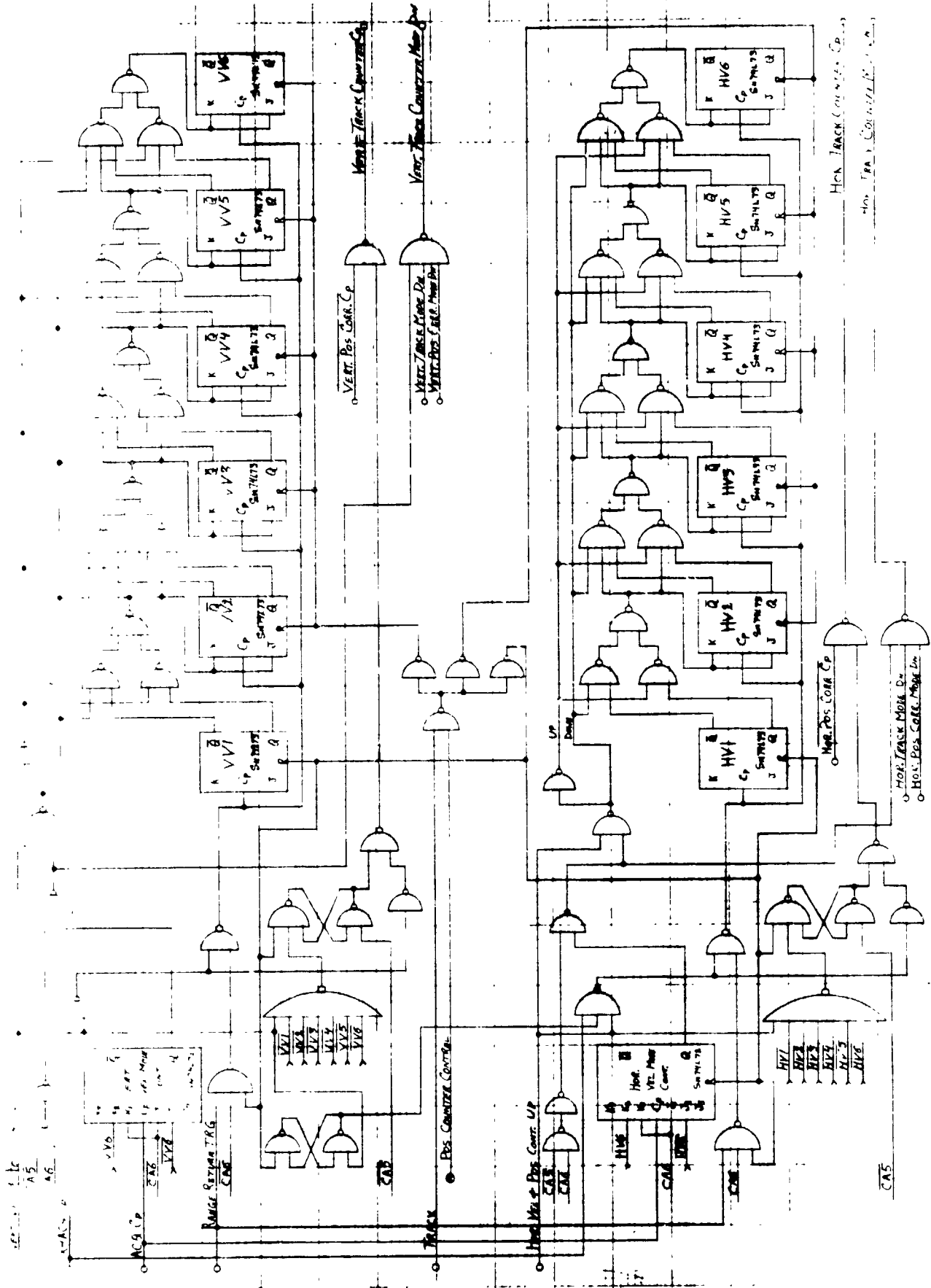
TRACK CONTROL COUNTER (Drawing RT4A)



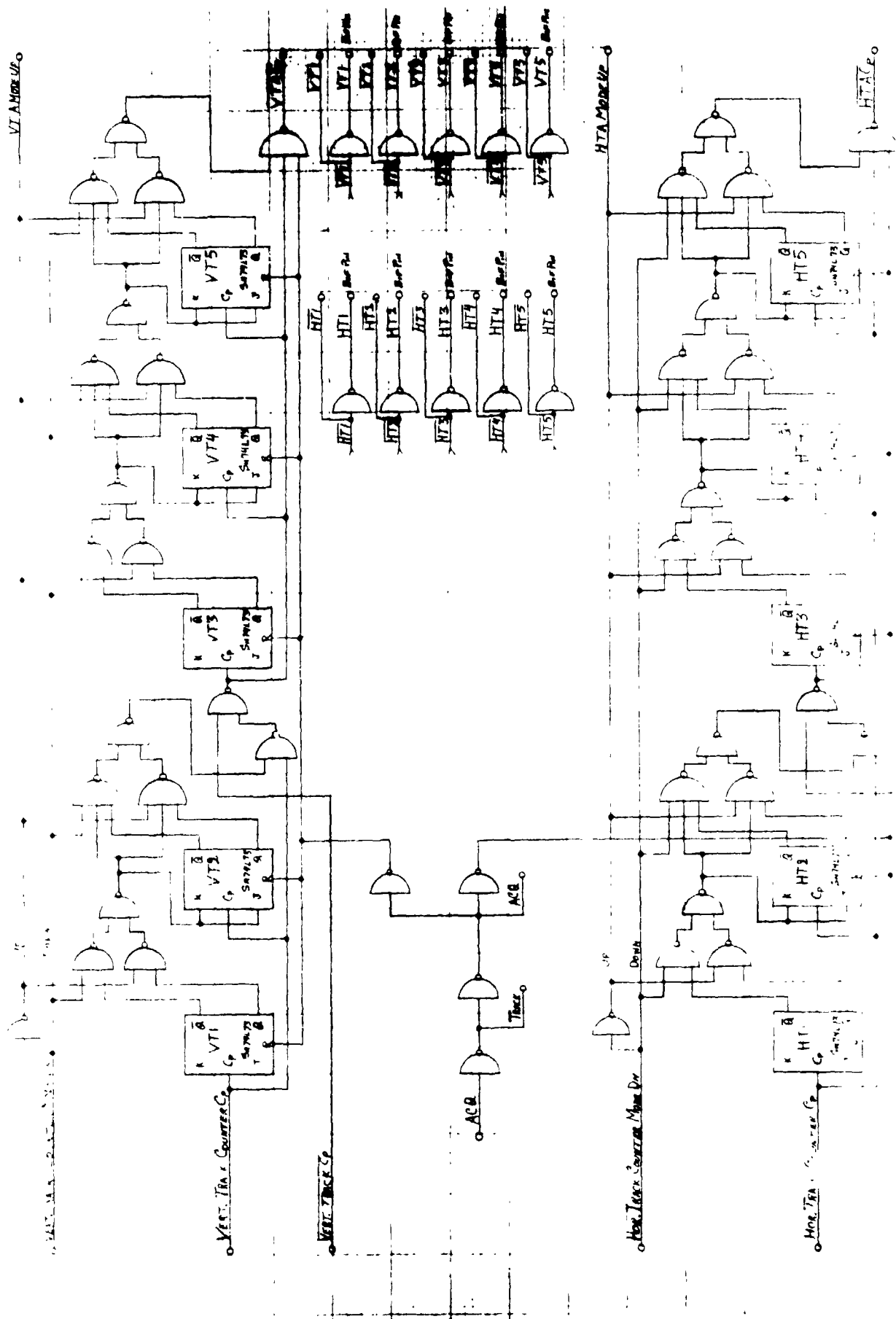


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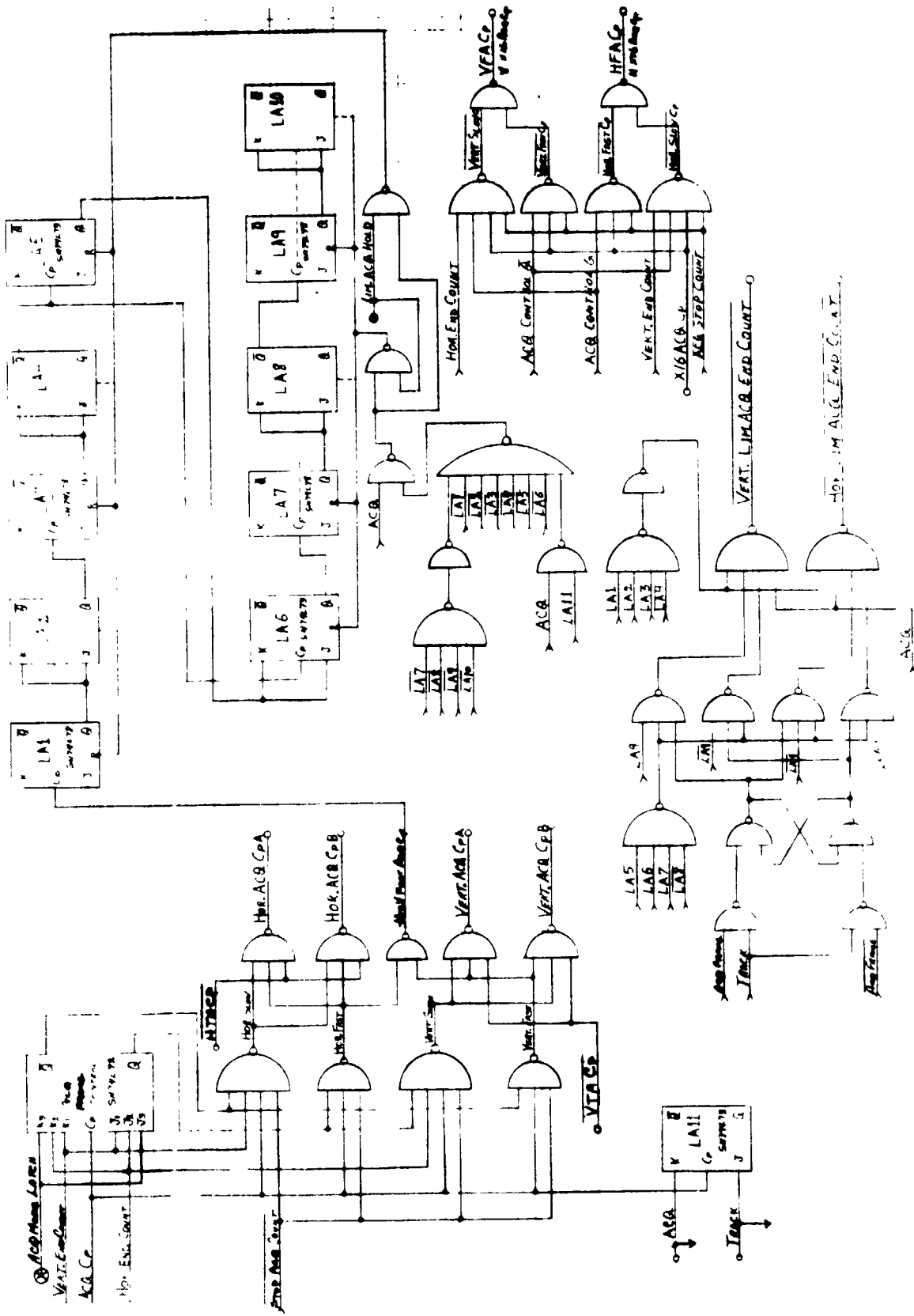
HORIZONTAL & VERTICAL POSITION CORRECTOR (Drawing RT4B)



HORIZONTAL & VERTICAL VELOCITY CORRECTOR (Drawing RT4C)

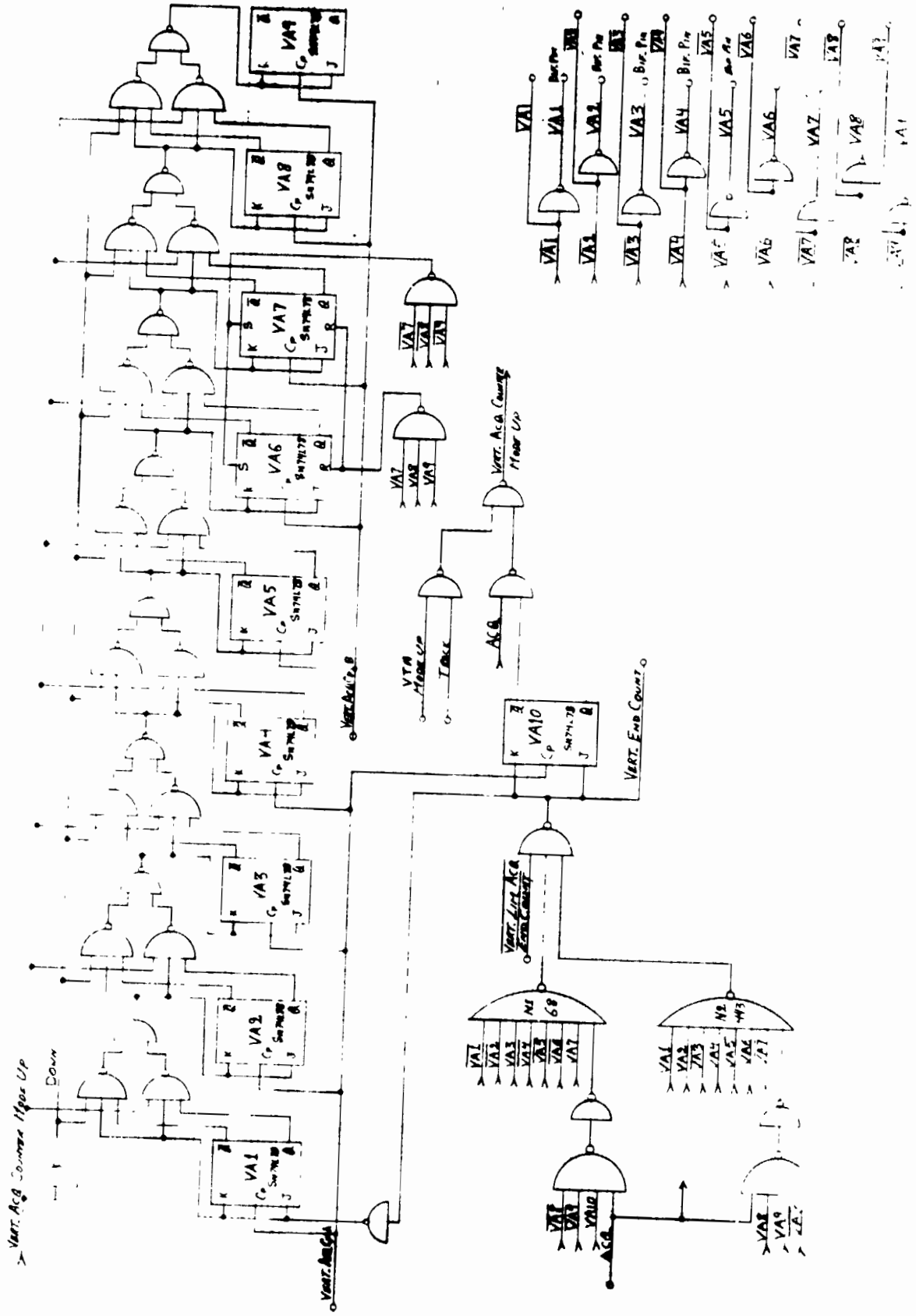


VERTICAL & HORIZONTAL COUNTERS (Drawing RT5A)



LIMITED ACQUISITION CONTROL COUNTER & CONTROL GATES (Drawing RT5B)

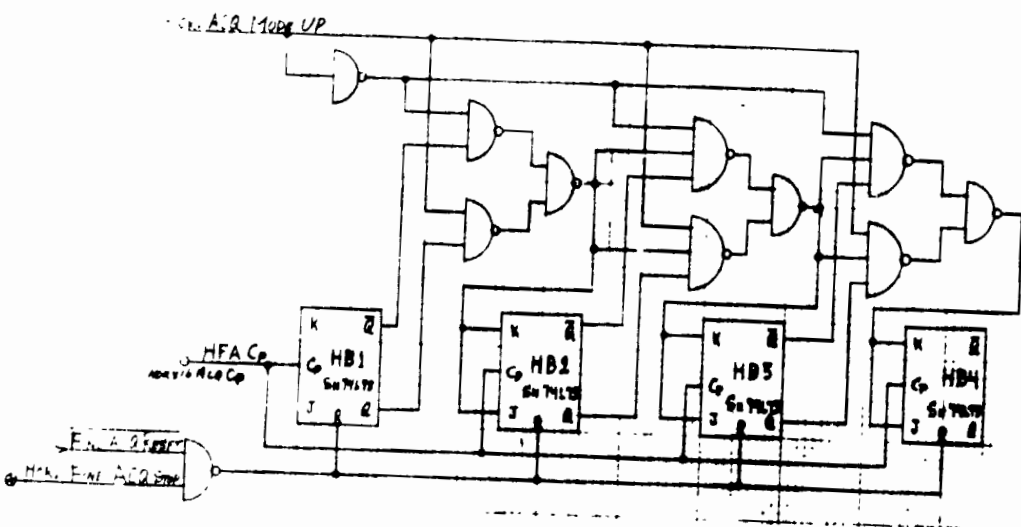
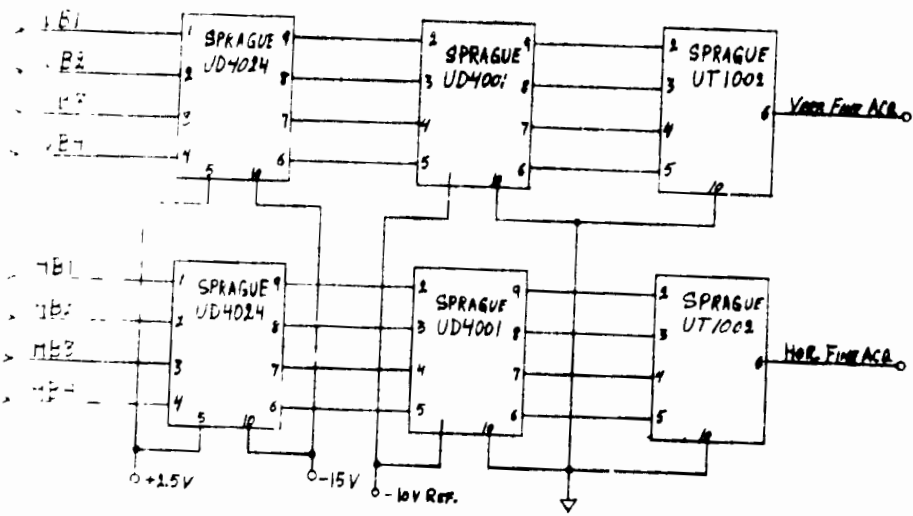
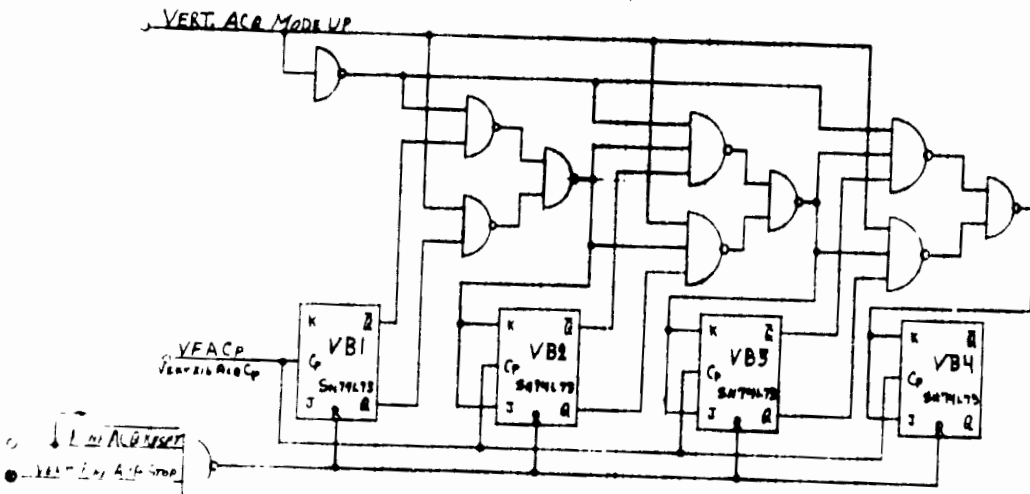
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VERTICAL ACQUISITION COUNTER (Drawing RT5C)



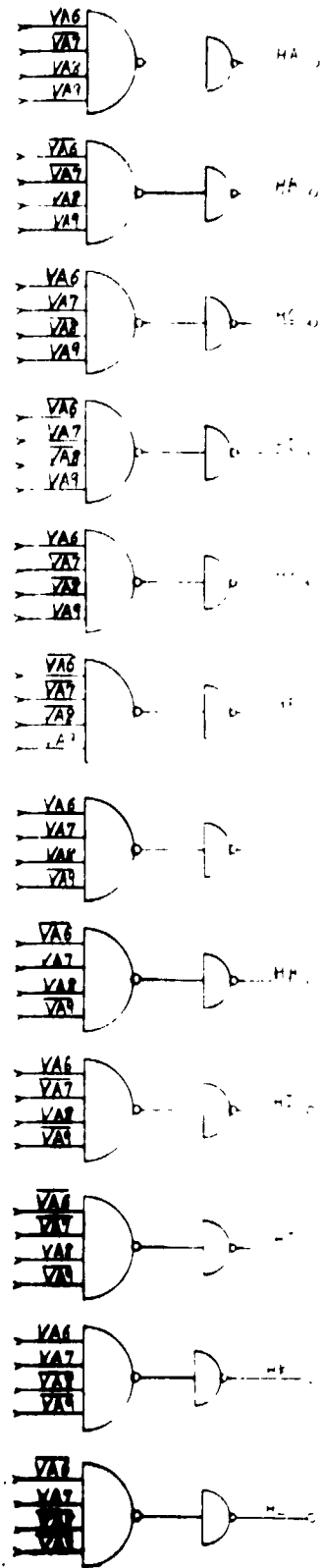
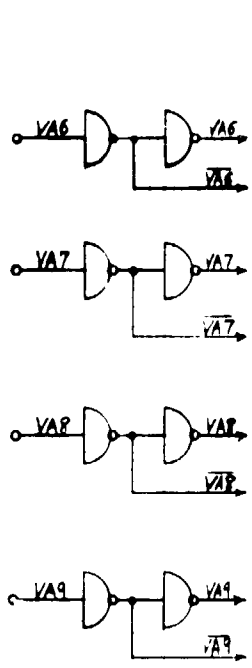
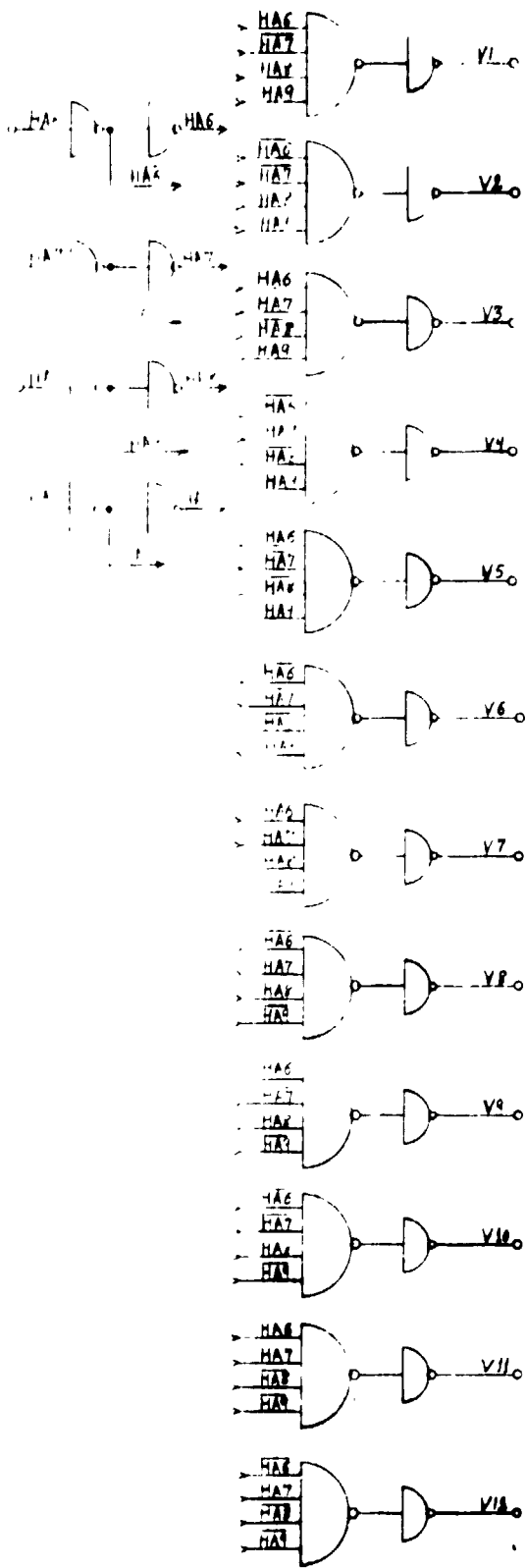




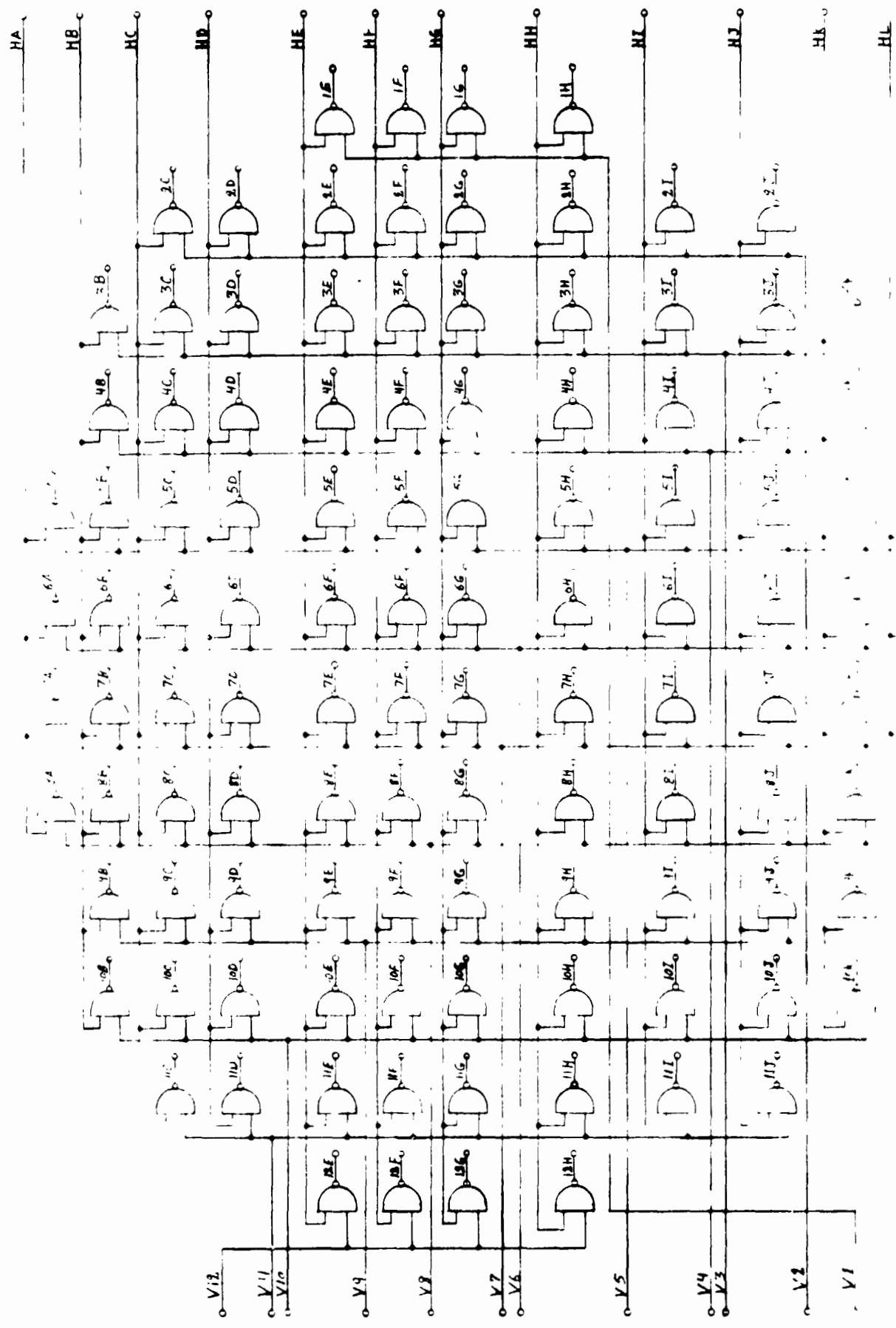
FINE ACQUISITION GENERATOR (Drawing RT5F)

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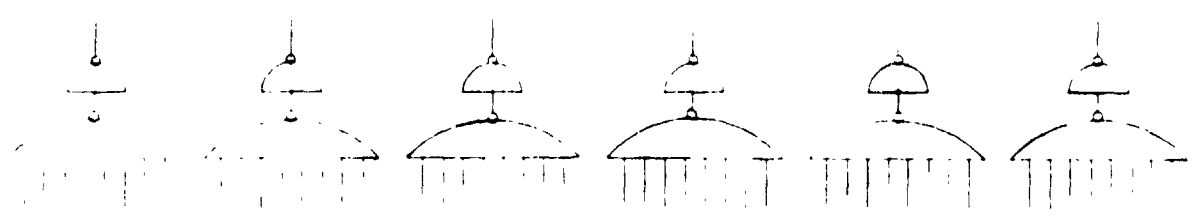
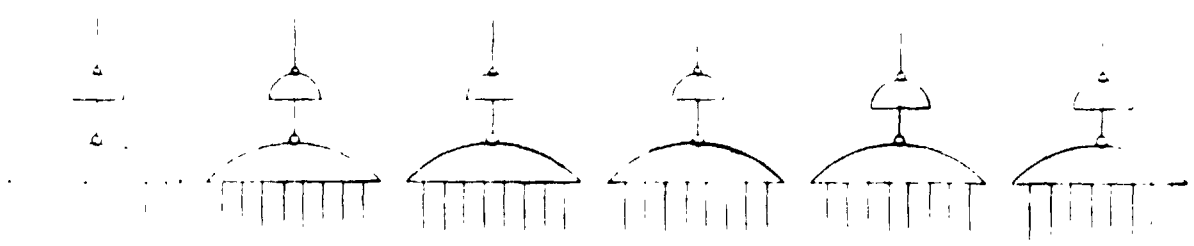
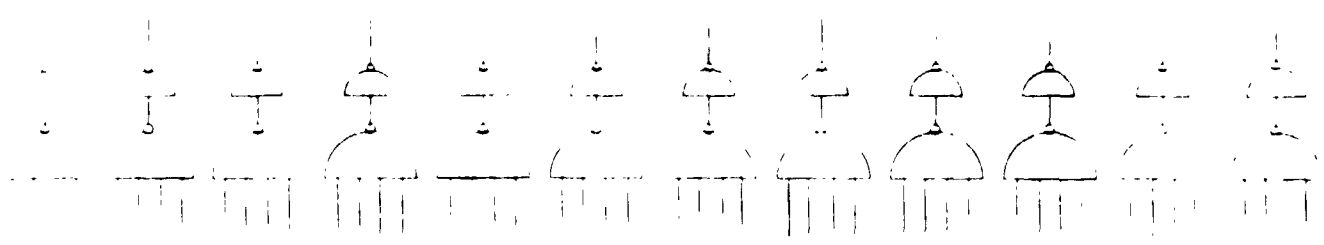
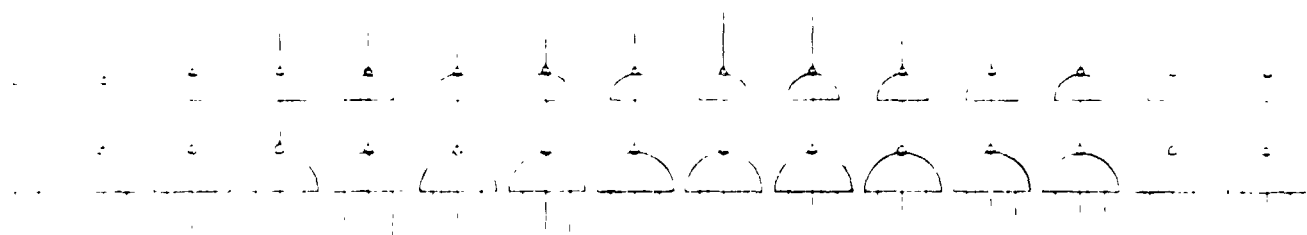
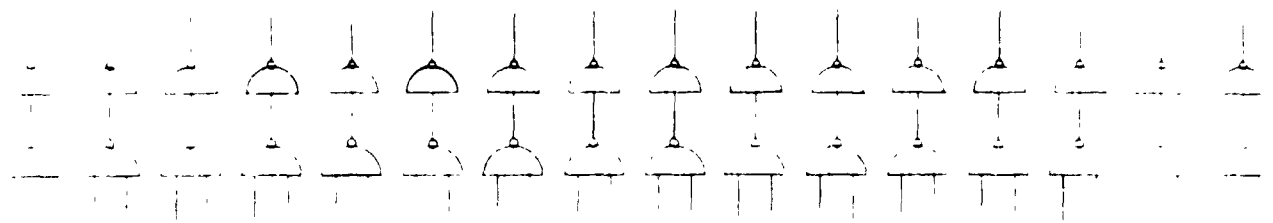




LINEARITY LINE LOCATION (Drawing RT6A)

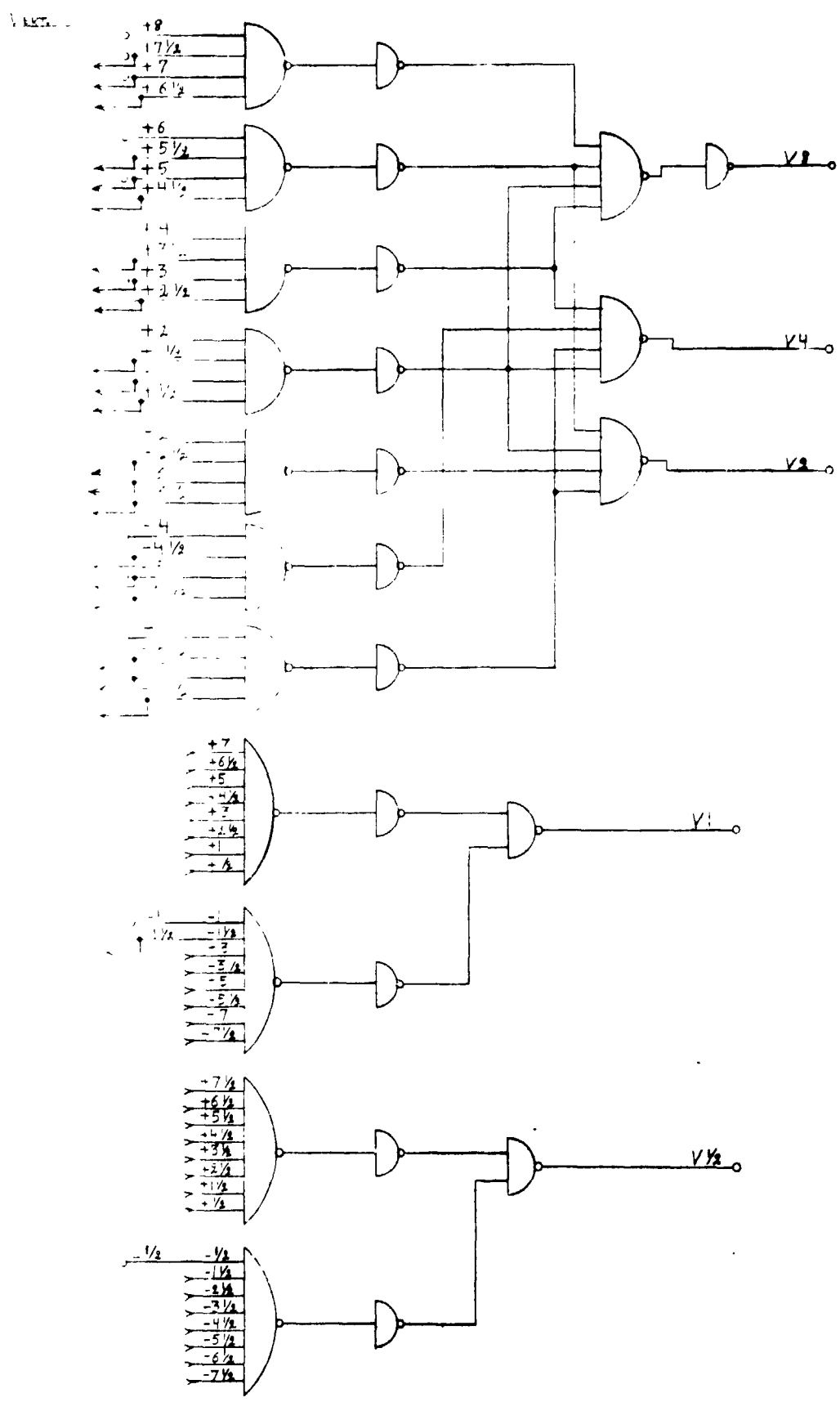


LINEARITY SPOT LOCATION (Drawing RT6B)  
A-21

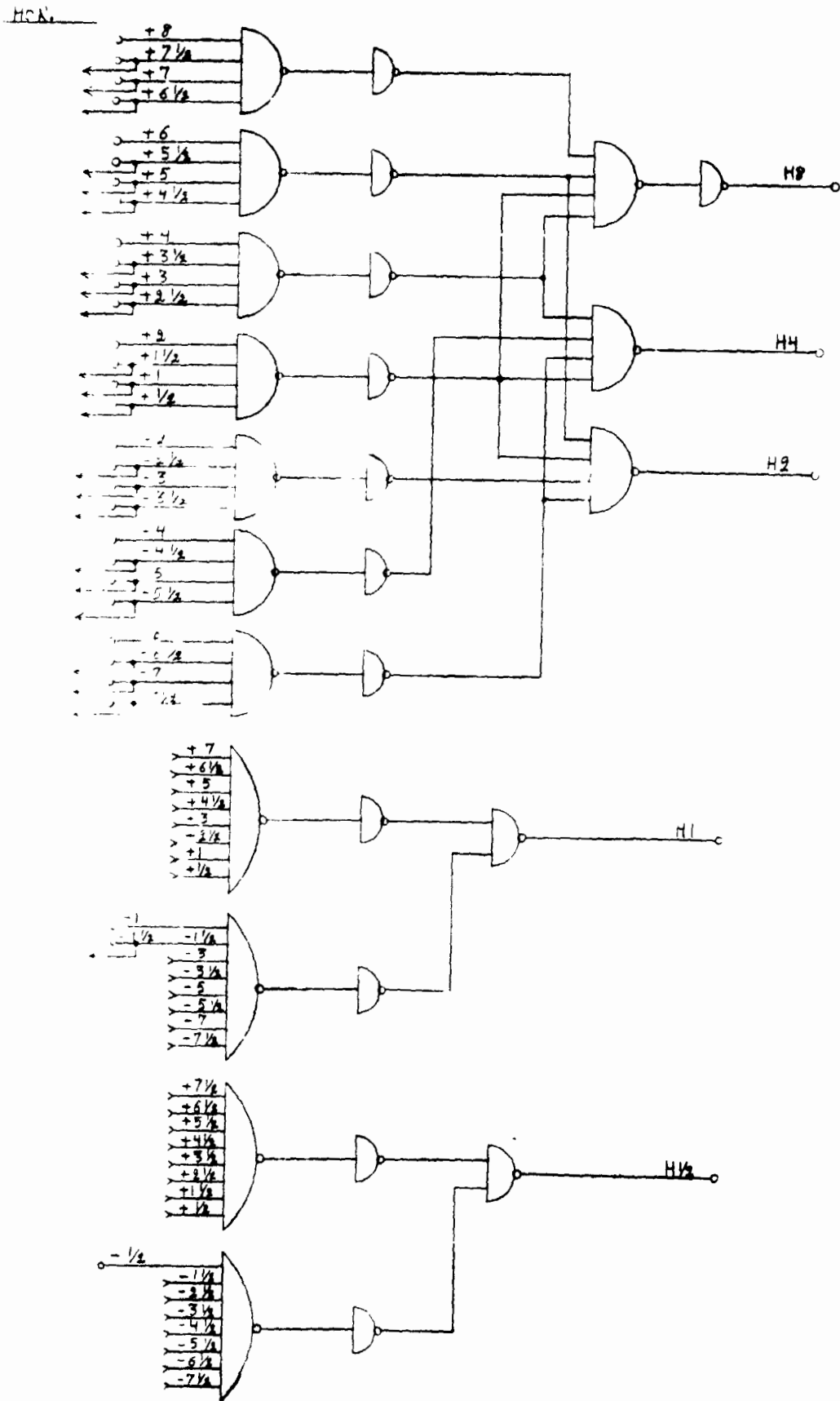


LINERITY OR GATFS (Drawing RT6C)

A-92

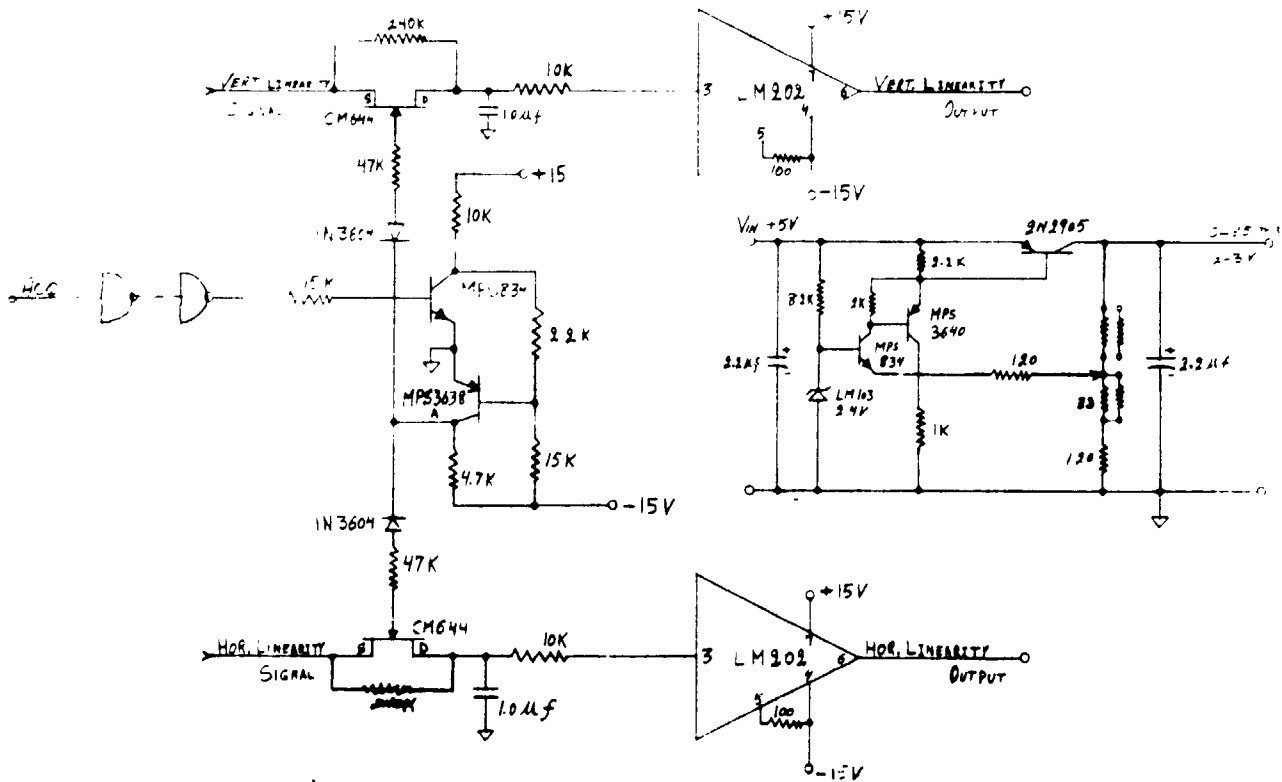
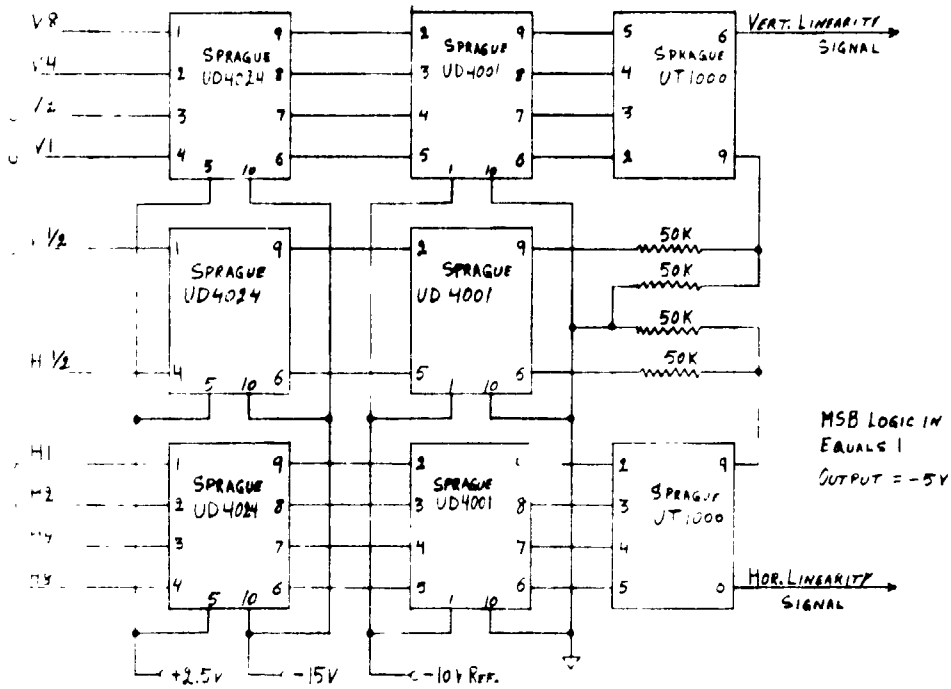


VERTICAL LINEARITY CORRECTION GENERATOR (Drawing RT6D)



HORIZONTAL LINEARITY CORRECTION GENERATOR (Drawing RT6E)

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LINEARITY CORRECTION OUTPUT (Drawing RT6F)

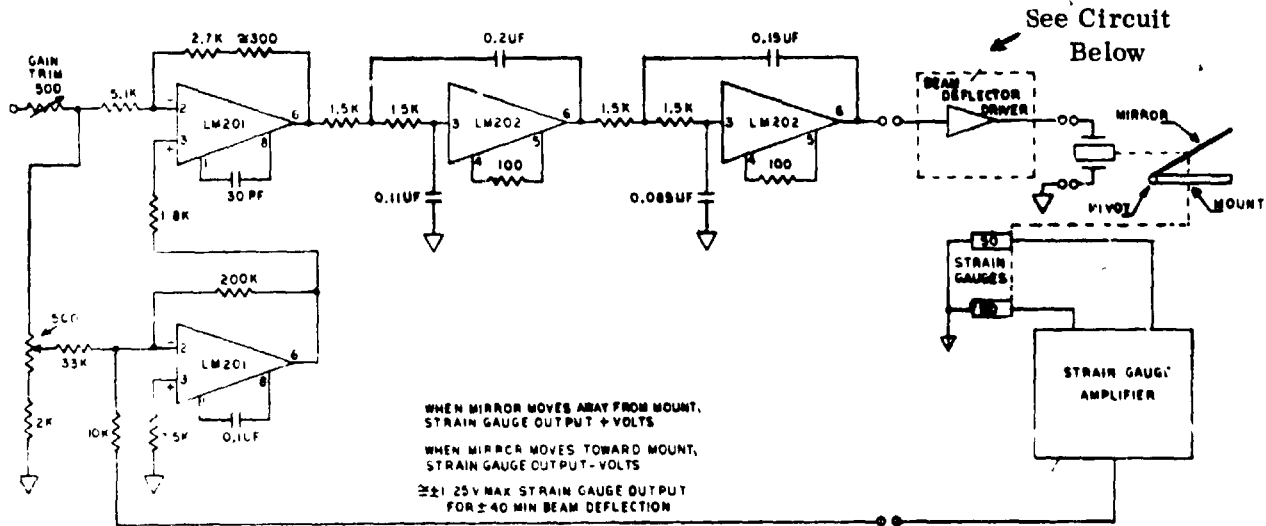




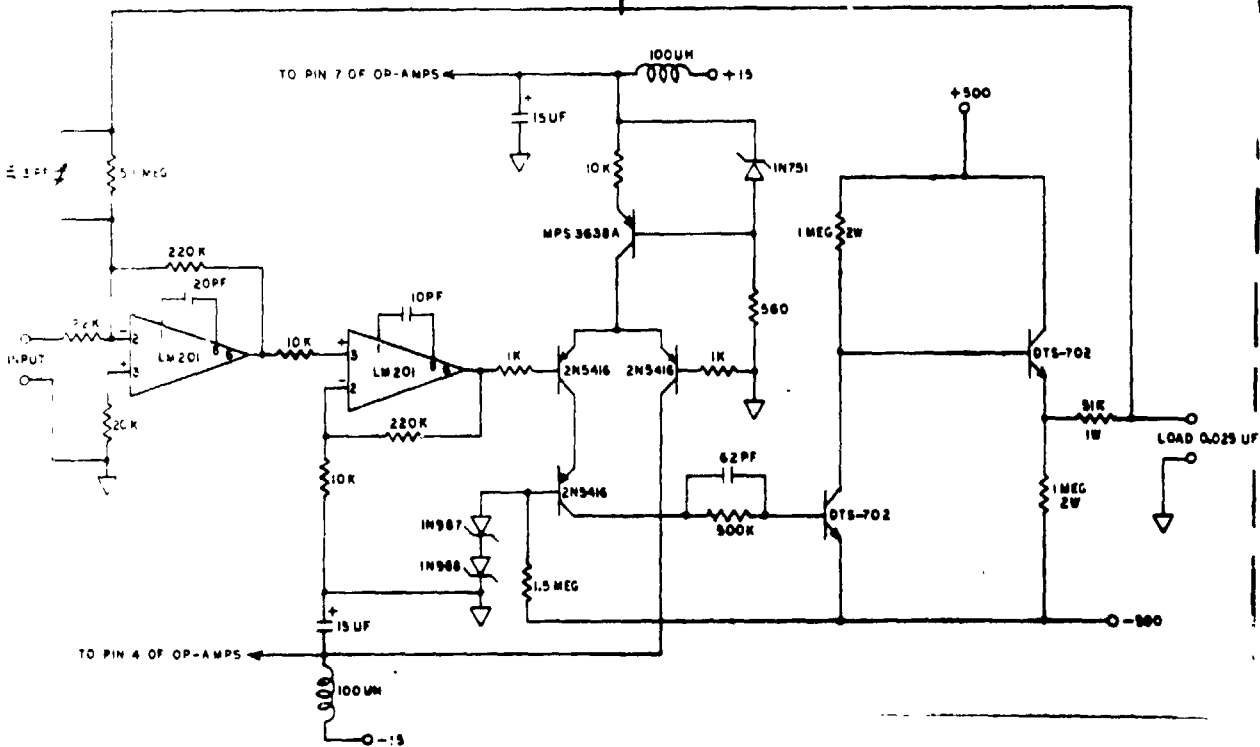


NOTE: OP-AMP PIN 4 IS -15V  
PIN 7 IS +15V

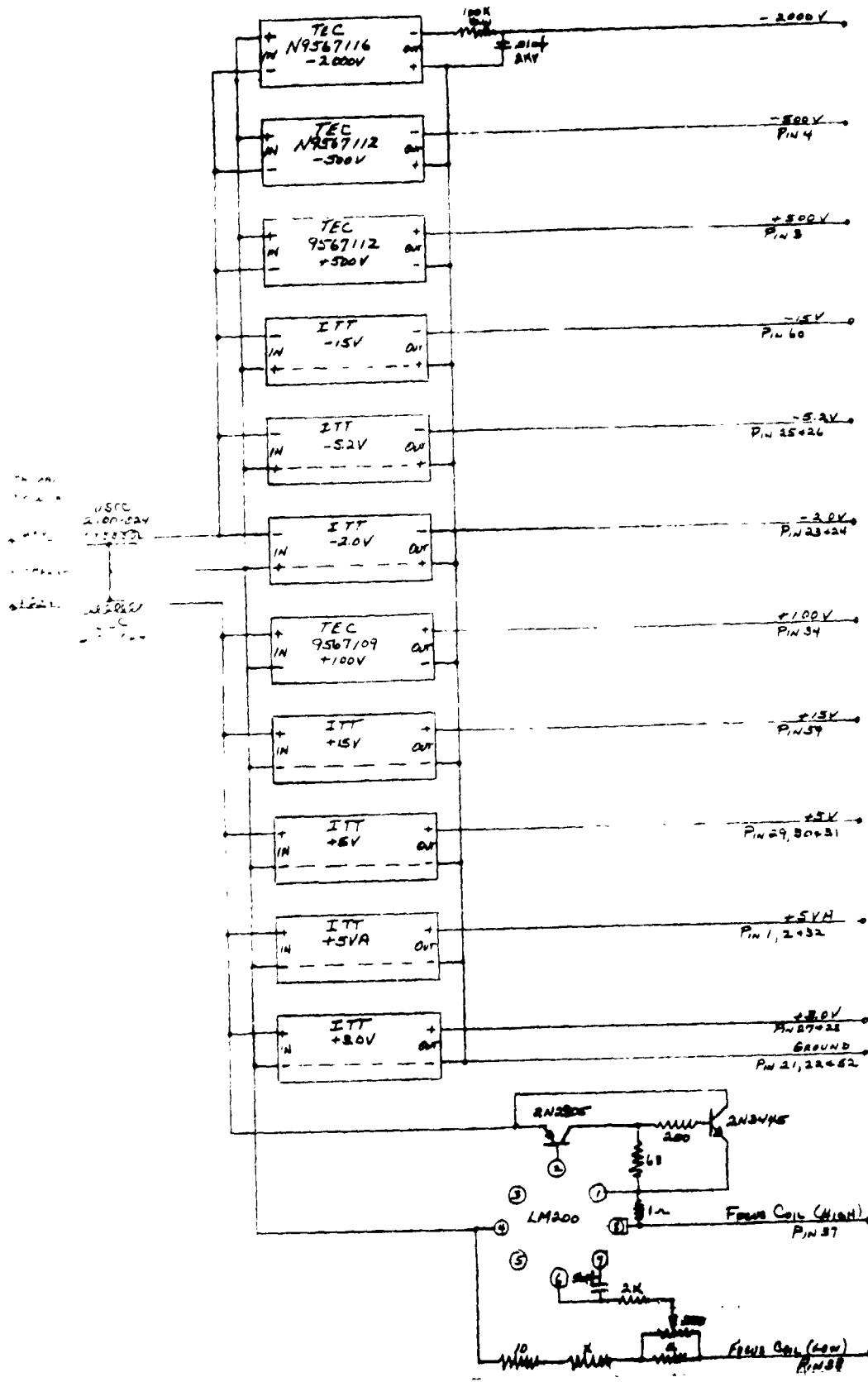
- VOLTS ON XTAL. MOVES MIRROR AWAY FROM MOUNT  
+ VOLTS ON XTAL. MOVES MIRROR TOWARD MOUNT



BEAM DEFLECTOR DRIVER



SCHEMATIC OF THE BEAM DEFLECTOR (Drawing RT8)



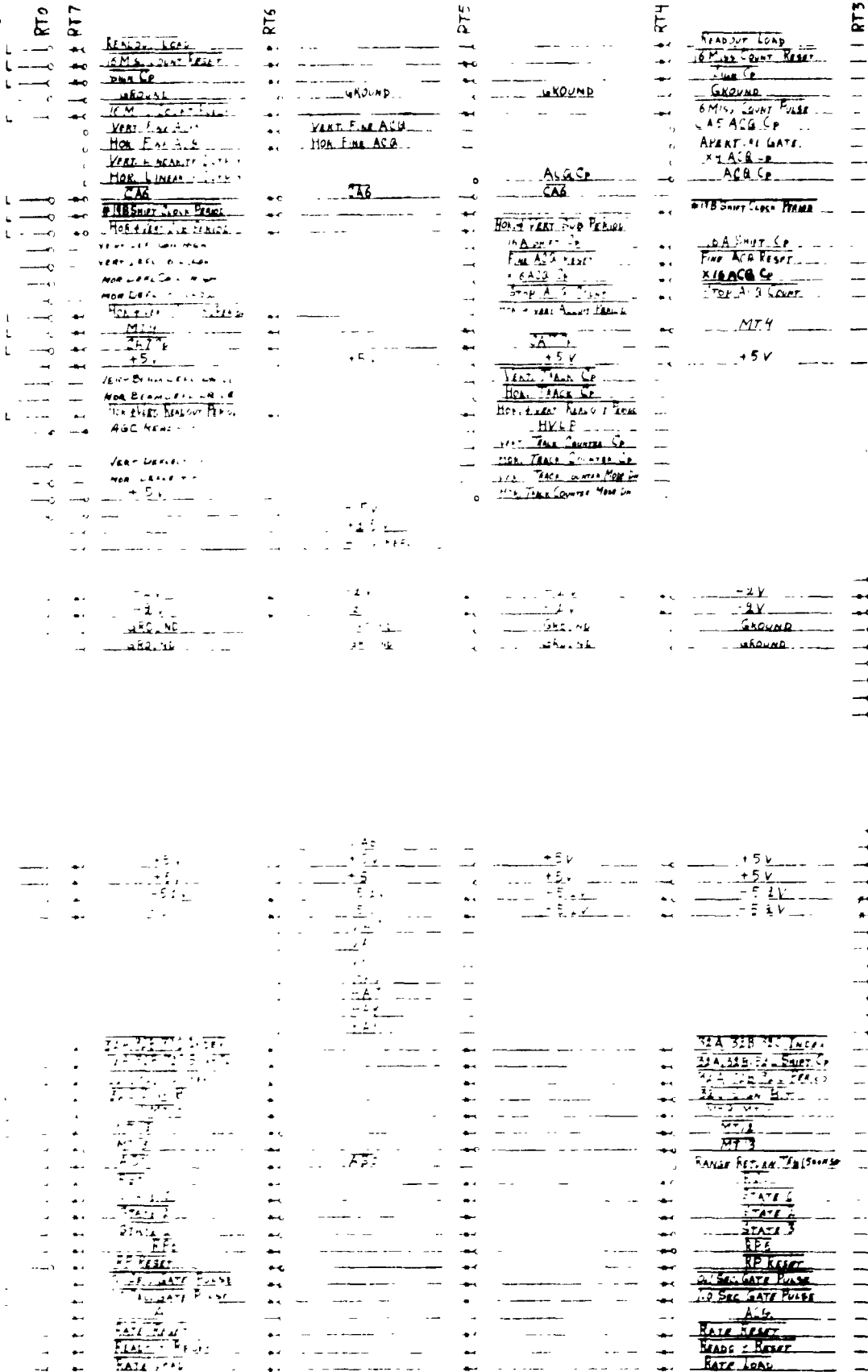
POWER CONVERTERS FOR TRANS-RECEIVER & ELECTRONICS (Drawing RT9-10)



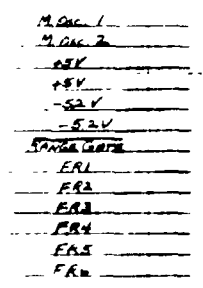
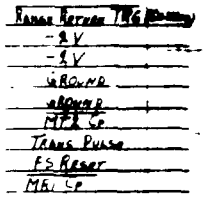




6-8-58

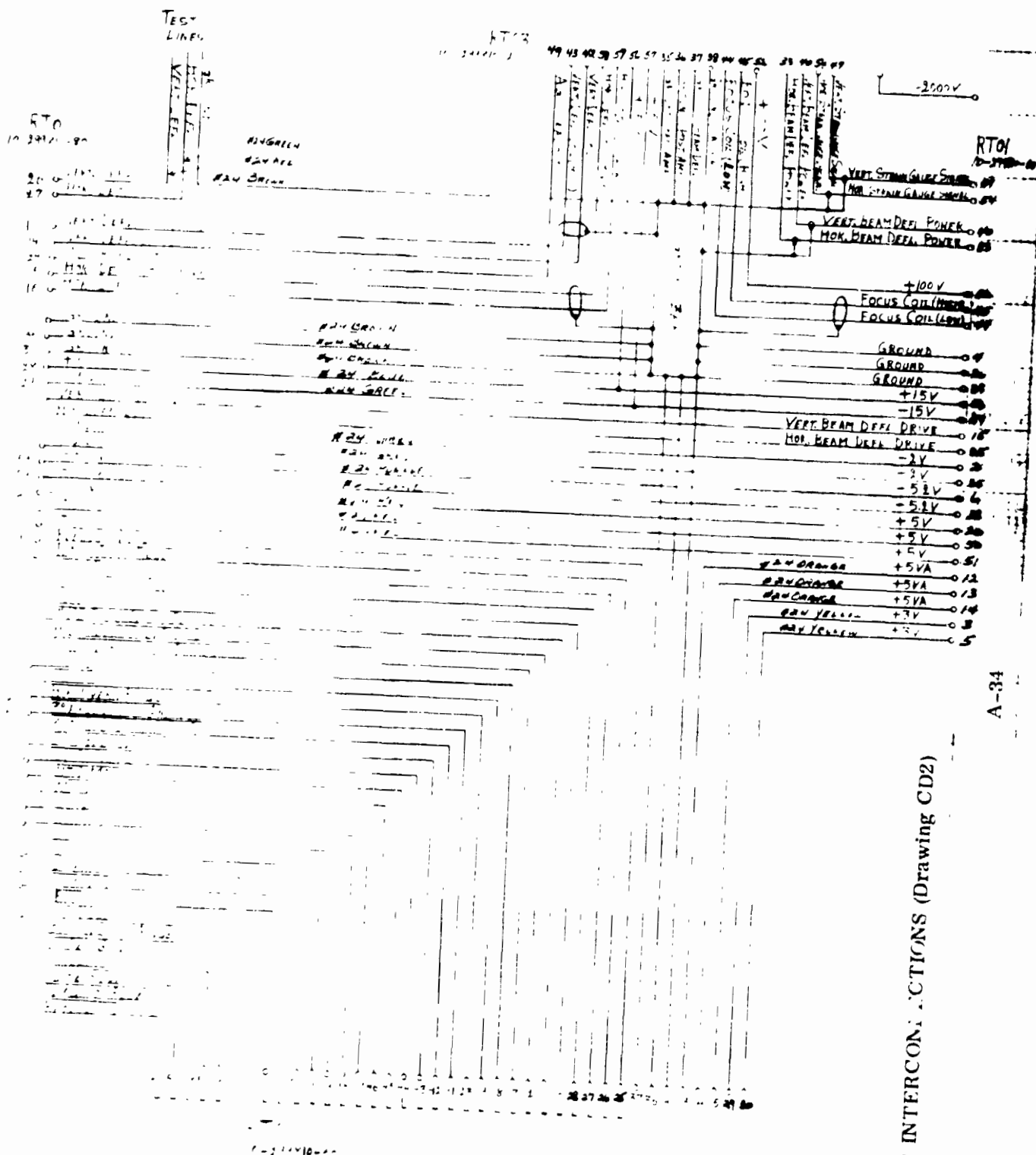


RT2 - RT0 CONNECTOR LAYOUT (Drawing CD 1)



A-33

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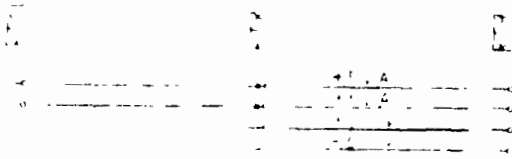


A-34

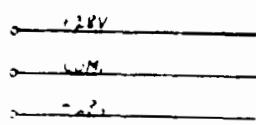
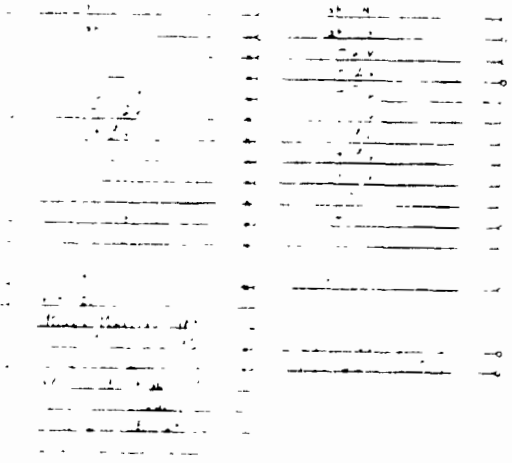
RANGE TRACKER INTERCONNECTIONS (Drawing CD2)

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5762



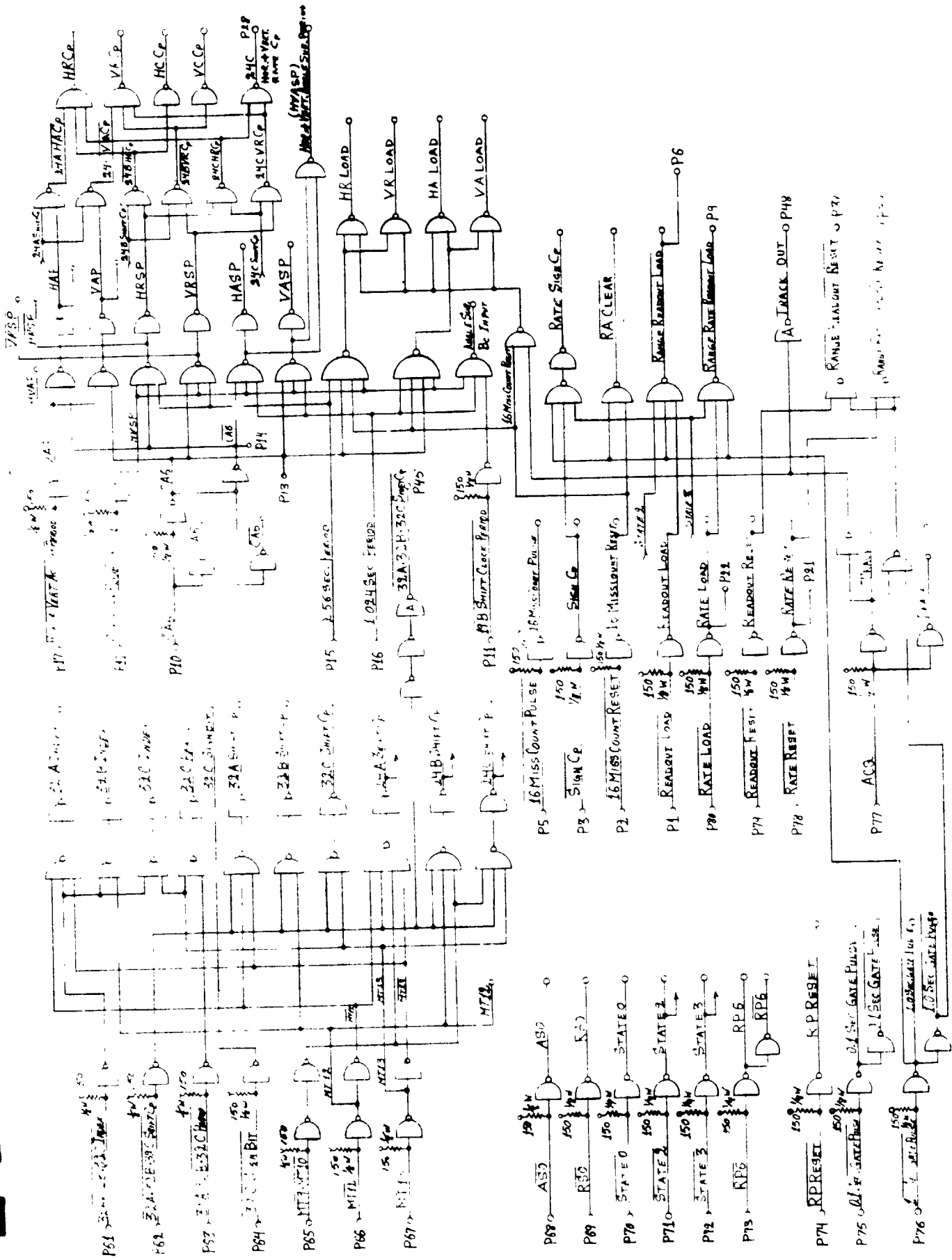
BEAM DEFLECTOR DRIVER & POWER SUPPLY CONNECTIONS (Drawing CD3)

A-35

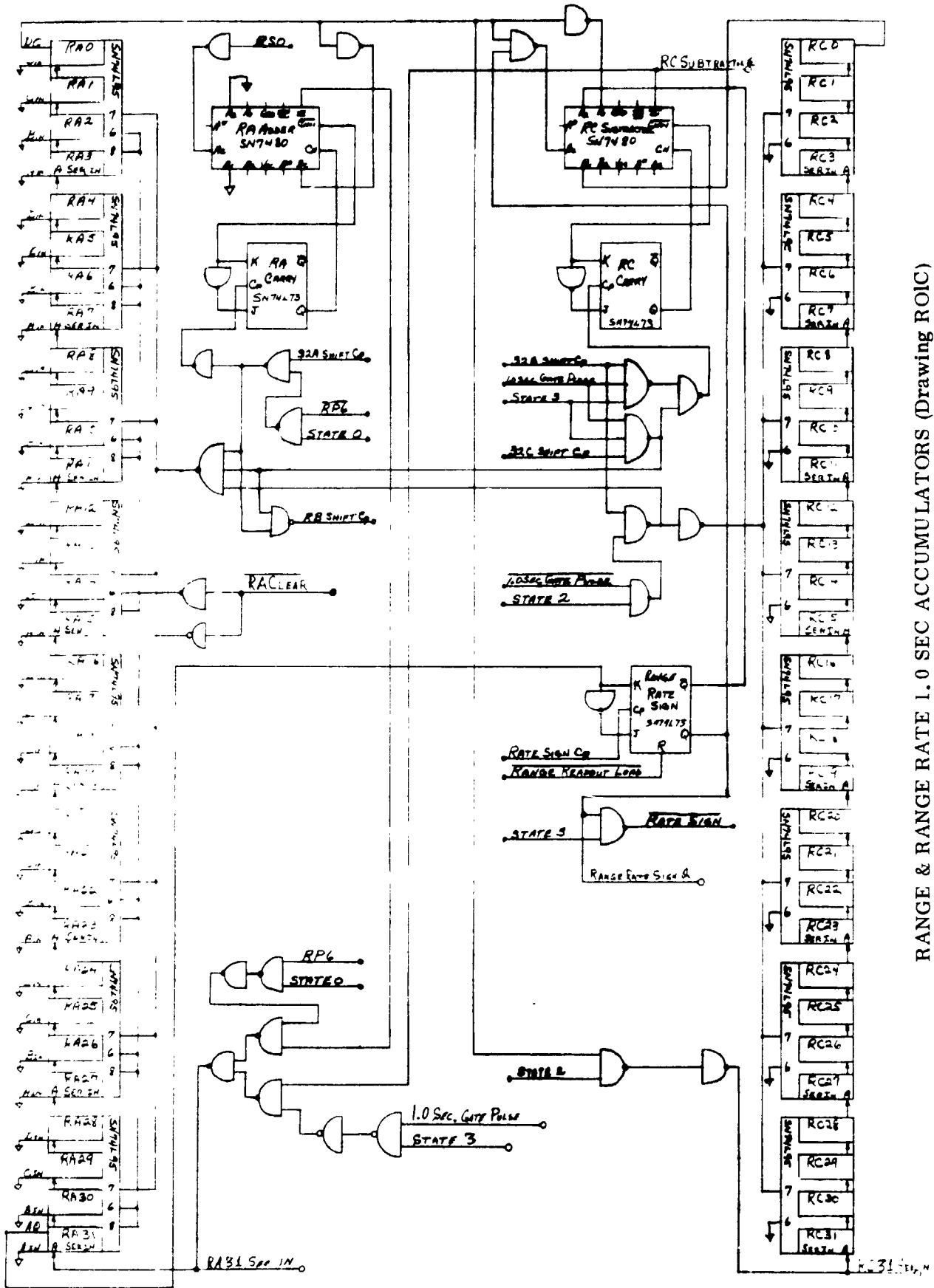
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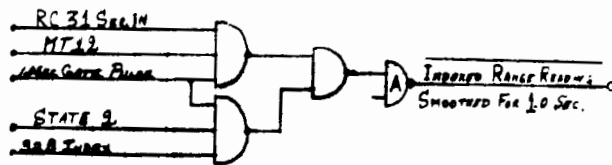
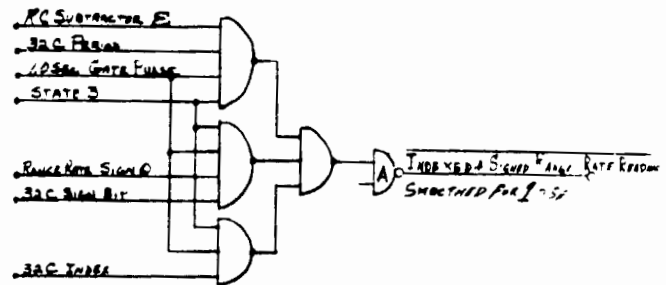
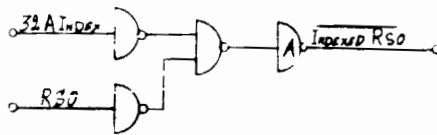
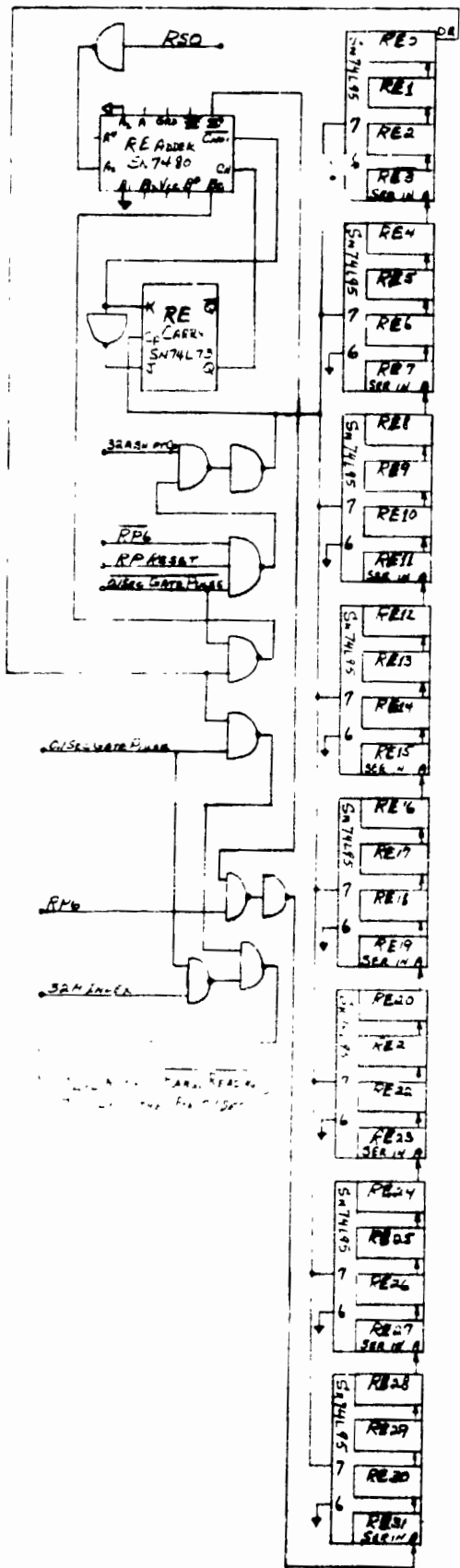




ROI INTERFACE (Drawing ROIB)



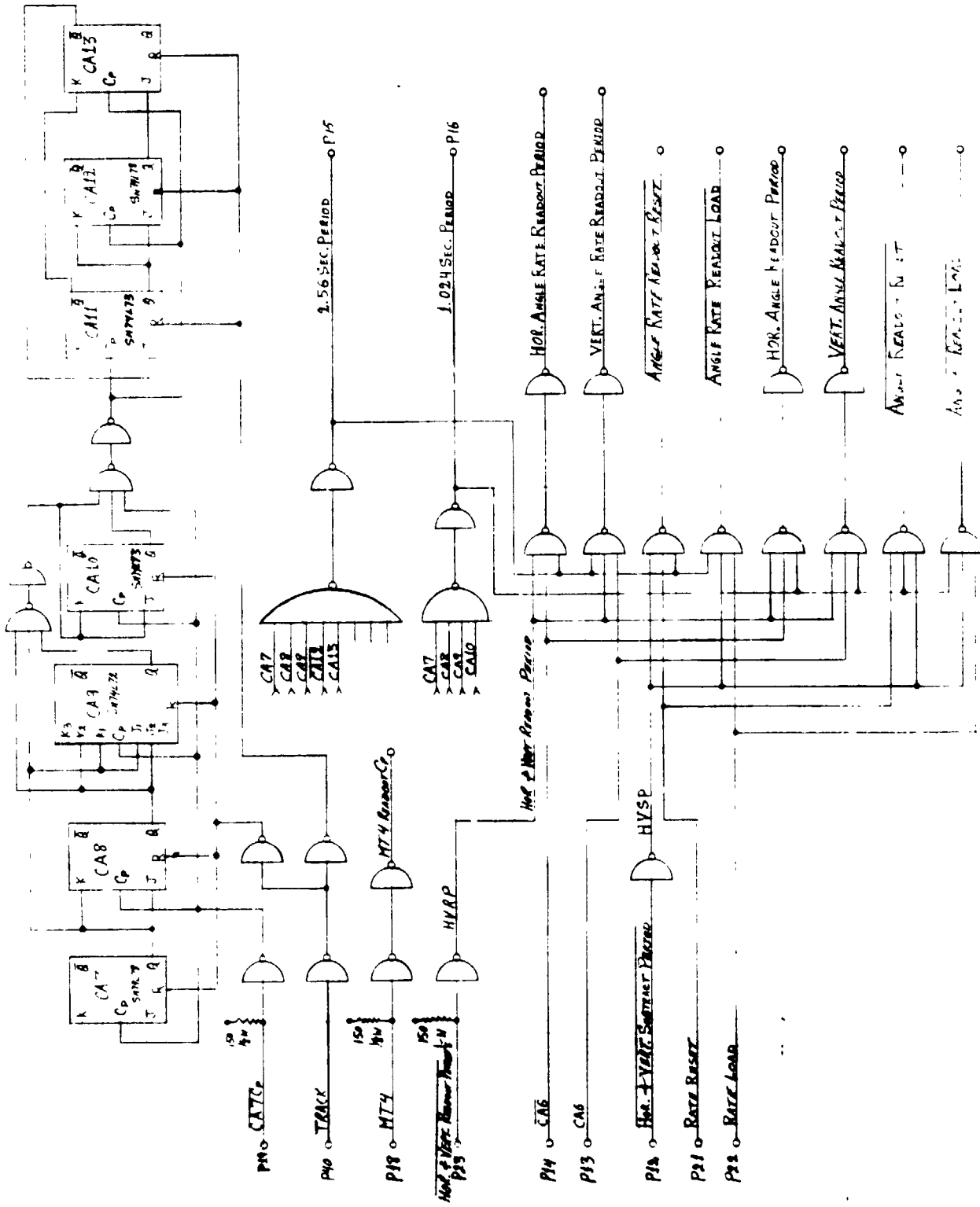
RANGE & RANGE RATE 1.0 SEC ACCUMULATORS (Drawing ROIC)



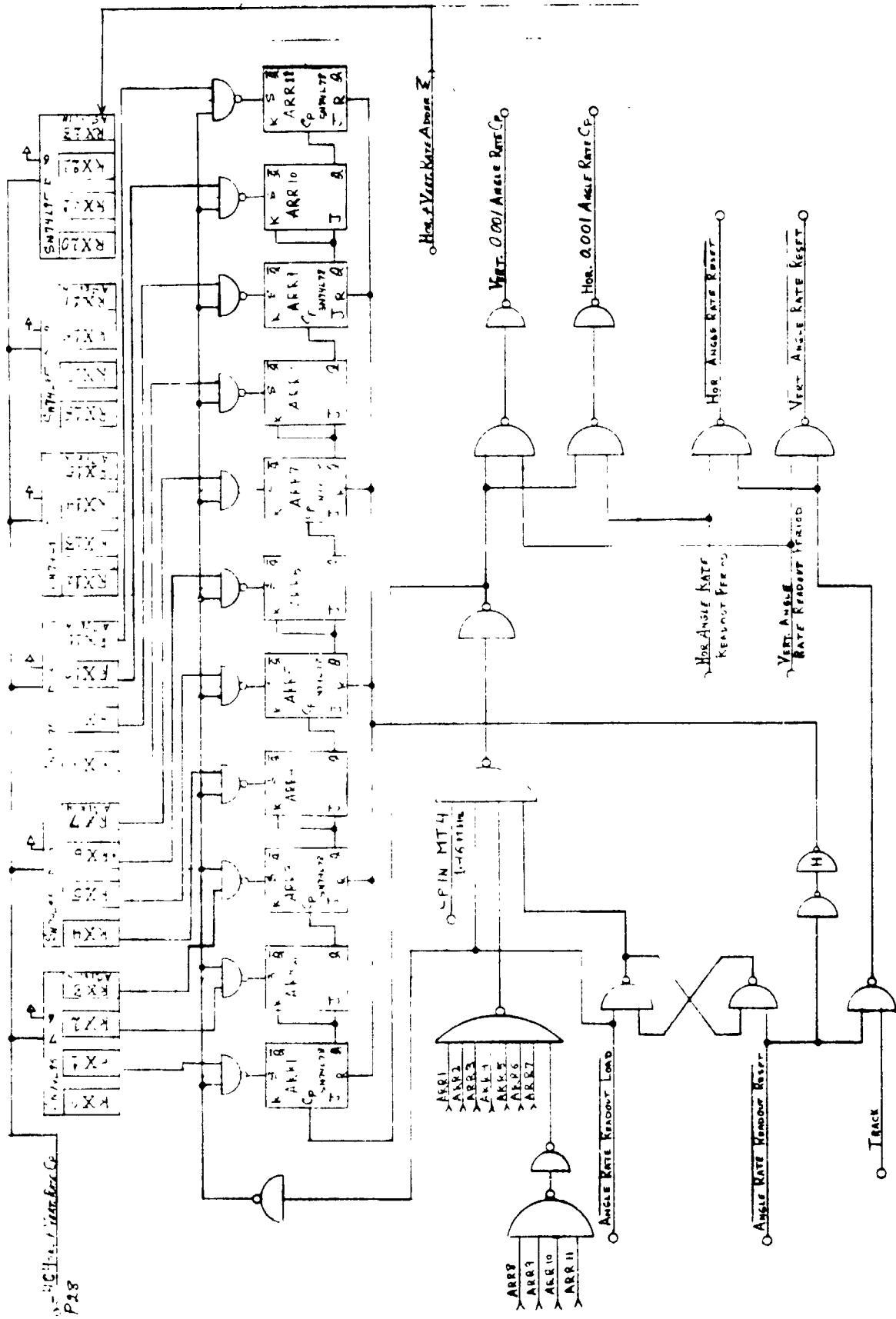
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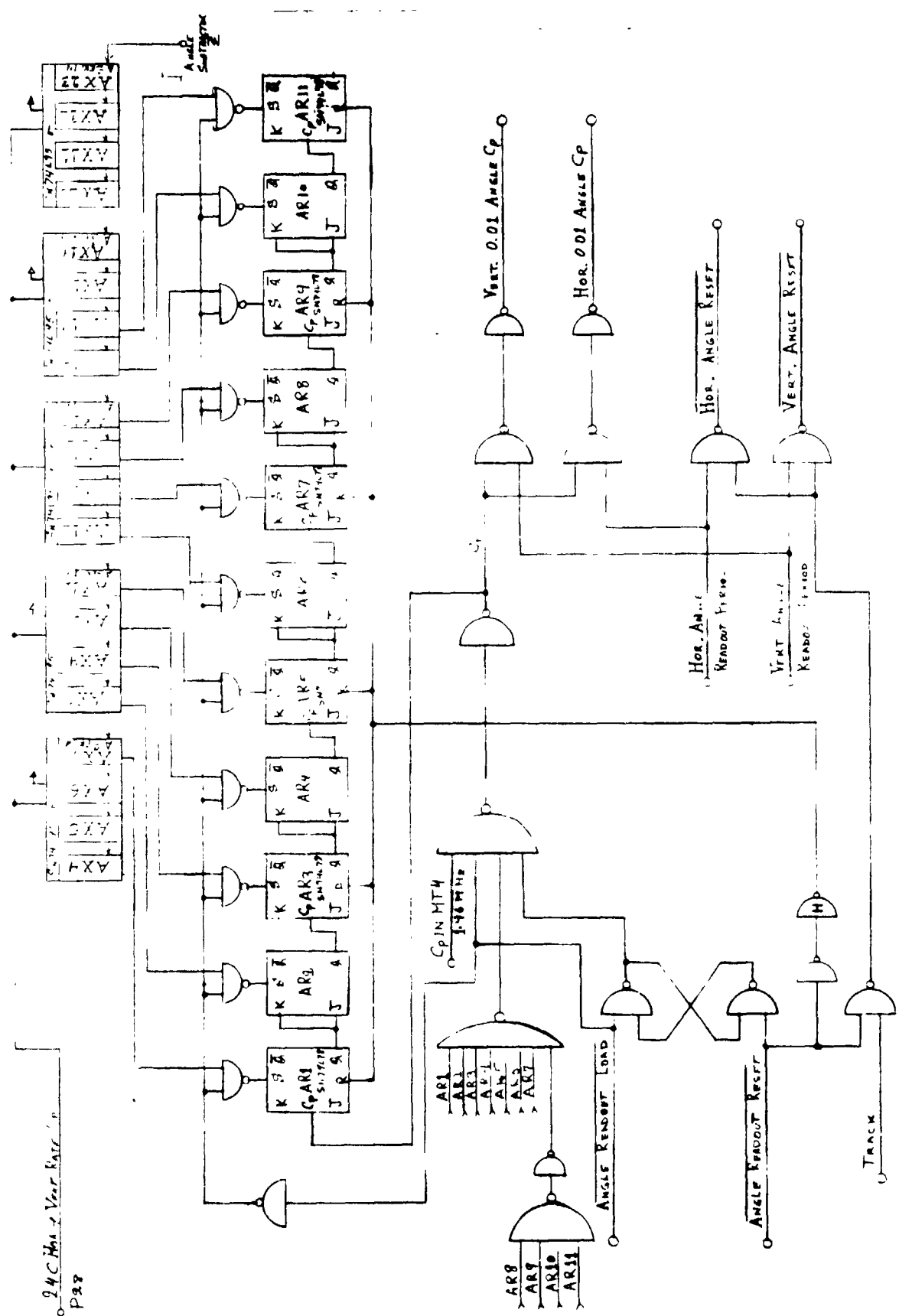


RO2 INTERFACE (Drawing Ro2A)

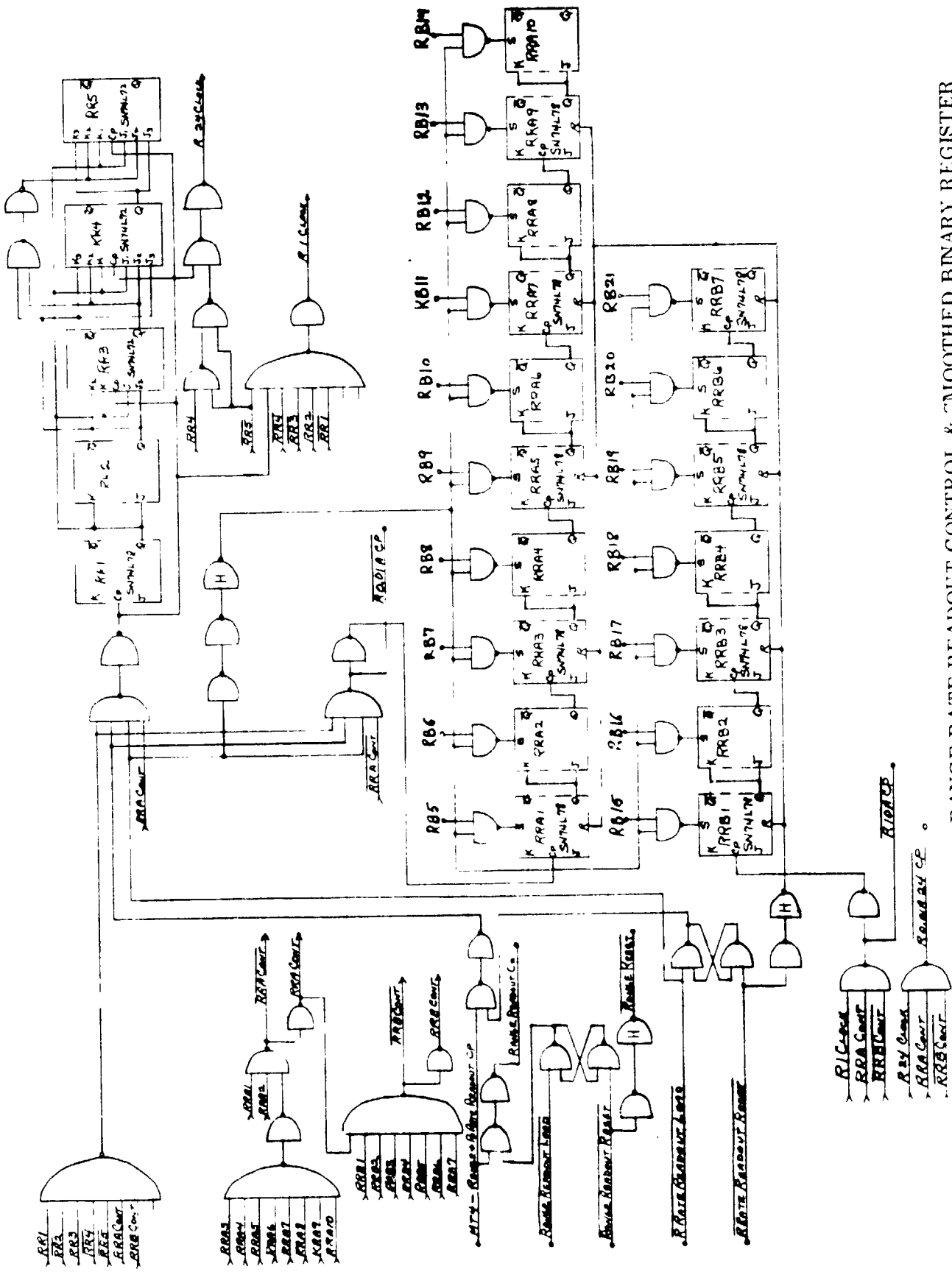


ANGLE RATE BINARY REGISTER (Drawing RO2B)

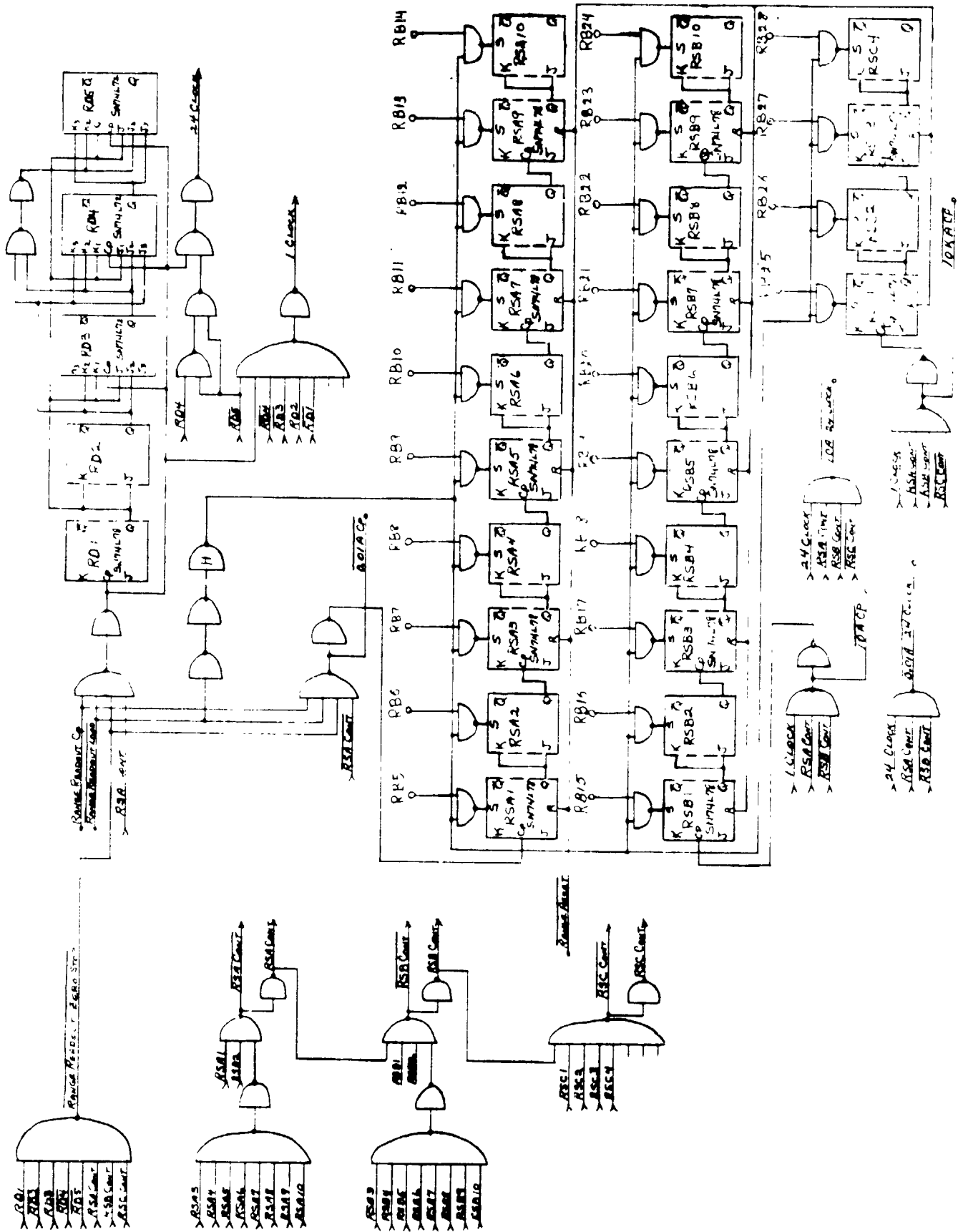




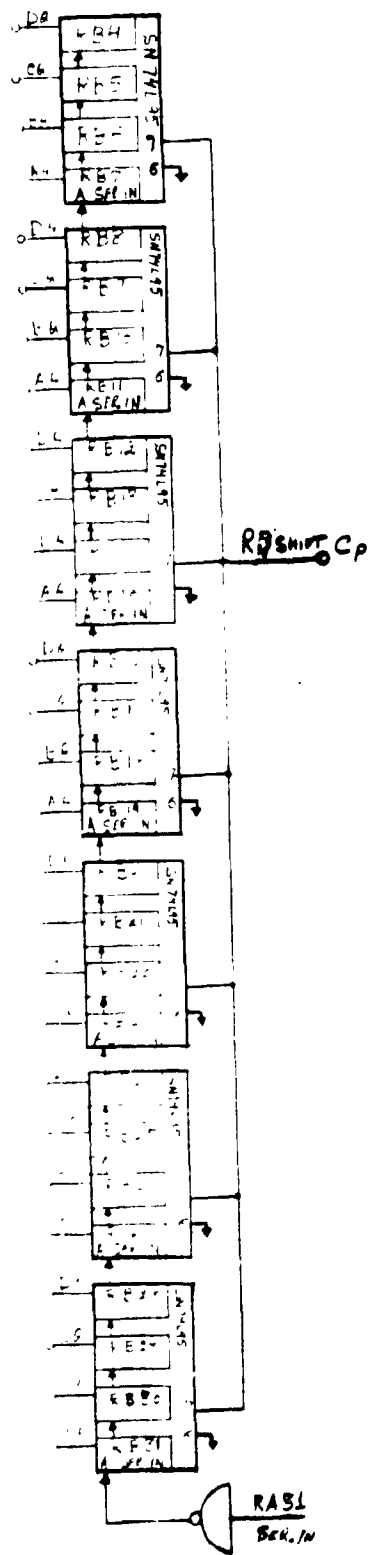
ANGLE BINARY REGISTER (Drawing RO2C)



RANGE-RATE READOUT CONTROL & SMOOTHED BINARY REGISTER  
(Drawing RO2D)

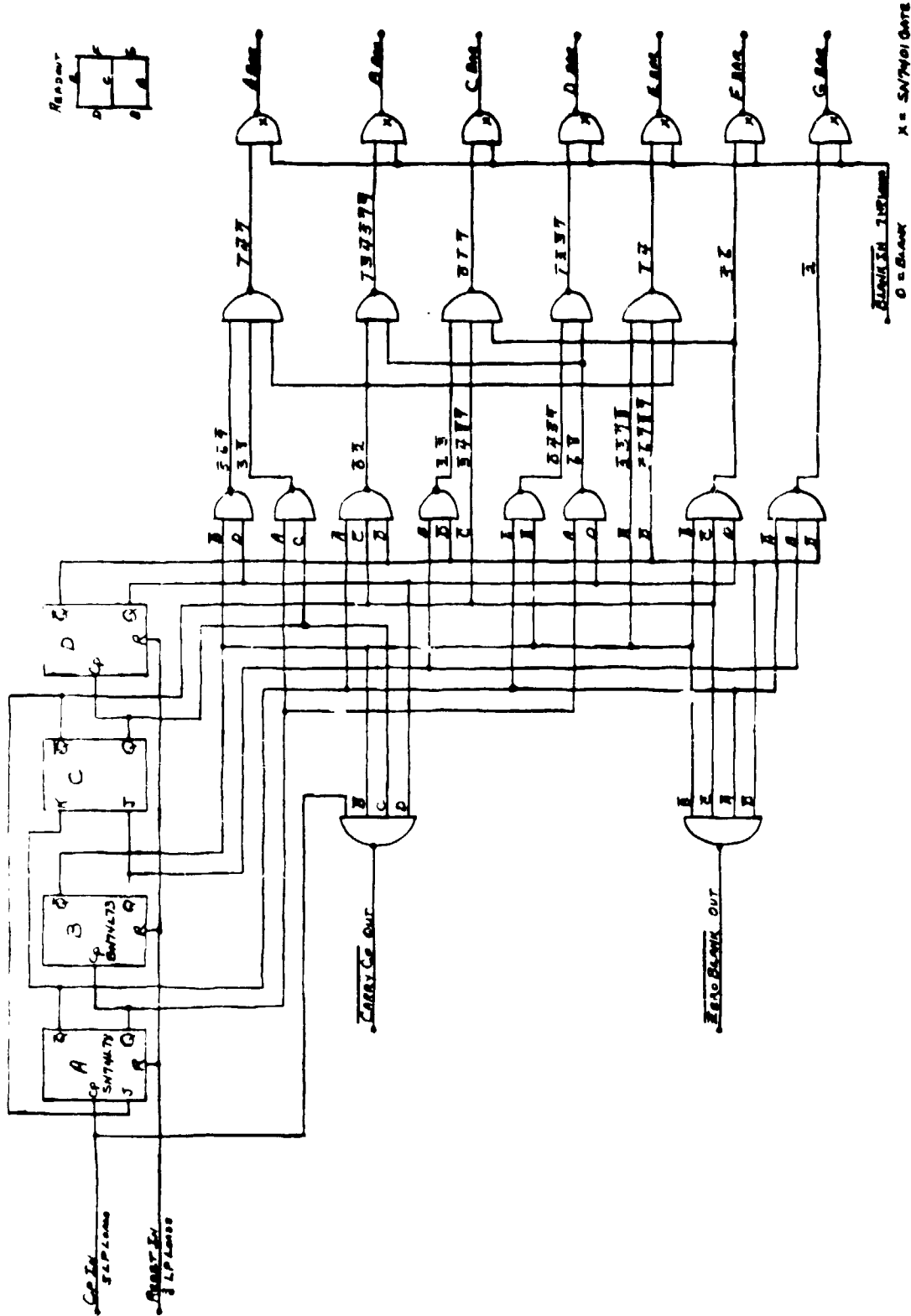


RANGE READOUT CONTROL & SMOOTHED BINARY REGISTER (Drawing RC2F)



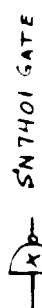
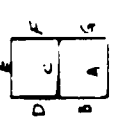
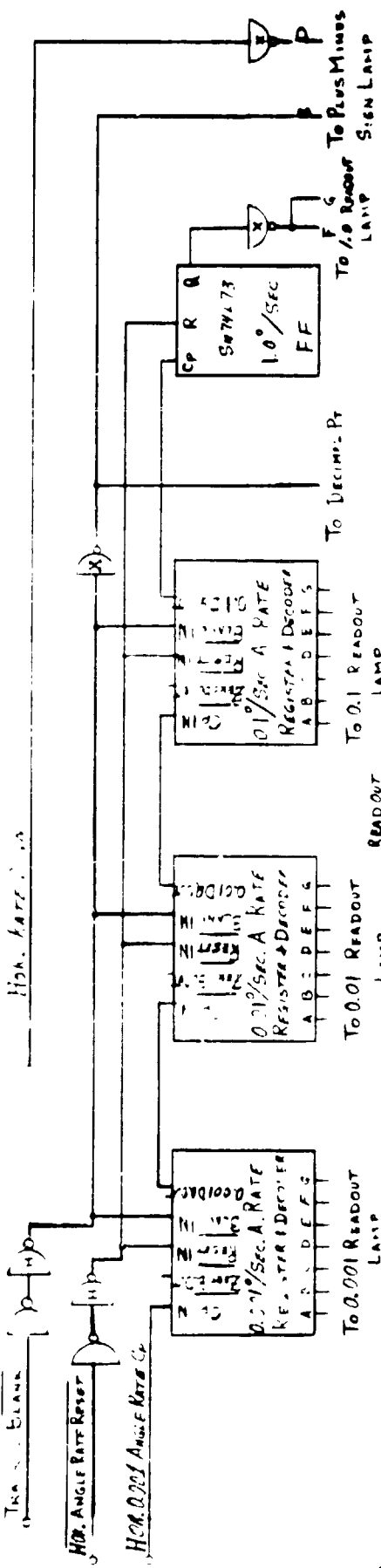
RANGE & RANGE-RATE LOAD REGISTER (Drawing RO2F)





DECADE READOUT REGISTER & SEVEN SEGMENT DECODER (Drawing R03 B thru N, Except H)  
 (Drawing R04 B thru N, Except G)

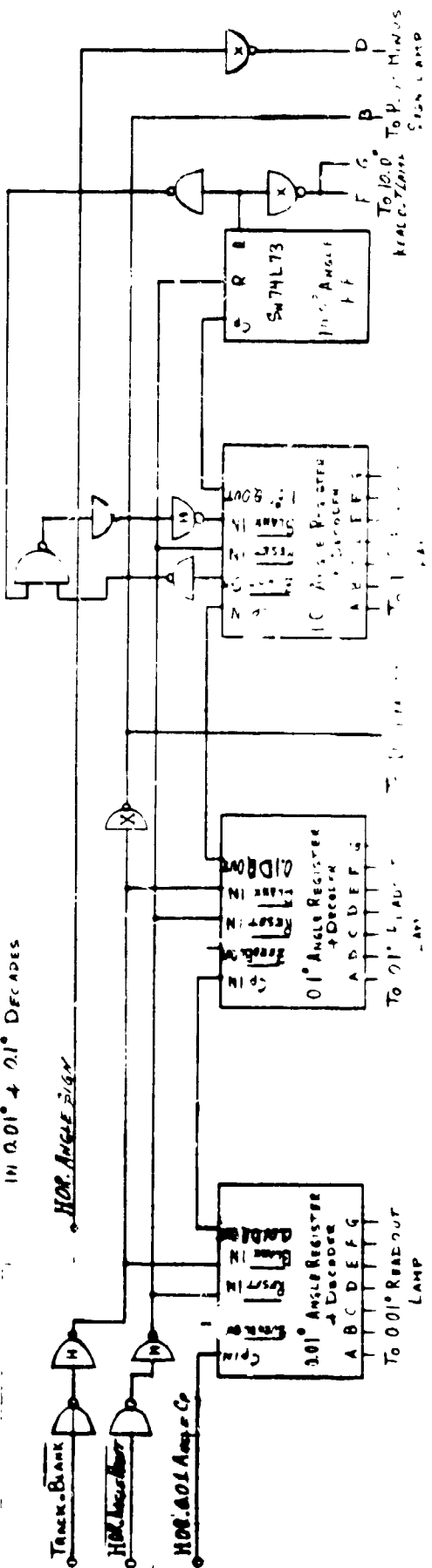
Carry Cp Out  $\rightarrow$  AFF 1000 Hz IN A - 1000 Hz  
 Zero Blank Out  $\rightarrow$  AFF 1000 Hz IN A - 1000 Hz  
 HOR. RATE  $\rightarrow$  AFF 1000 Hz IN A - 1000 Hz



CARRY Cp OUT GATE NOT REQUIRED IN ALL DECADES  
 ZERO BLANK OUT GATE NOT REQUIRED IN 0.01° & 0.1° DECADES

HOR. ANGLE RATE READOUT

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HORIZONTAL ANGLE READOUT (Drawing R03H)







TT0 60 SECRET

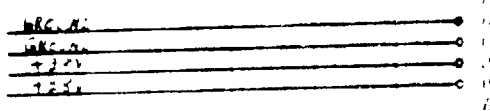
TT4 156

TT3 88

TT2 18

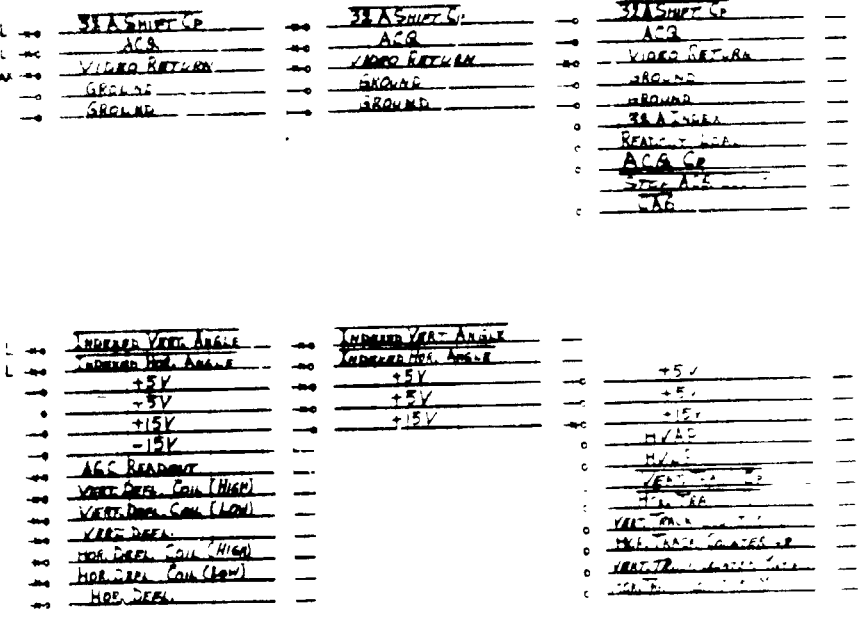
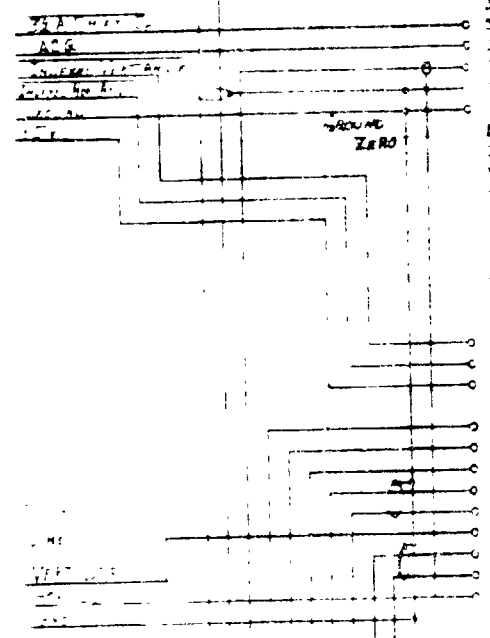
TT1 JA  
TT1 3

PRIMARY POWER



- GROUND
  - GROUND
  - +28V
  - +18V
- } PRIMARY POWER
- FOCUS COIL (HIGH)
  - FOCUS COIL (LOW)

OUTPUT SIGNAL



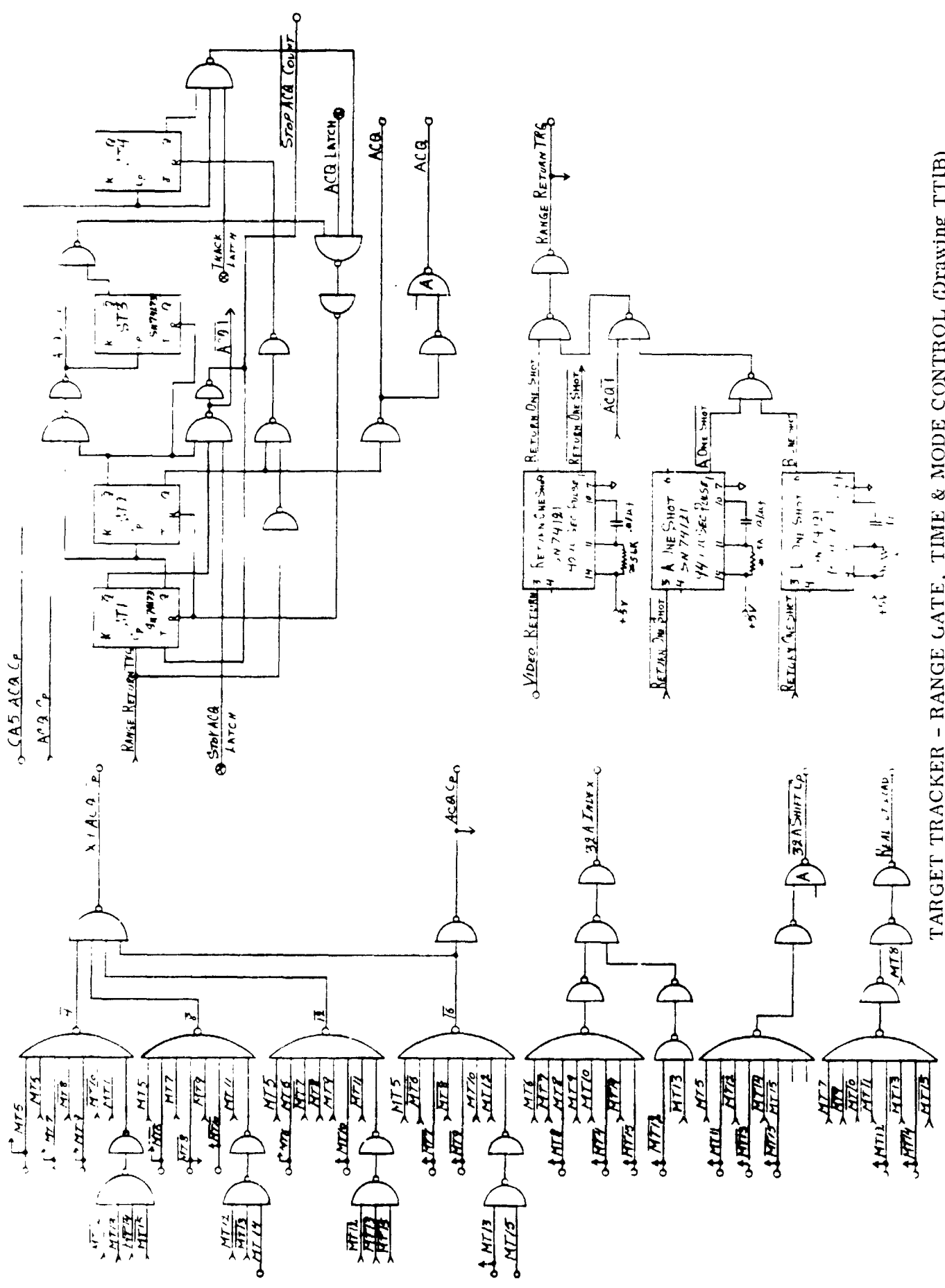
⊕ -9000V

TARGET TRACKER INTERCONNECTIONS (Drawing TT0A)

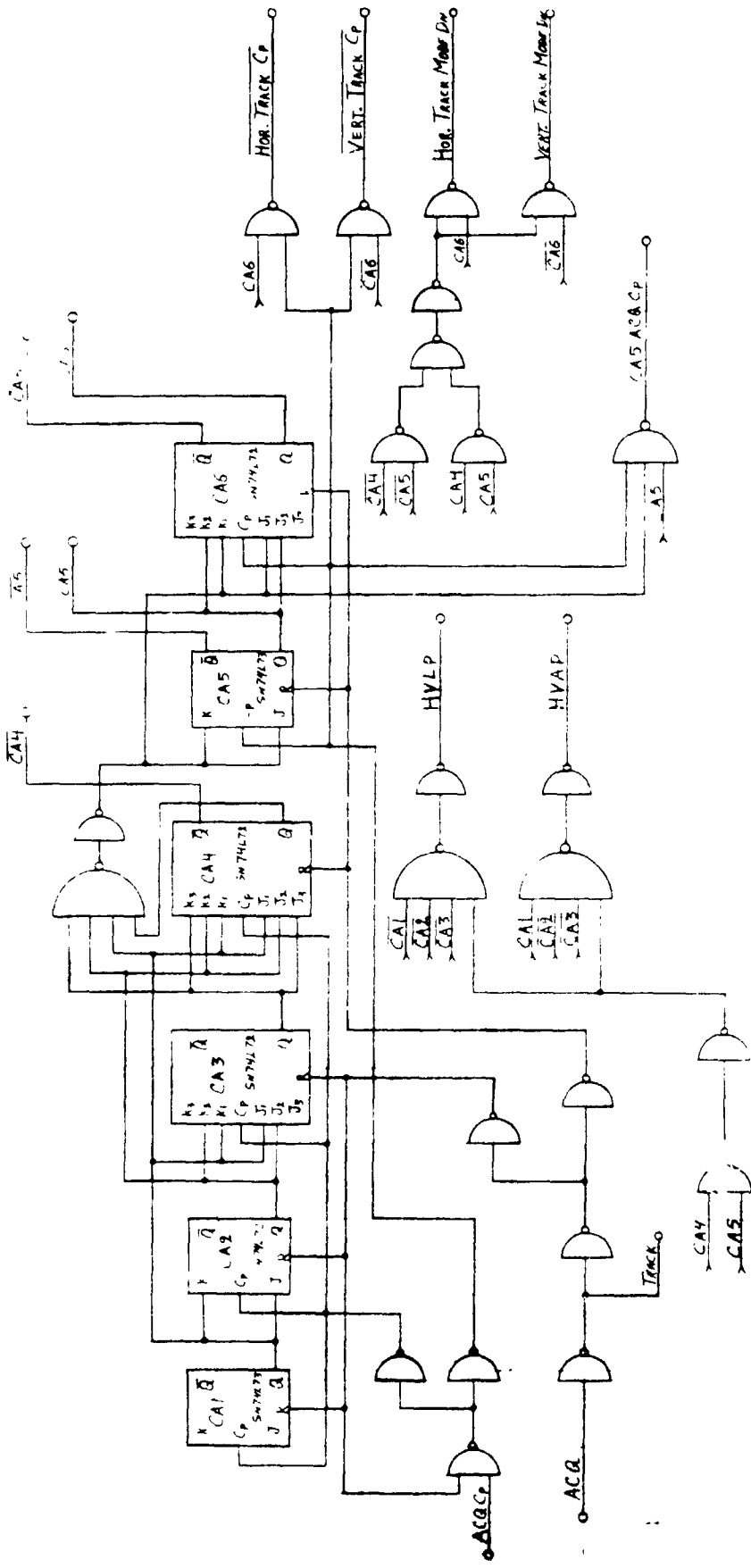
A-50

REPRODUCTION OF THIS ORIGINAL PAGE IS POOR

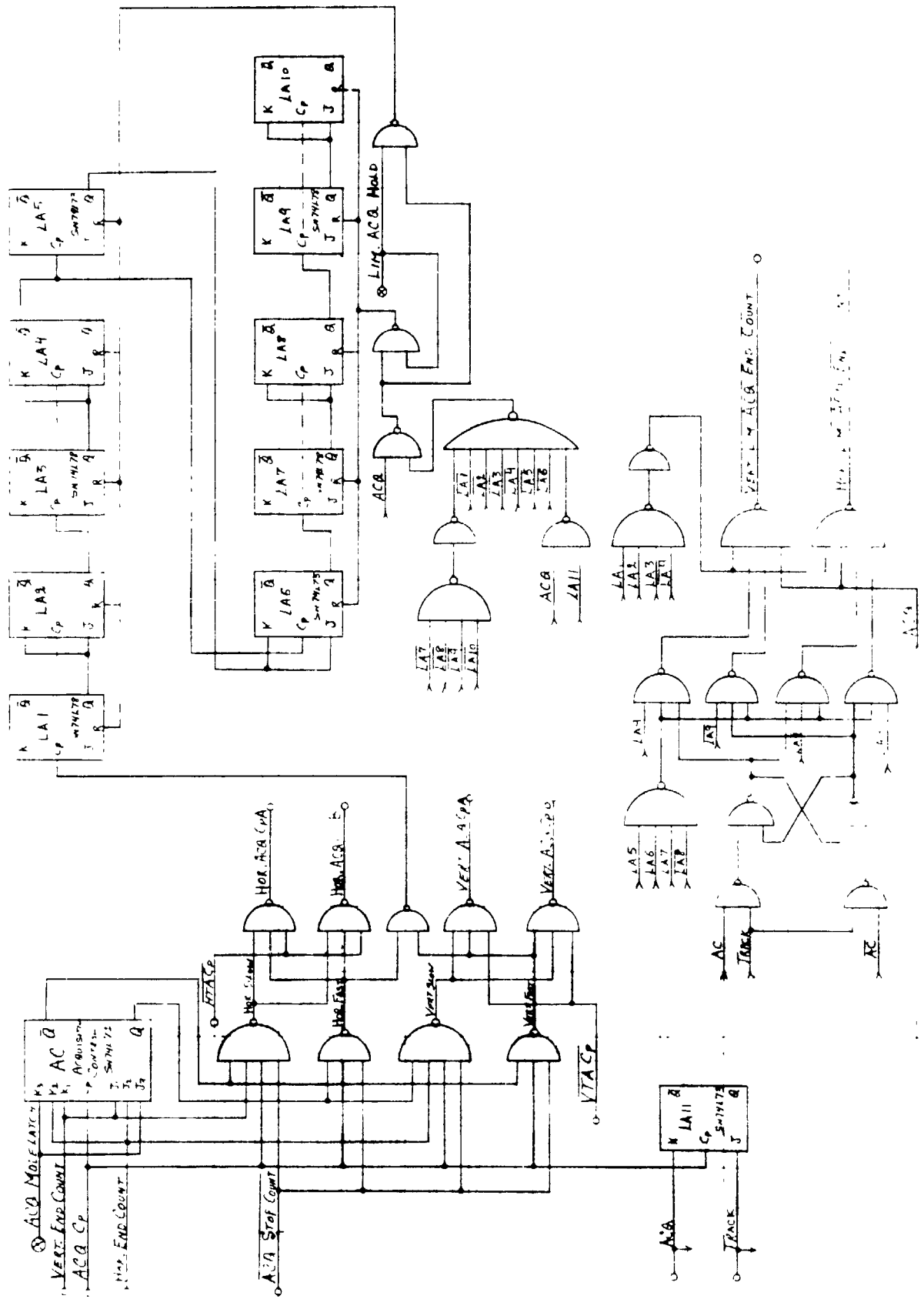




TARGET TRACKER - RANGE GATE, TIME & MODE CONTROL (Drawing TT1B)



TARGET TRACKER TRACK CONTROL COUNTER (Drawing TTIC)



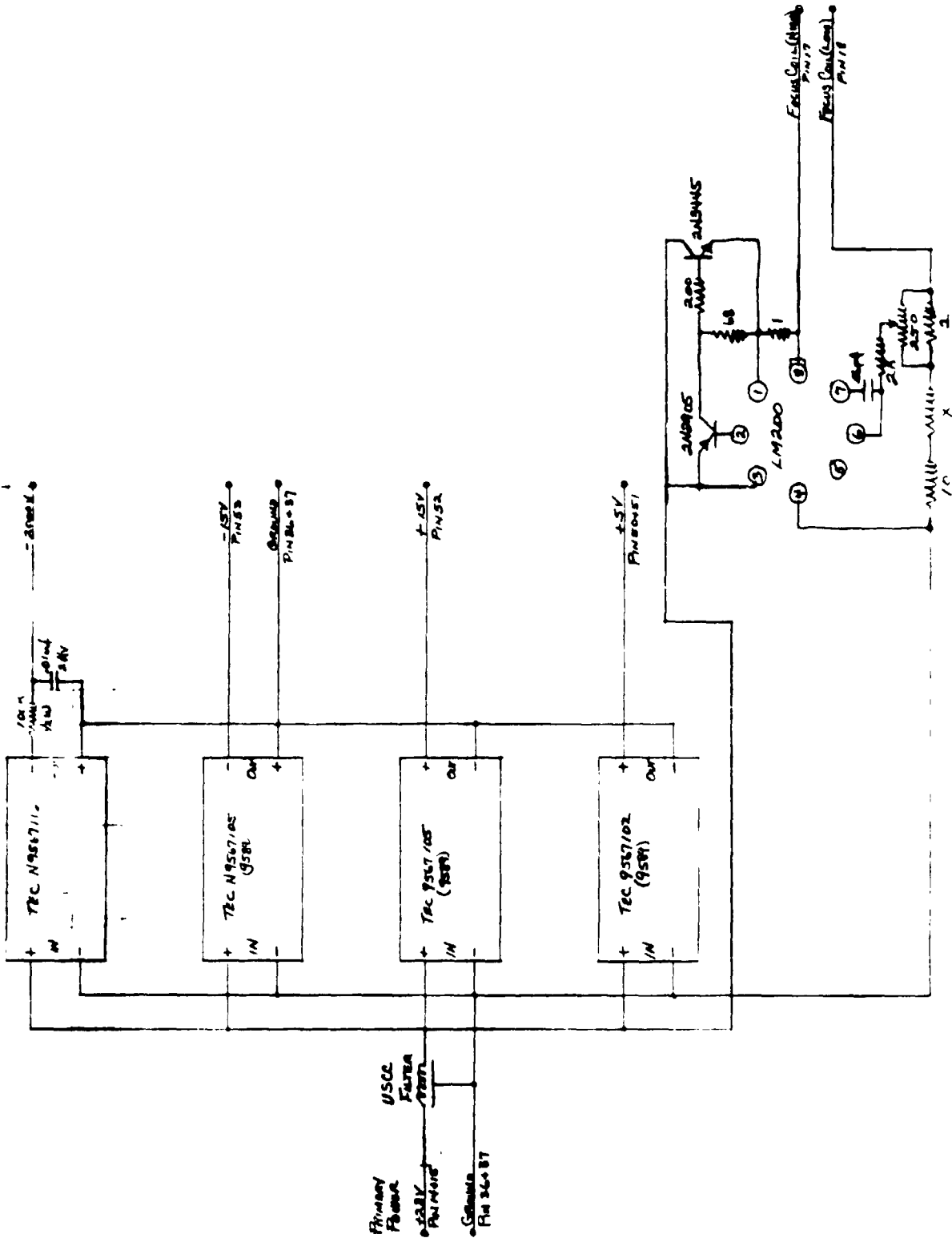
TARGET TRACKER, LIMITED ACQUISITION CONTROL COUNTER & CONTROL GATES (Drawing TT2B)











TARGET TRACKER POWER SUPPLY SYSTEM (Drawing TT4)