

**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
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G3/07 50876

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

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

DECEMBER 1971

GILFILLAN/SAN FERNANDO, CALIFORNIA

ITT



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TO
NASA
MARSHALL SPACE FLIGHT CENTER
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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

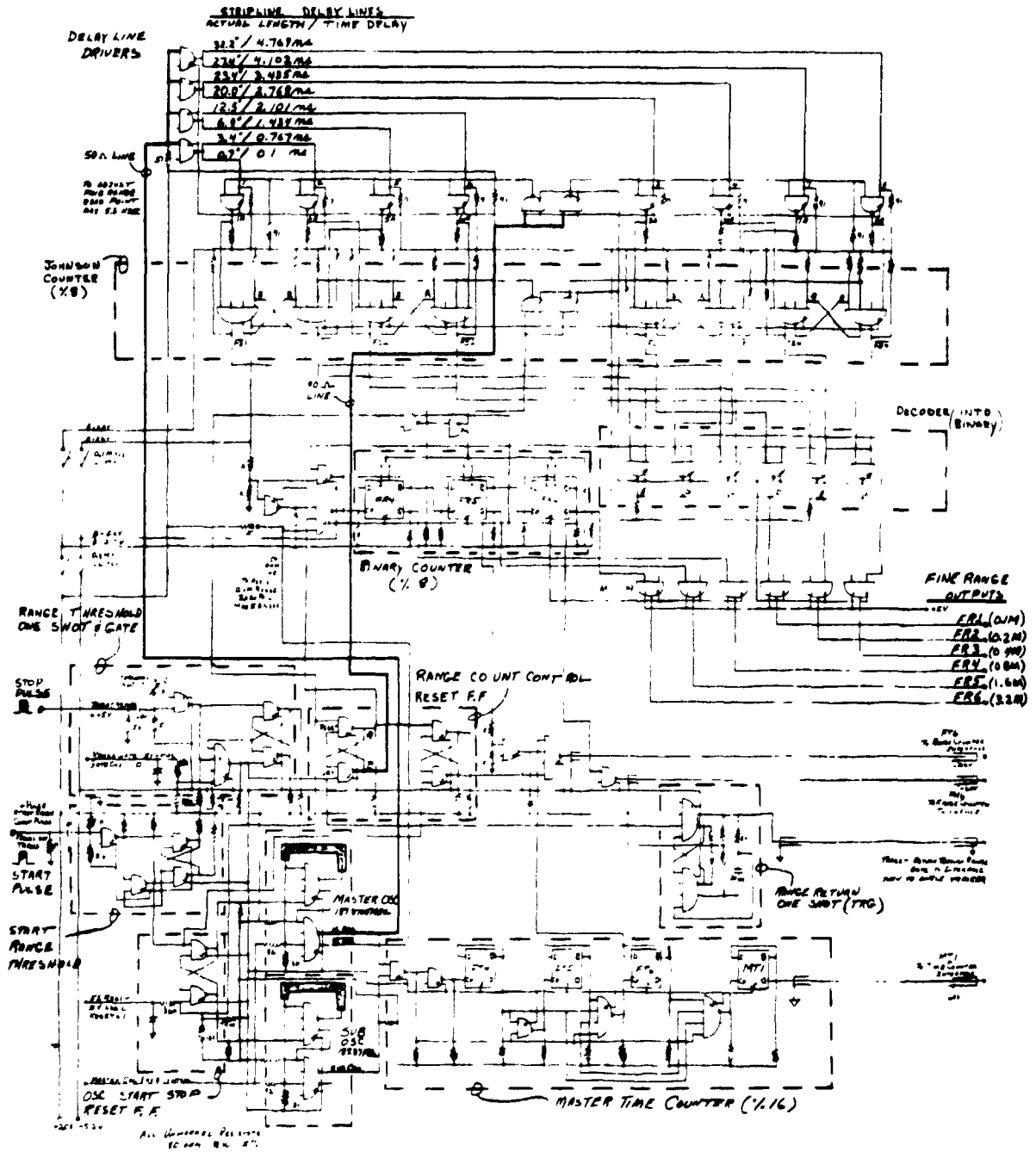
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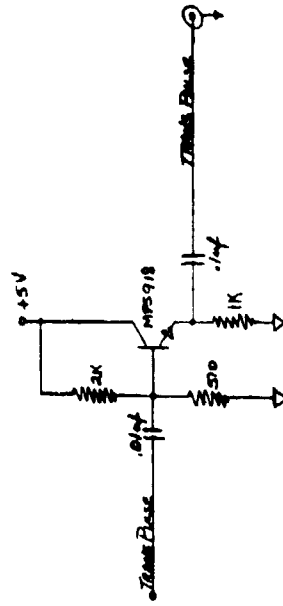
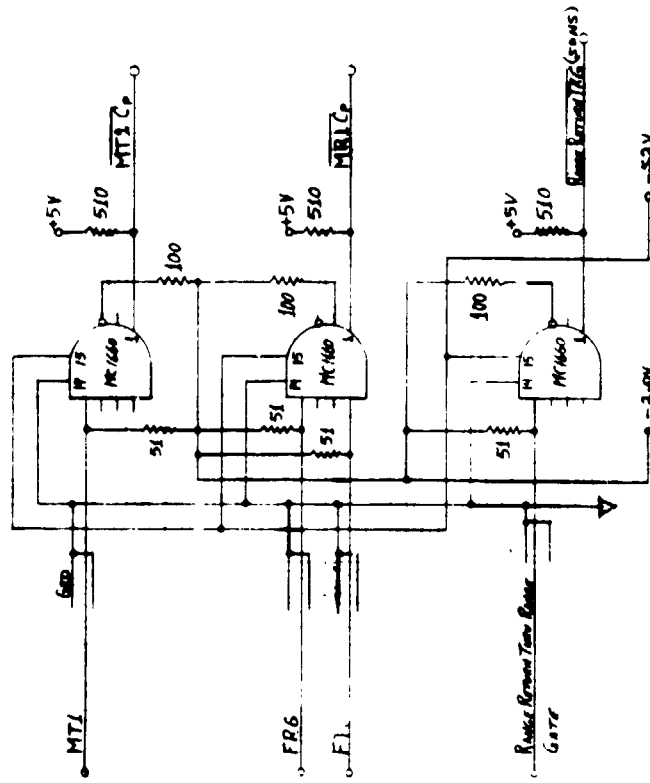
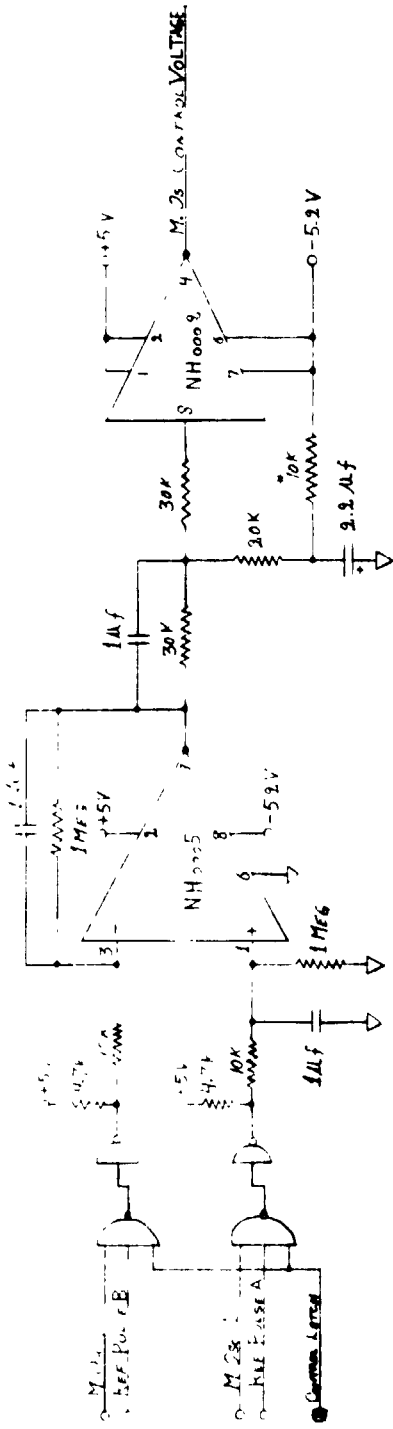
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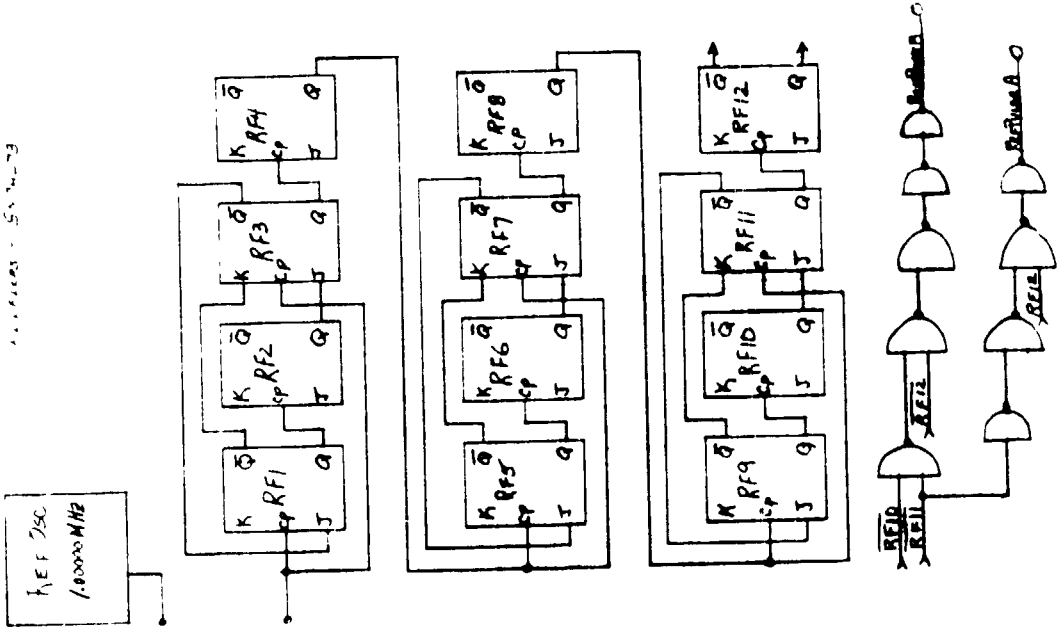
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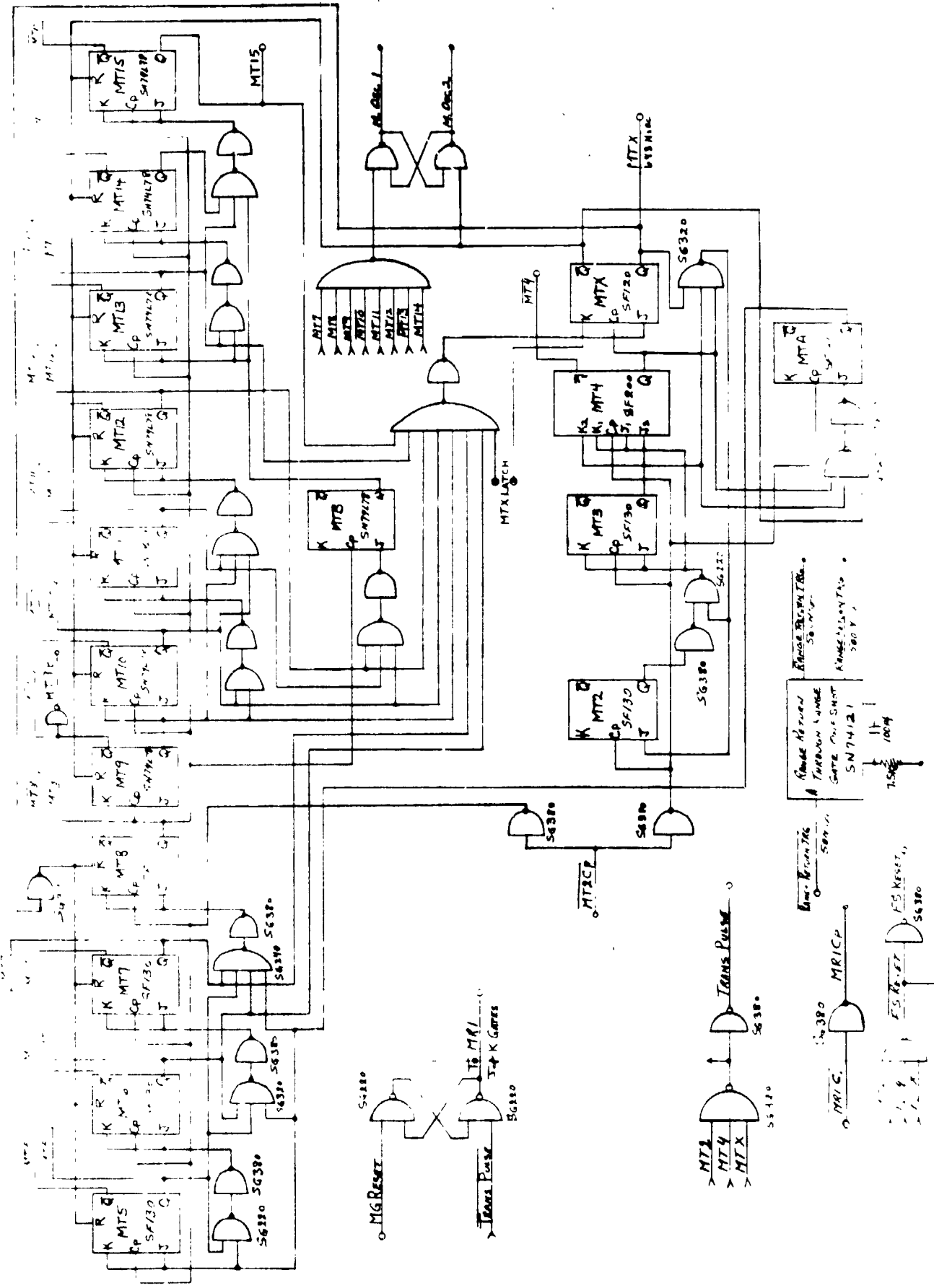
HIGH FREQUENCY (187 MHz) RANGING LOGIC (DRAWING RT1)



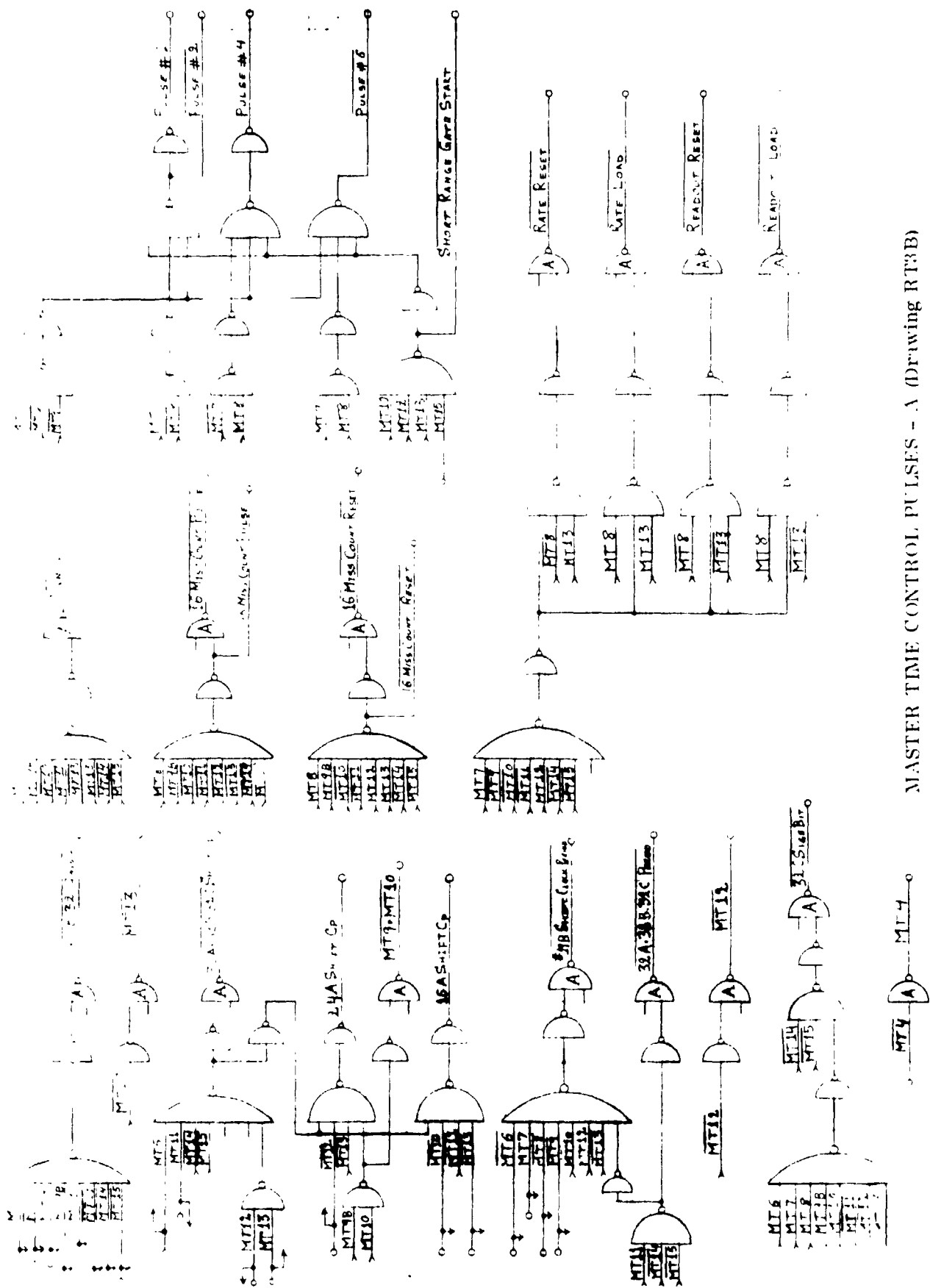
RANGE INTERFACE (Drawing RT2A)



REFERENCE OSCILLATOR AND OSCILLATOR CONTROL (Drawing RT2B)

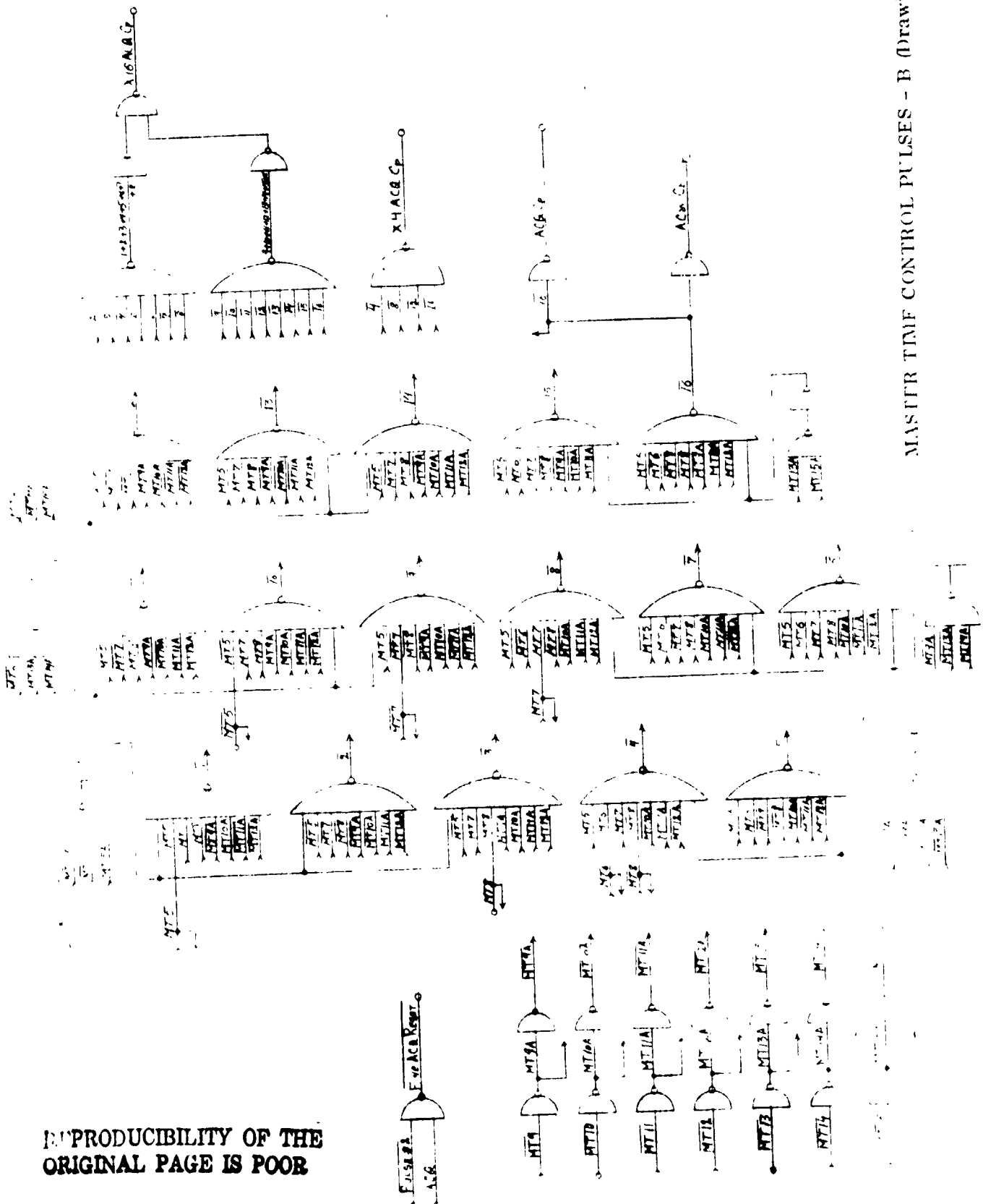


MASTER TIME COUNTER (Drawing RT3A)

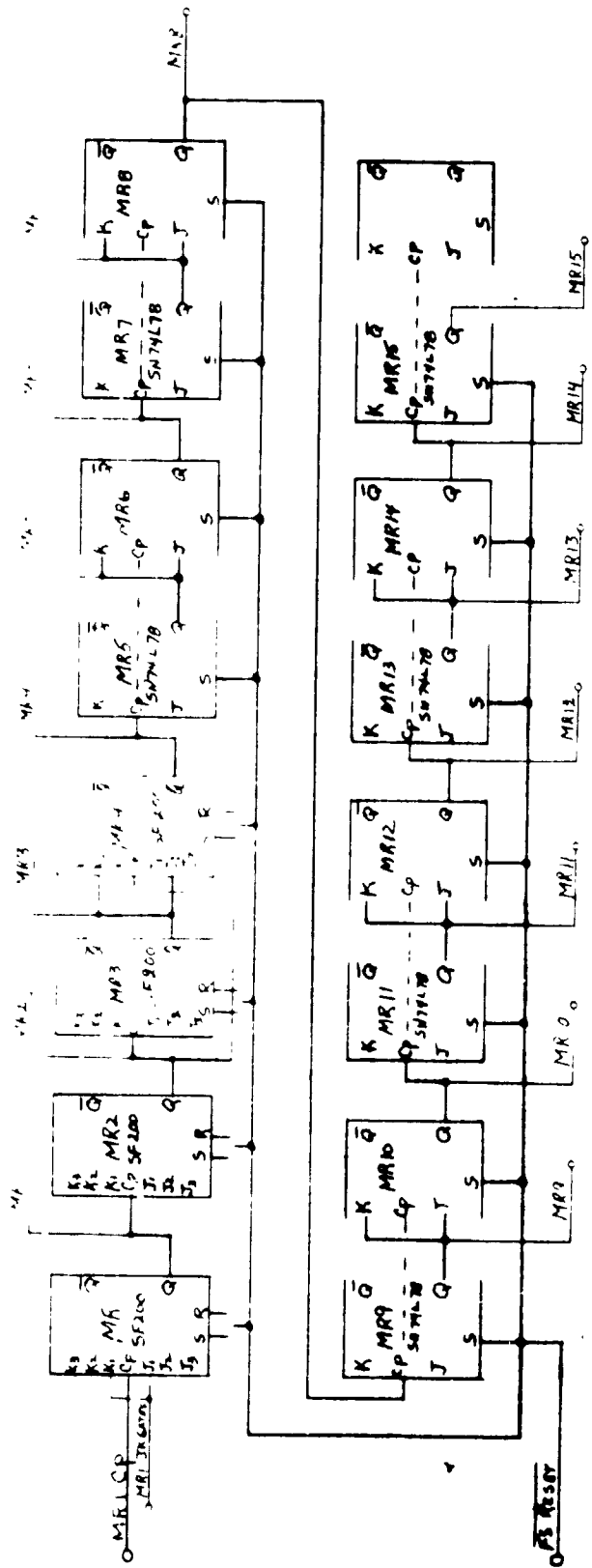


MASTER TIME CONTROL PULSES - A (Drawing RT3B)

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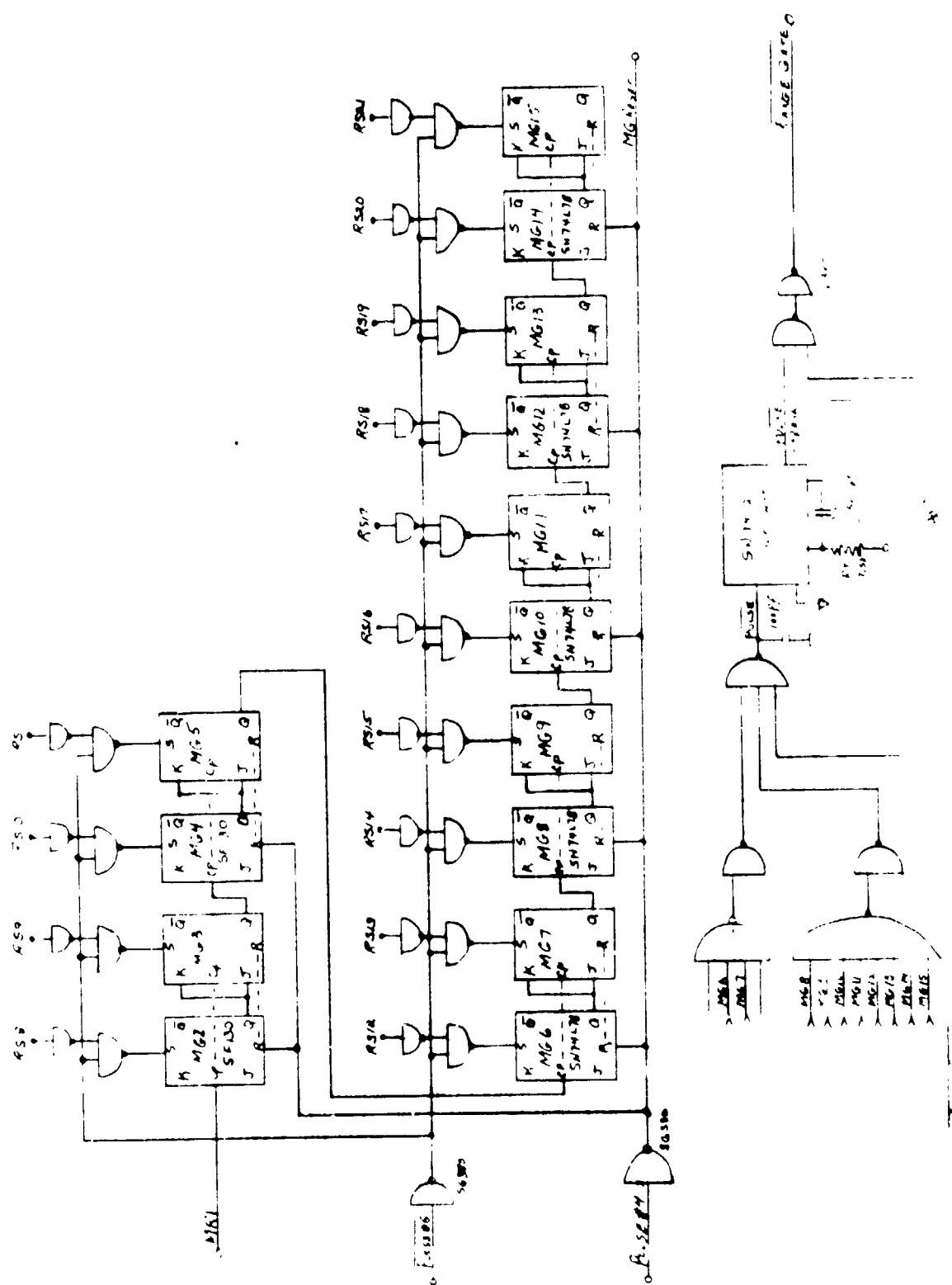


MASTER TIME CONTROL PULSES - B (Drawing RT-C)



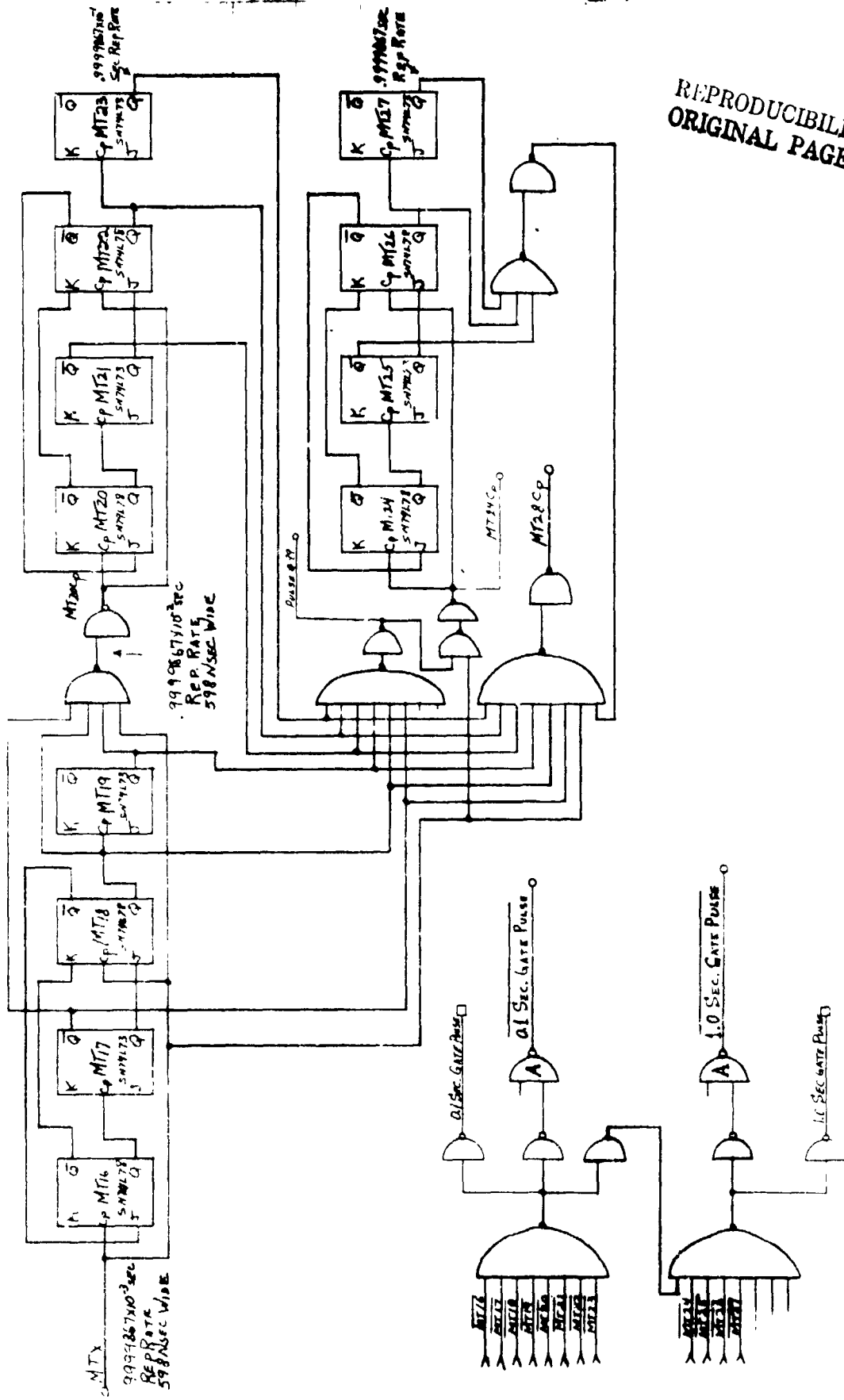
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RANGE COUNTER (Drawing RT3D)

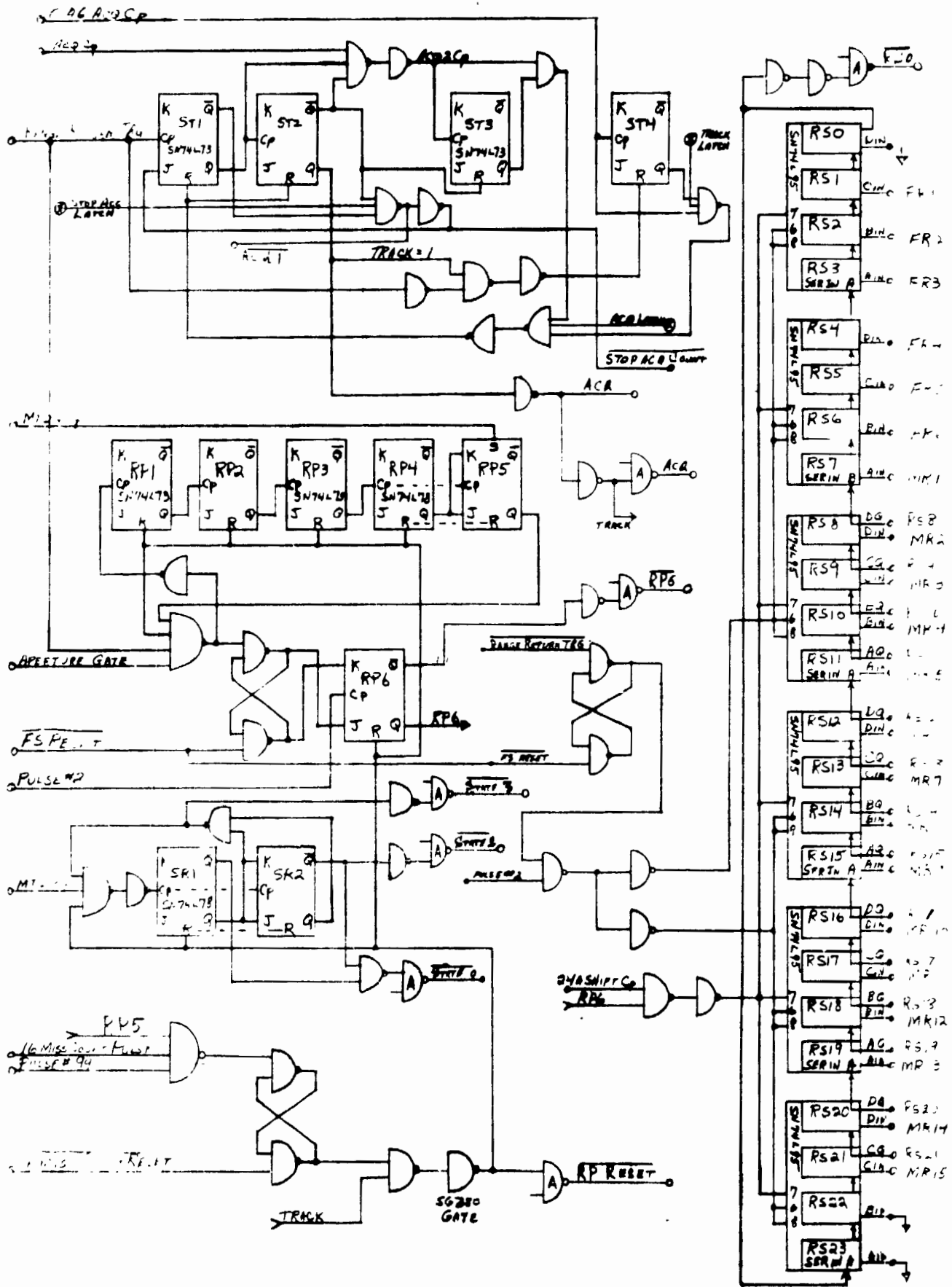


RANGE GATE COUNTER & CONTROL (DRAWING RTBF)

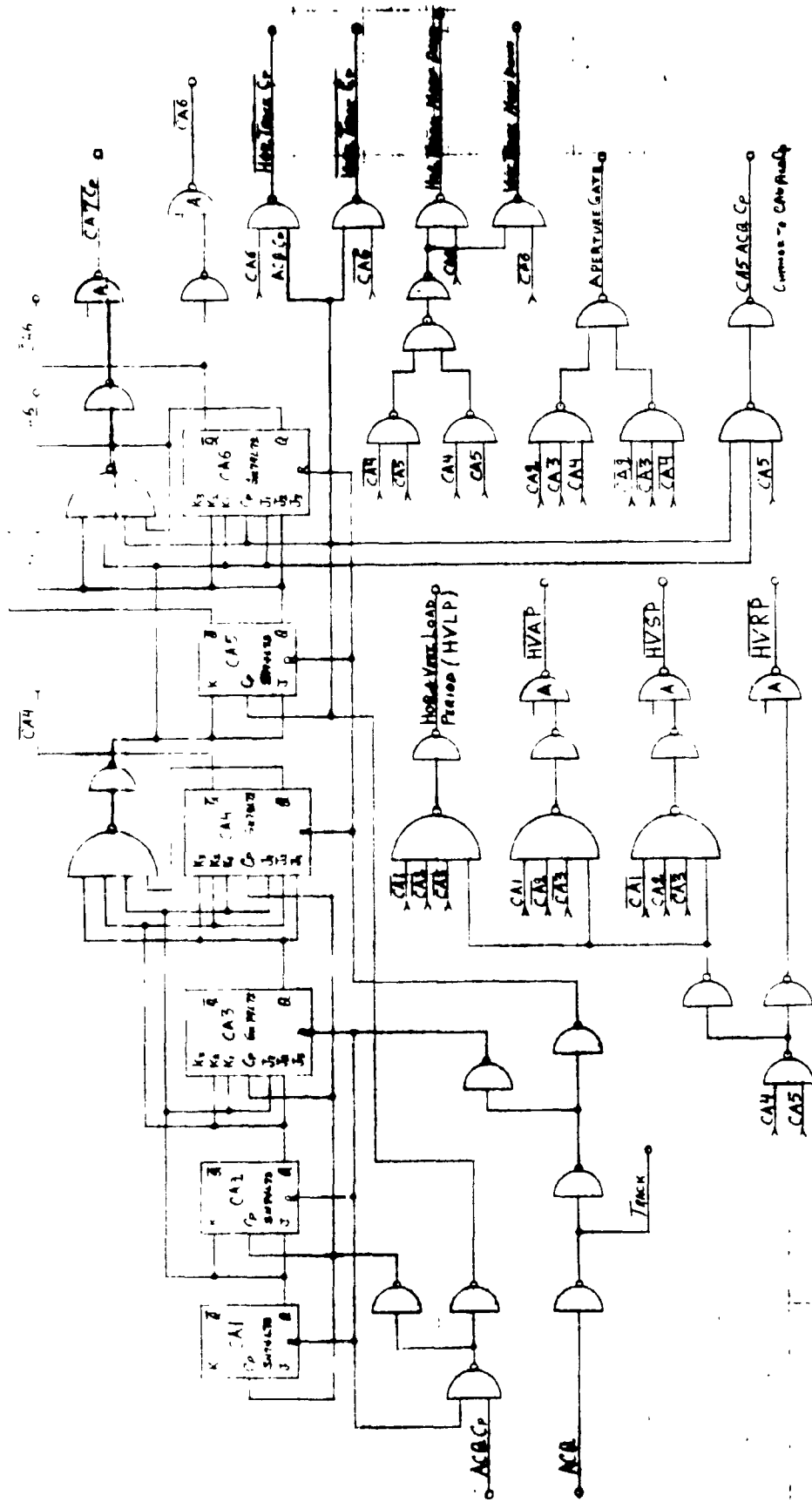
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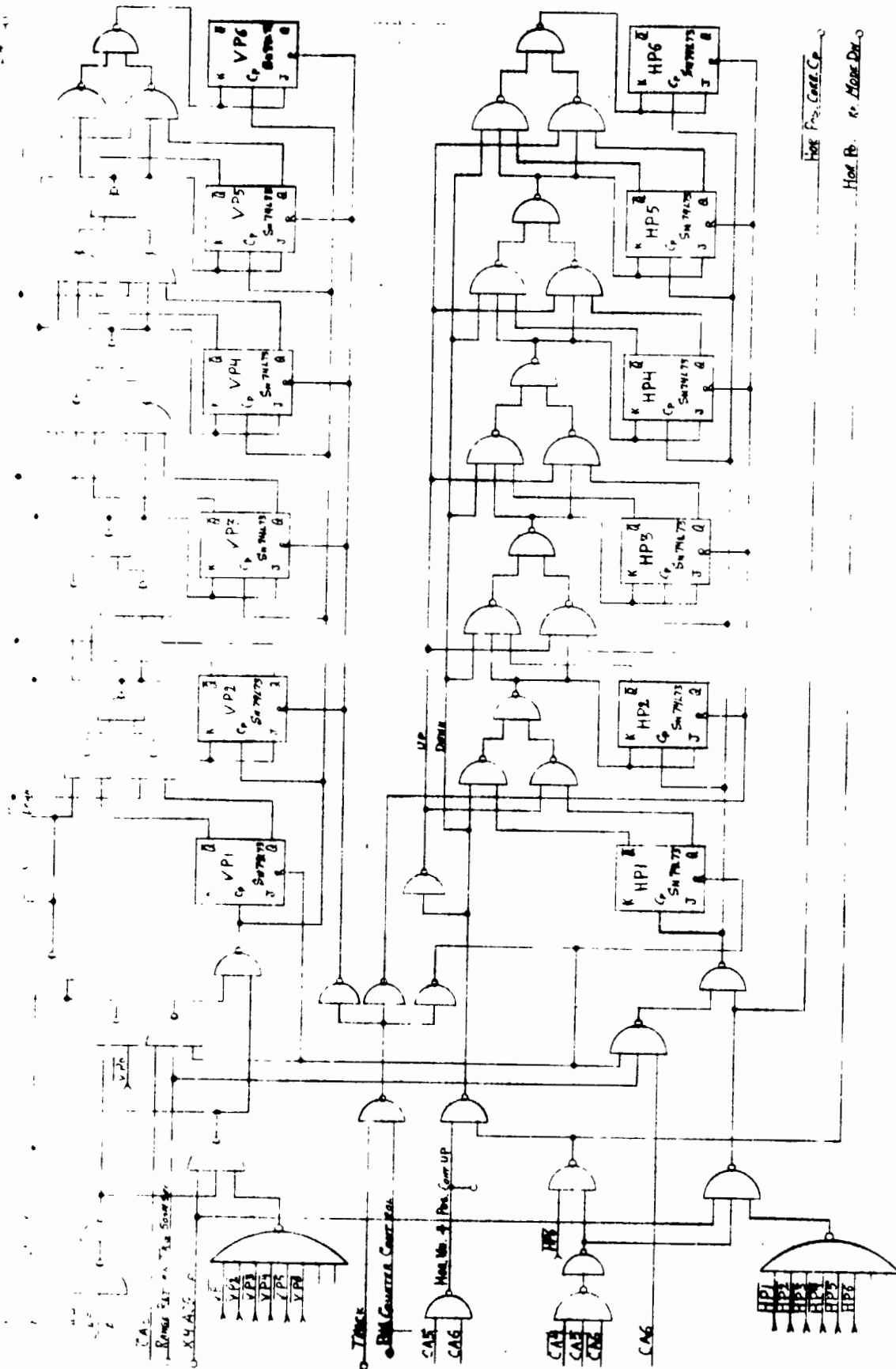
.01 - 1.0 COUNTER (Drawing RT3F)



RANGE STORAGE REGISTERS AND CONTROL CIRCUITS (Drawing RT3G)

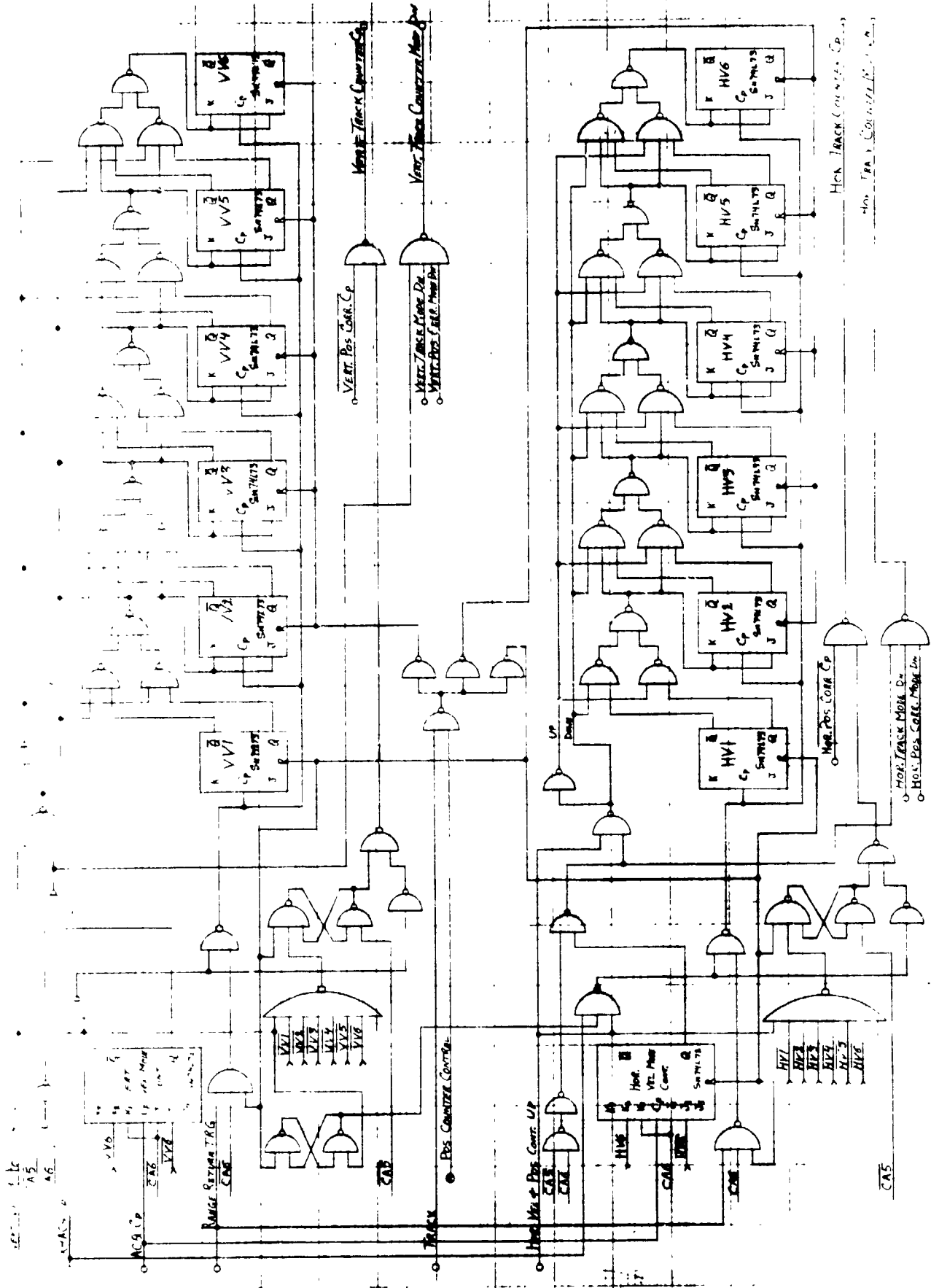


TRACK CONTROL COUNTER (Drawing RT4A)

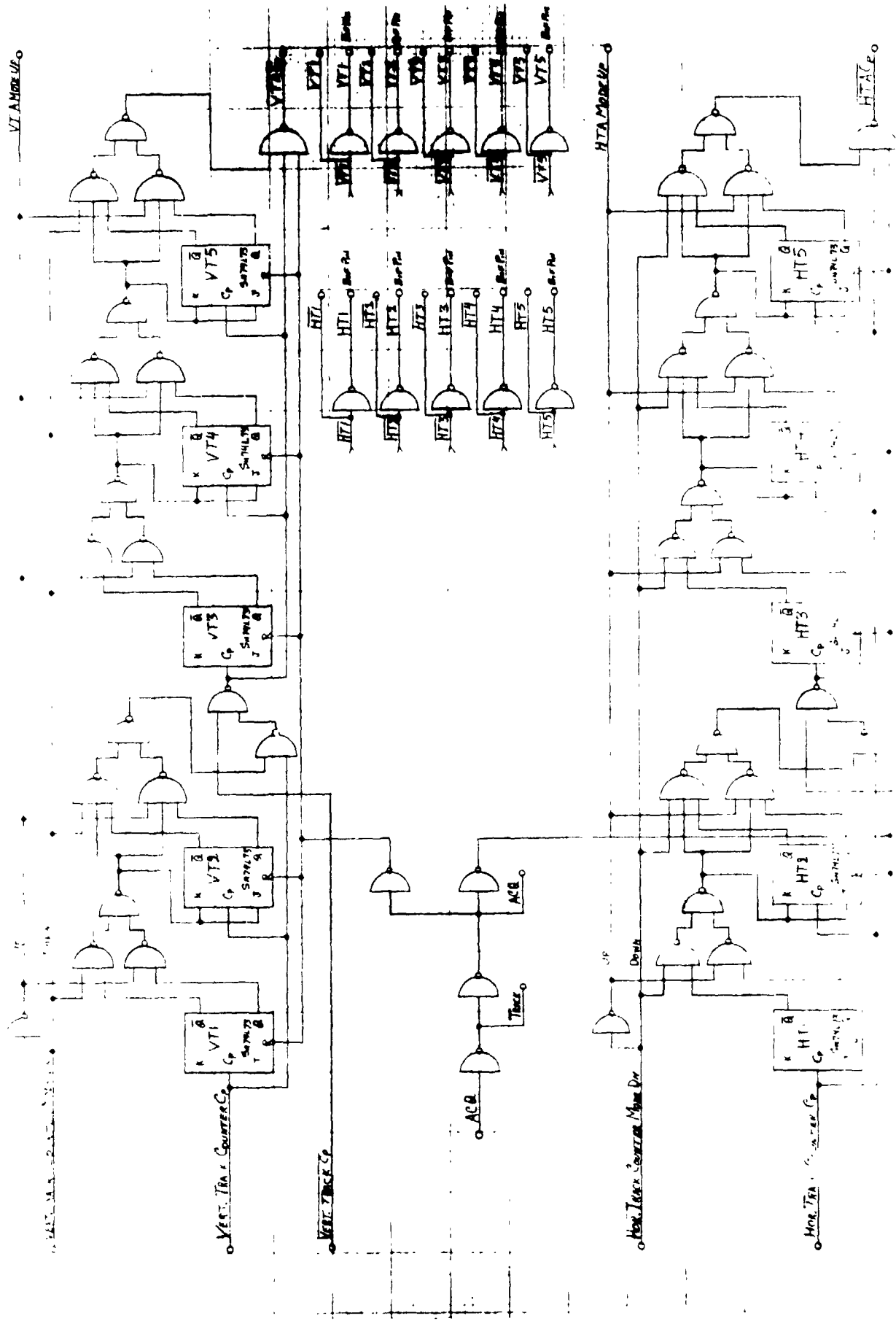


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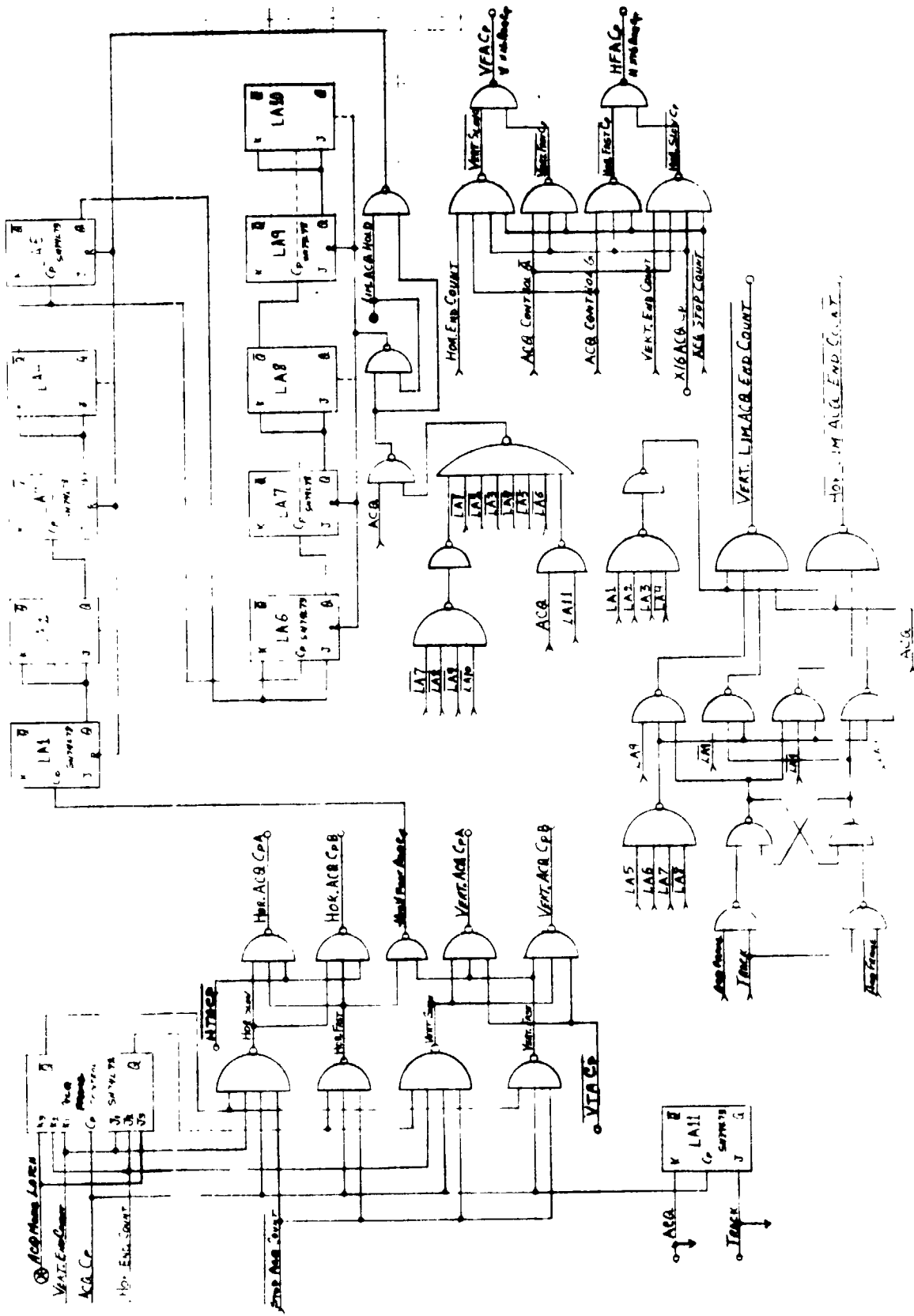
HORIZONTAL & VERTICAL POSITION CORRECTOR (Drawing RT4B)



HORIZONTAL & VERTICAL VELOCITY CORRECTOR (Drawing RT4C)

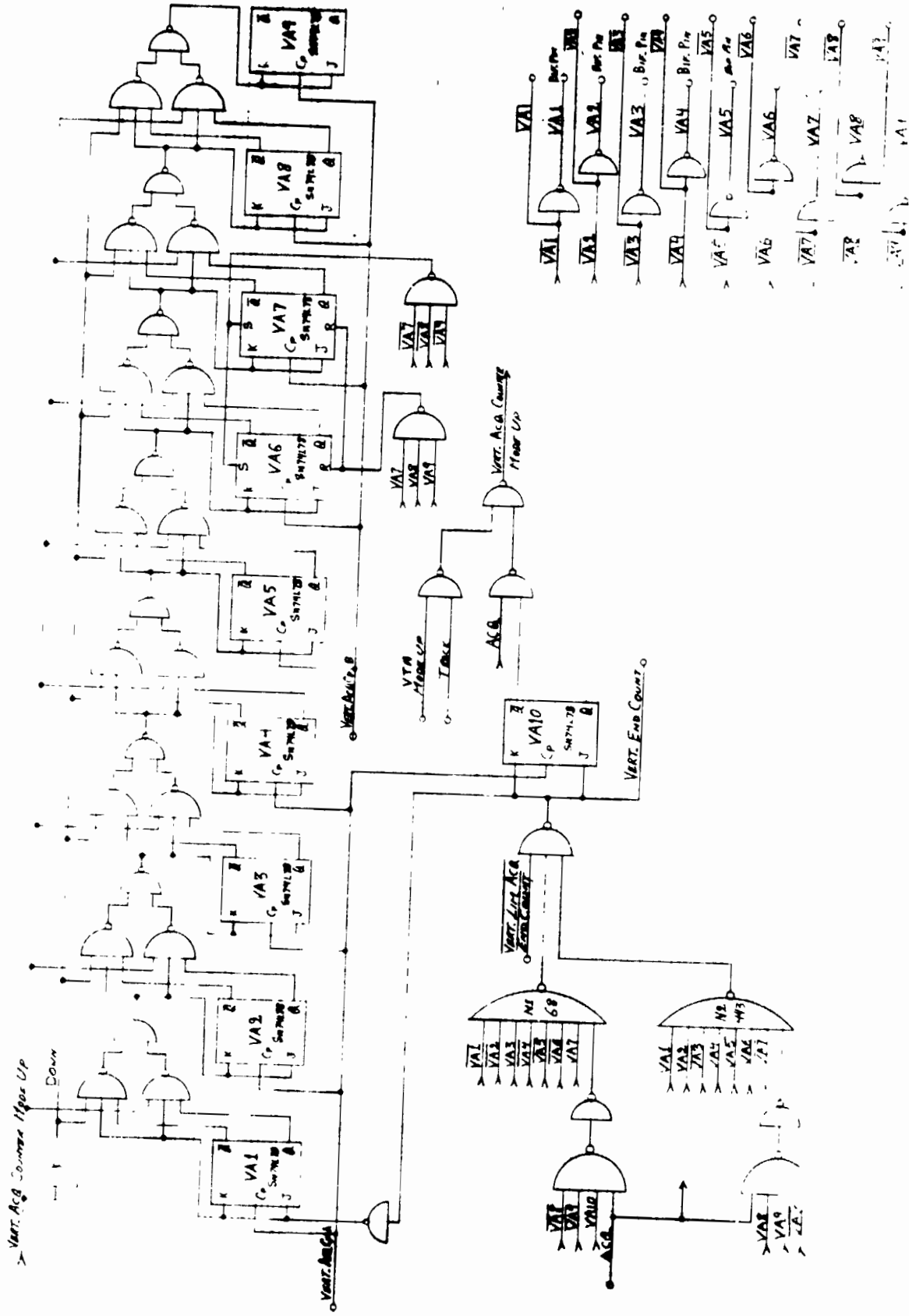


VERTICAL & HORIZONTAL COUNTERS (Drawing RT5A)

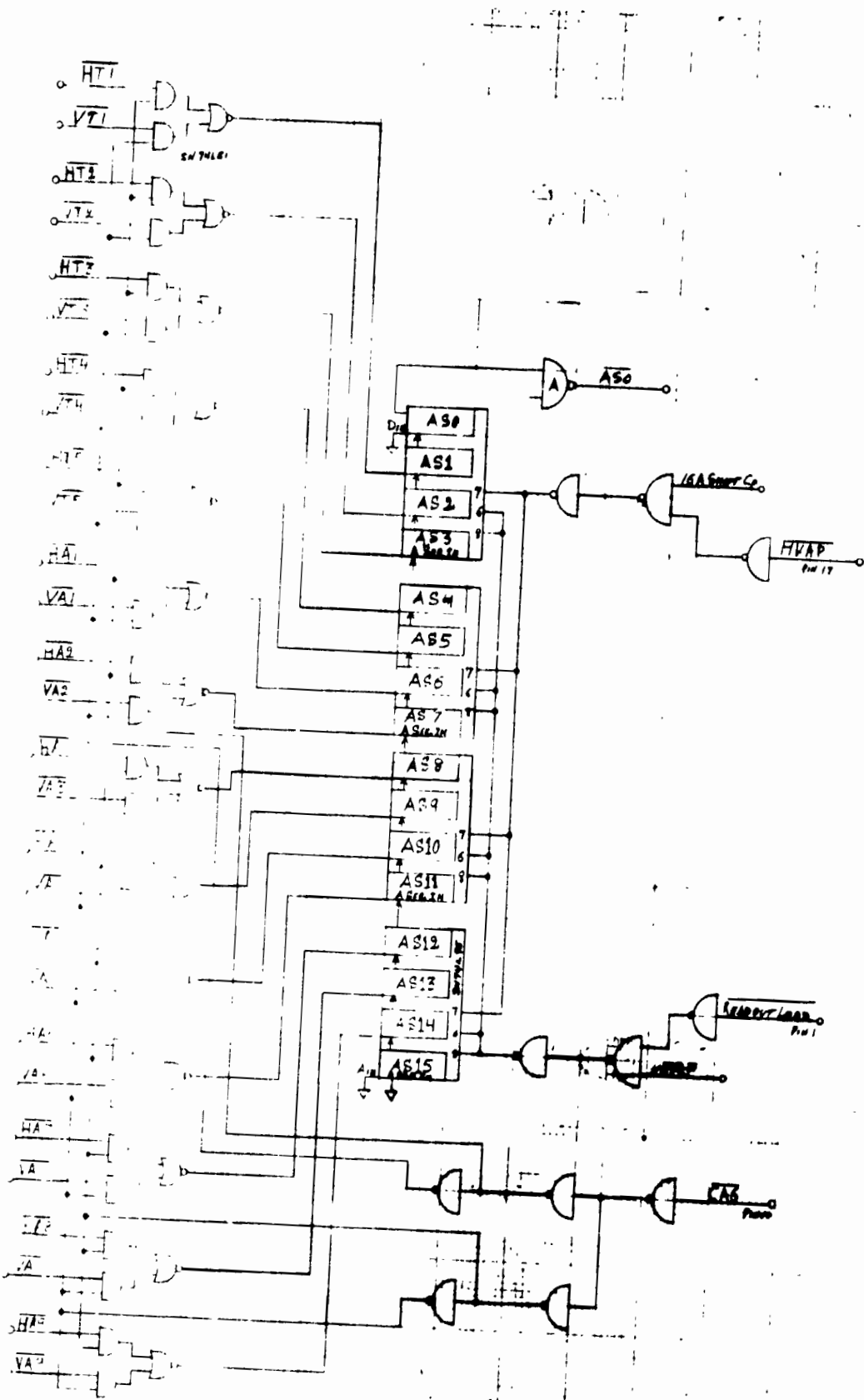


LIMITED ACQUISITION CONTROL COUNTER & CONTROL GATES (Drawing RT5B)

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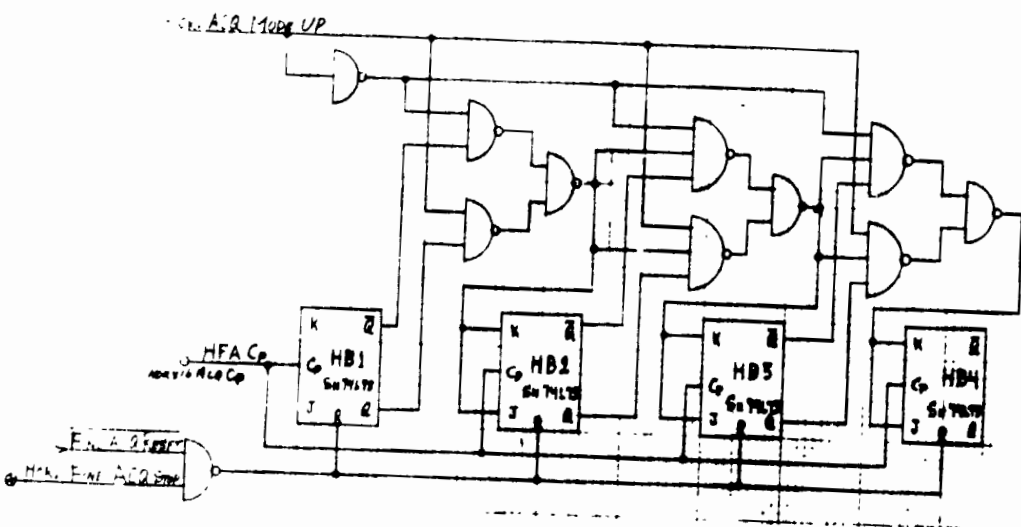
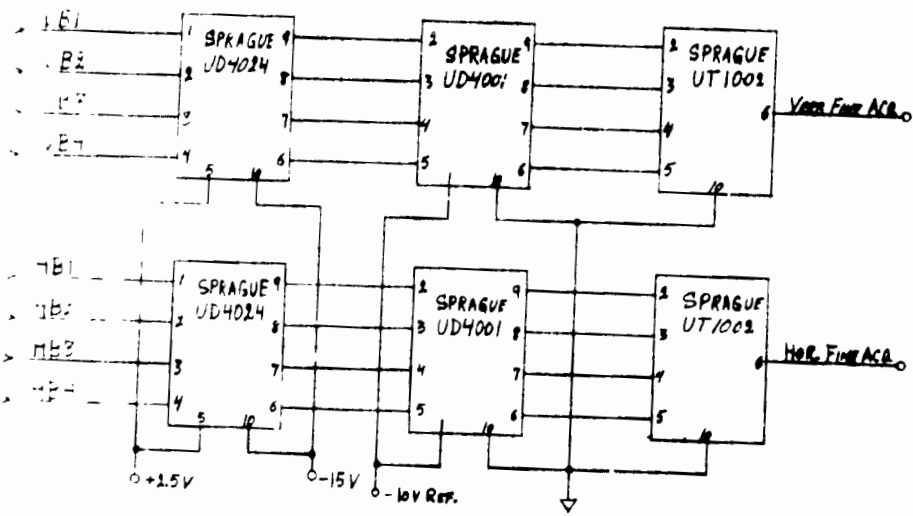
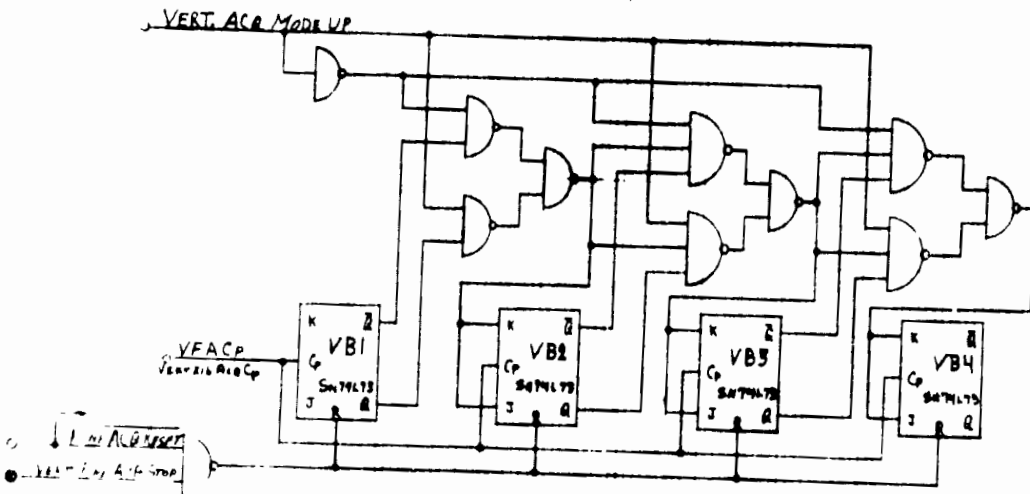


VERTICAL ACQUISITION COUNTER (Drawing RT5C)



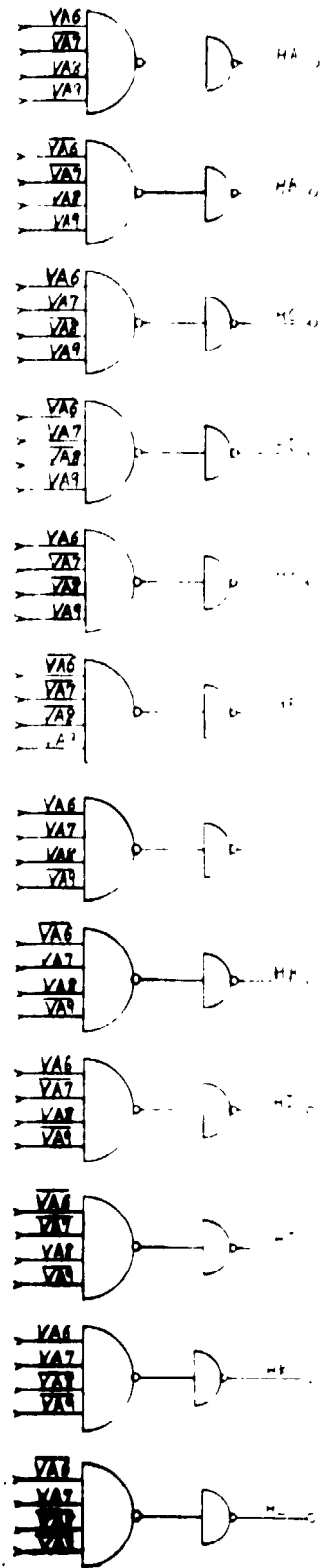
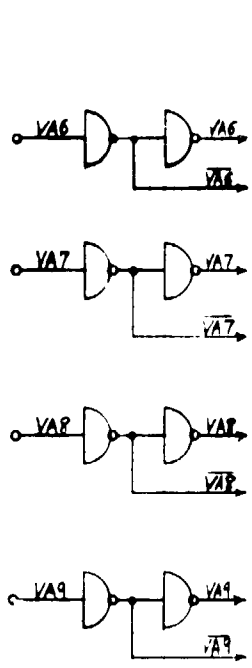
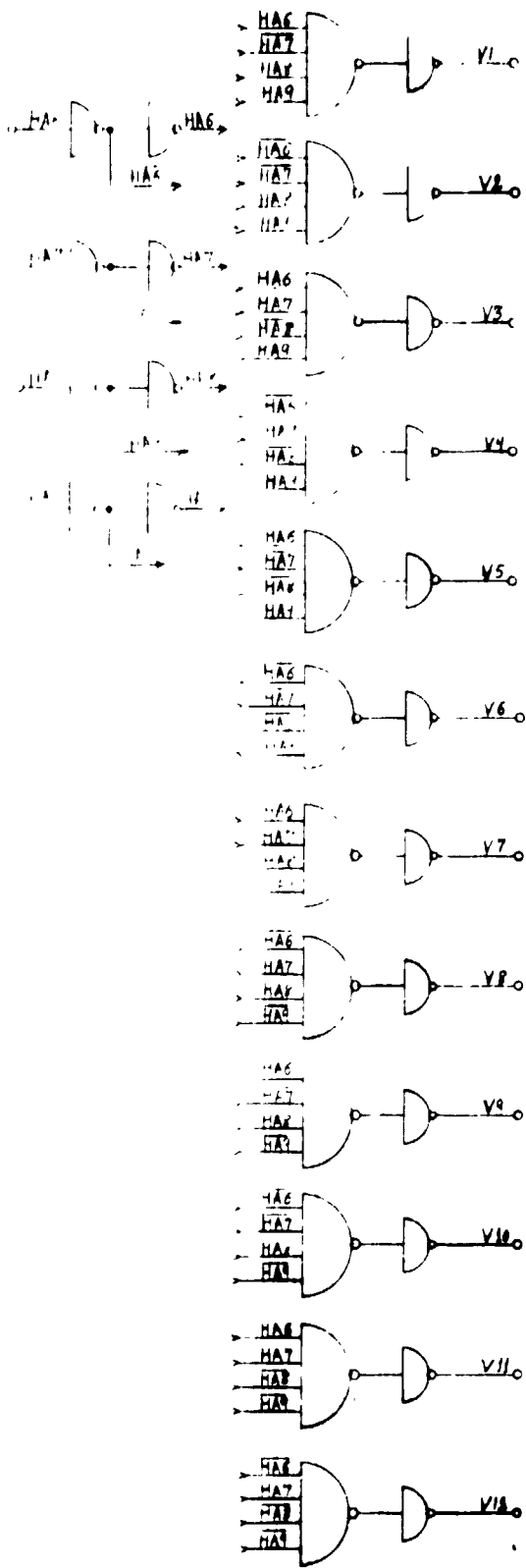
ANGLE SHIFT REGISTER (Drawing RT5E)

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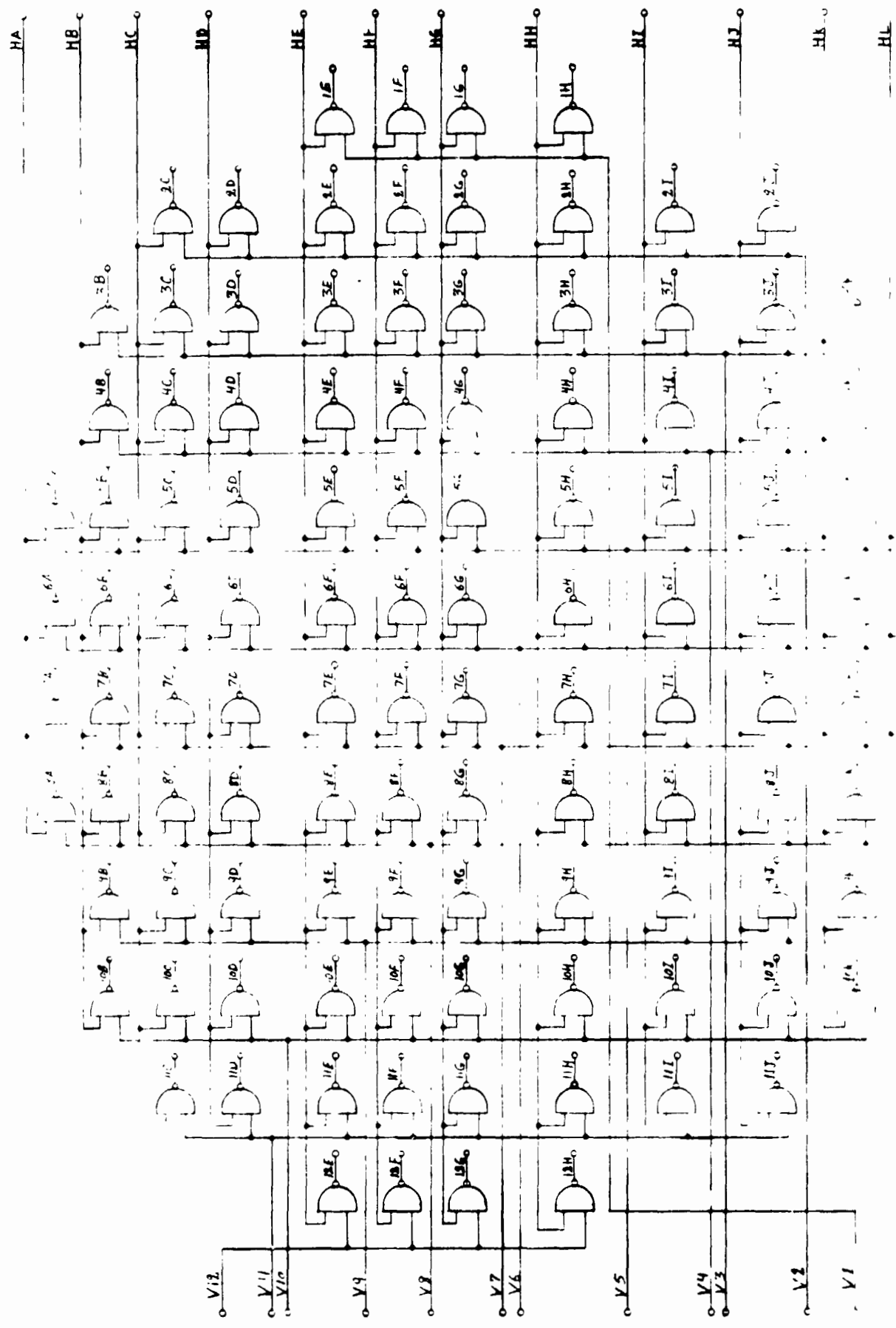


FINE ACQUISITION GENERATOR (Drawing RT5F)

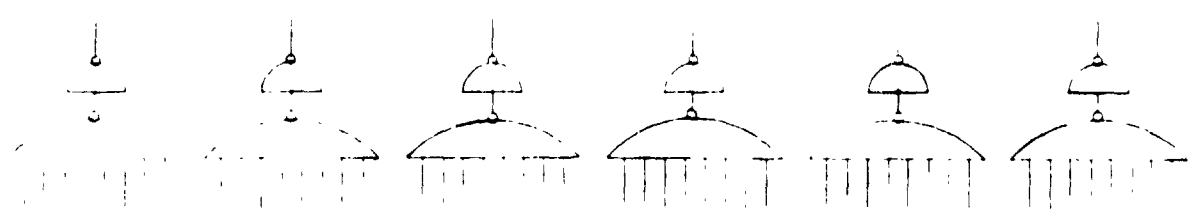
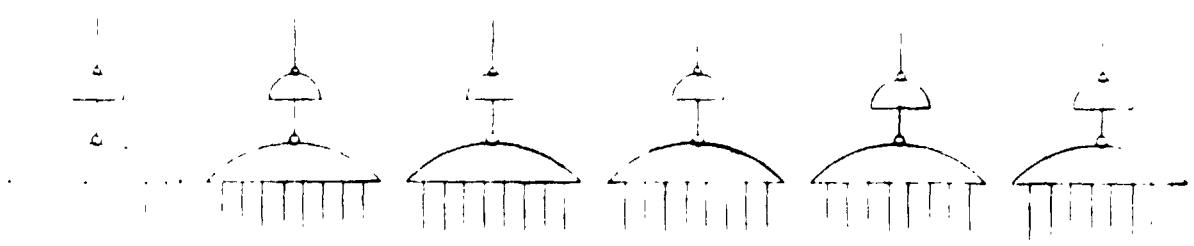
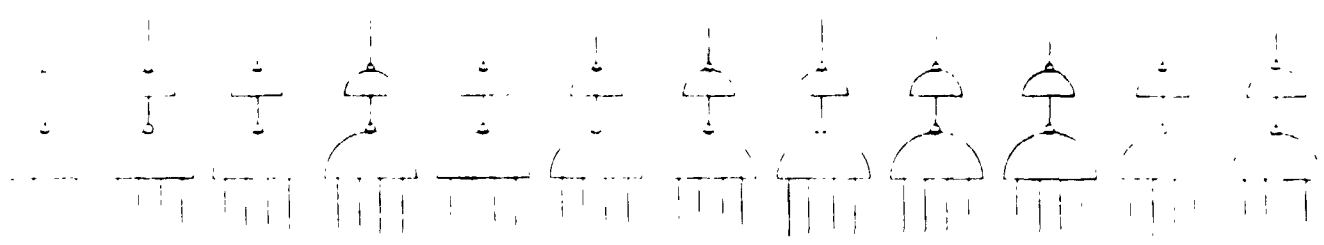
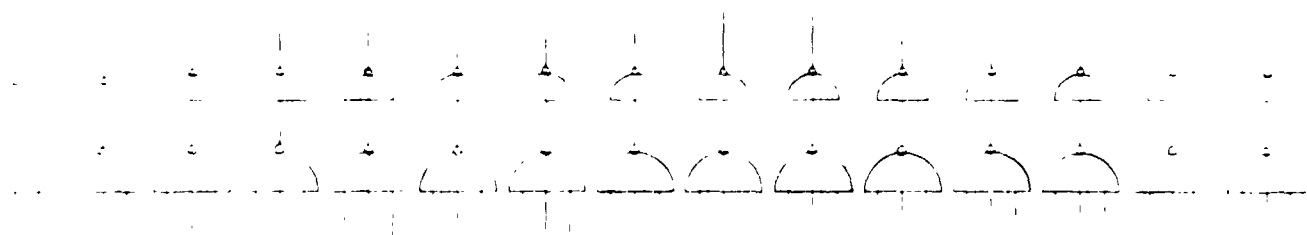
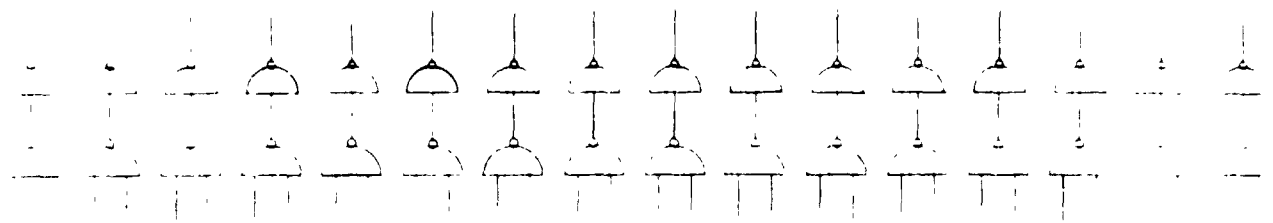
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LINEARITY LINE LOCATION (Drawing RT6A)

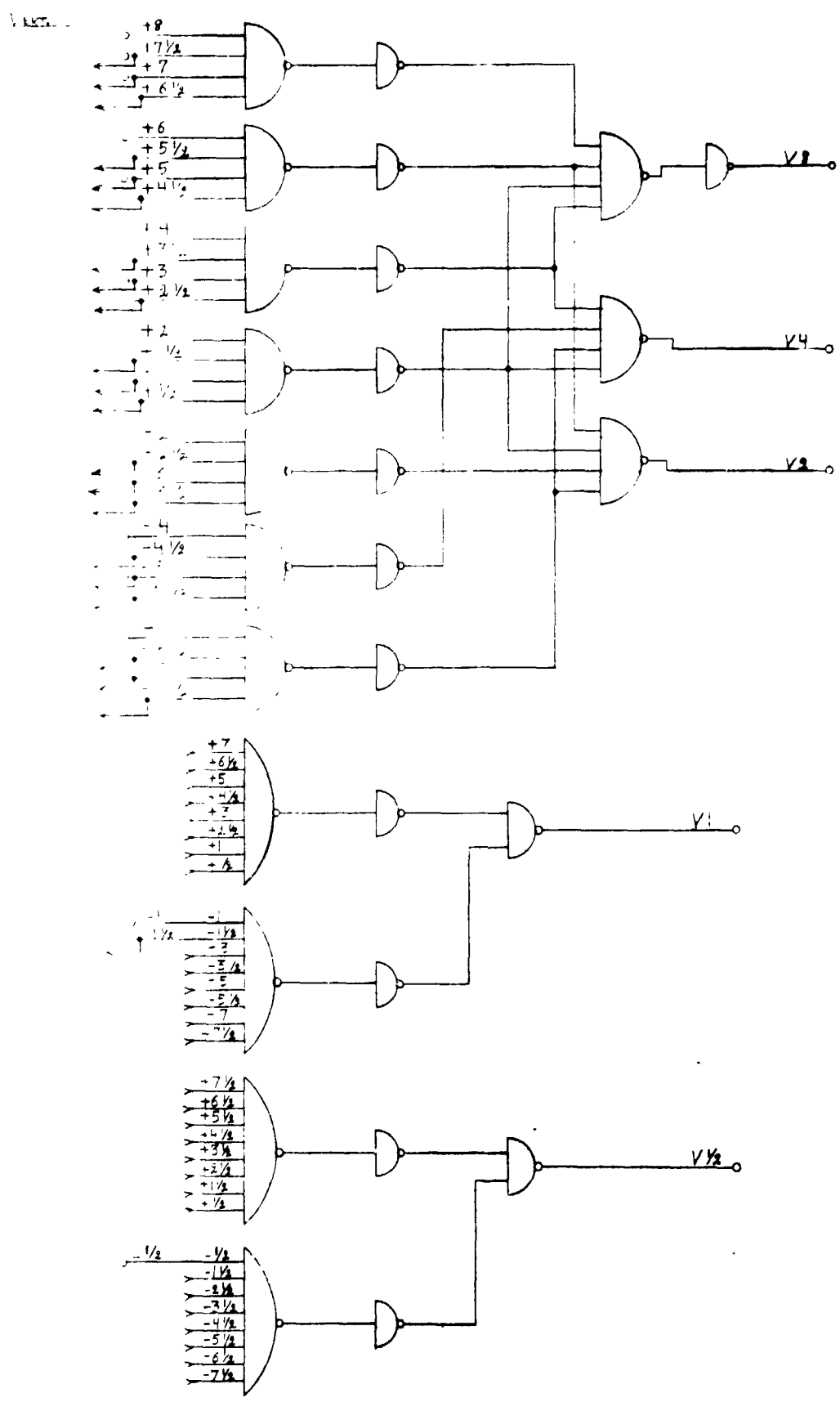


LINEARITY SPOT LOCATION (Drawing RT6B)

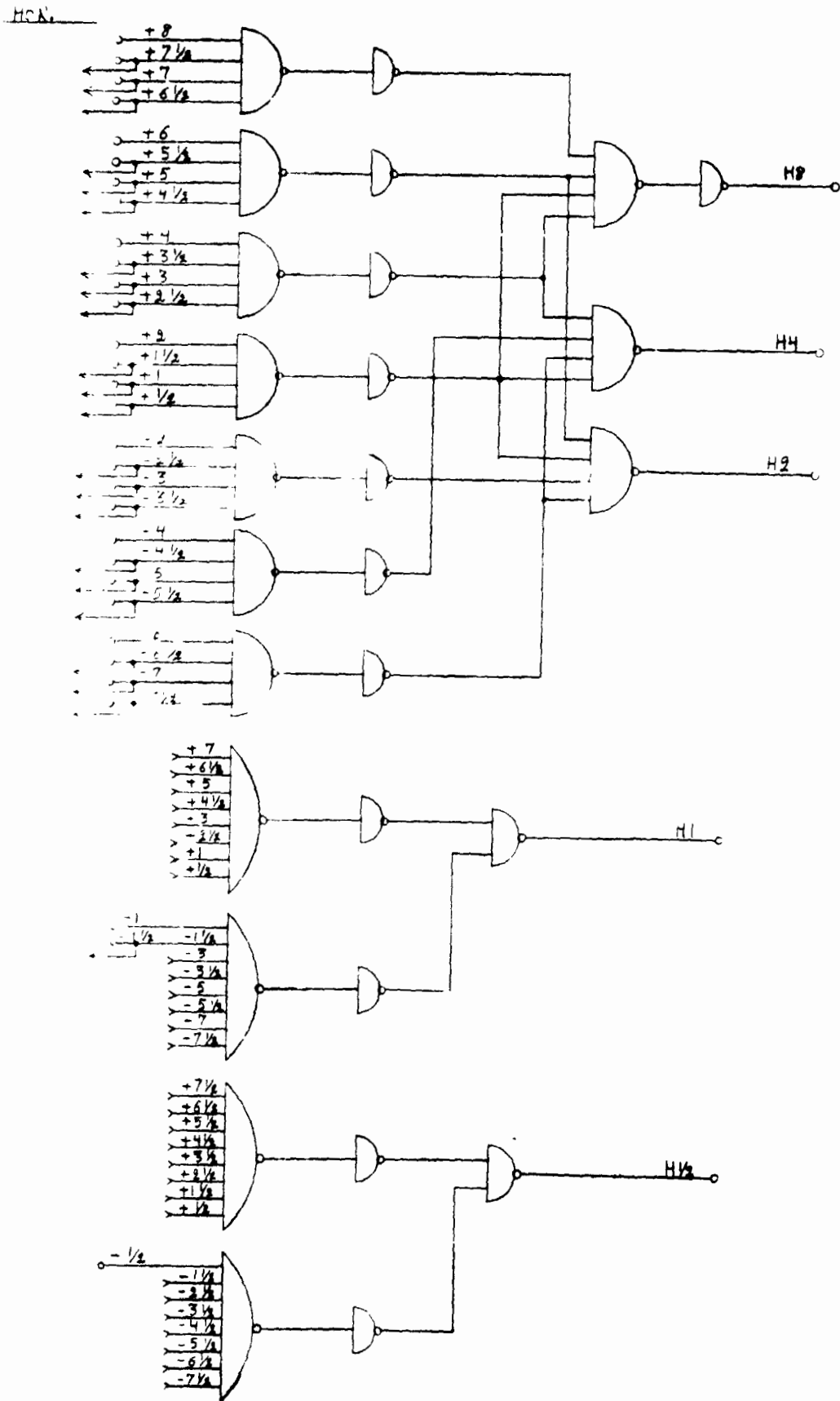


LINERITY OR GATFS (Drawing RT6C)

A-92

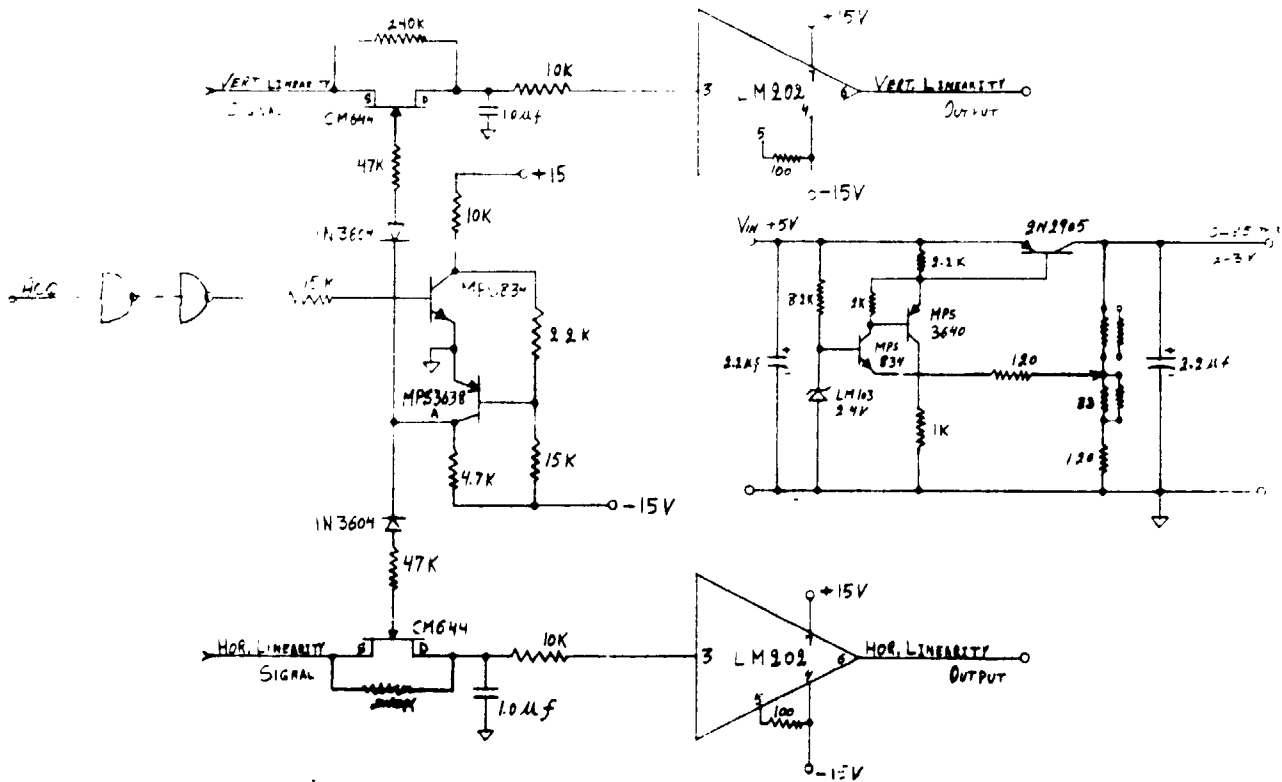
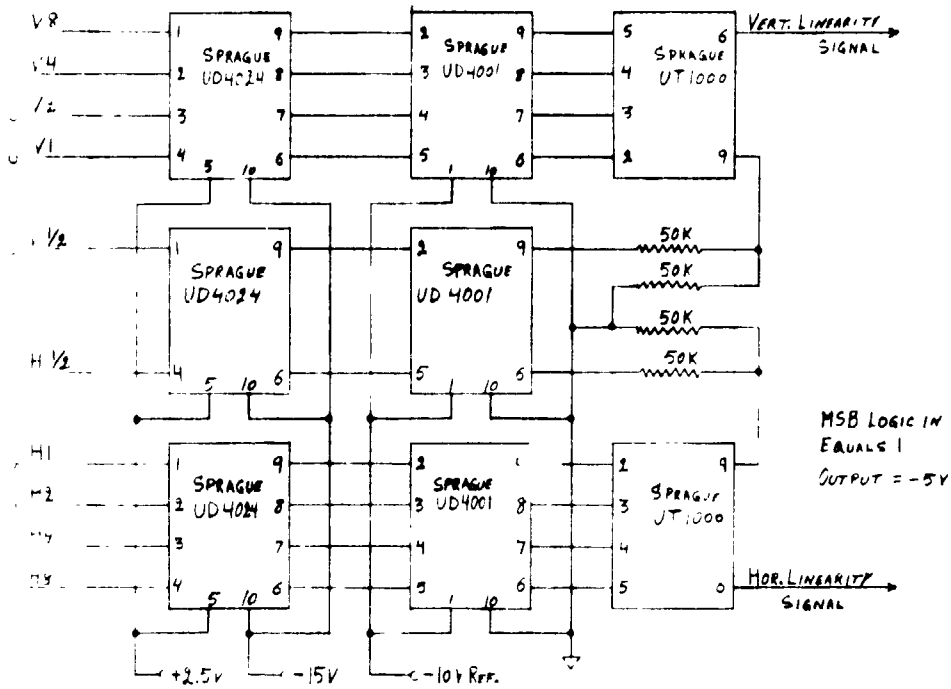


VERTICAL LINEARITY CORRECTION GENERATOR (Drawing RT6D)

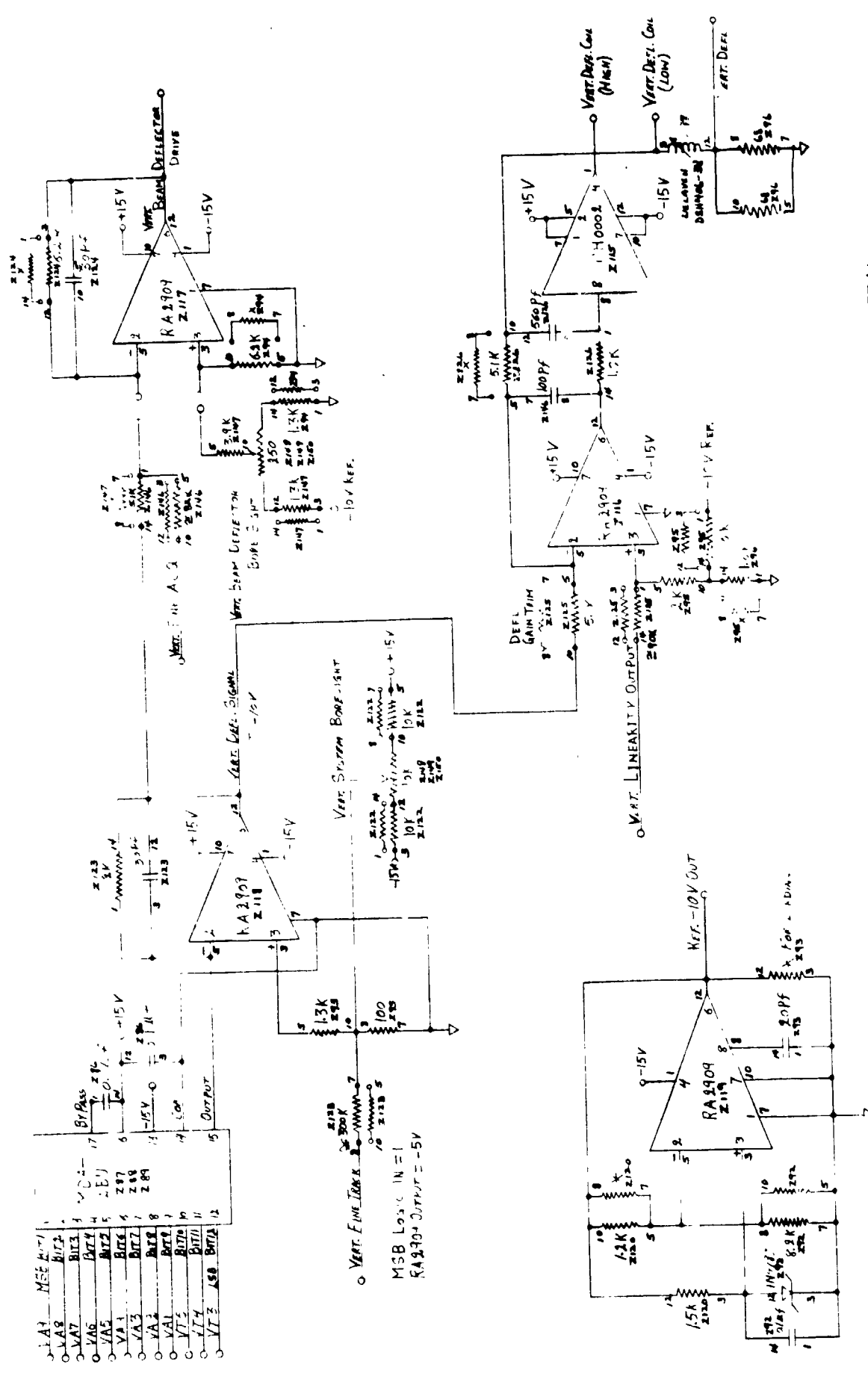


HORIZONTAL LINEARITY CORRECTION GENERATOR (Drawing RT6E)

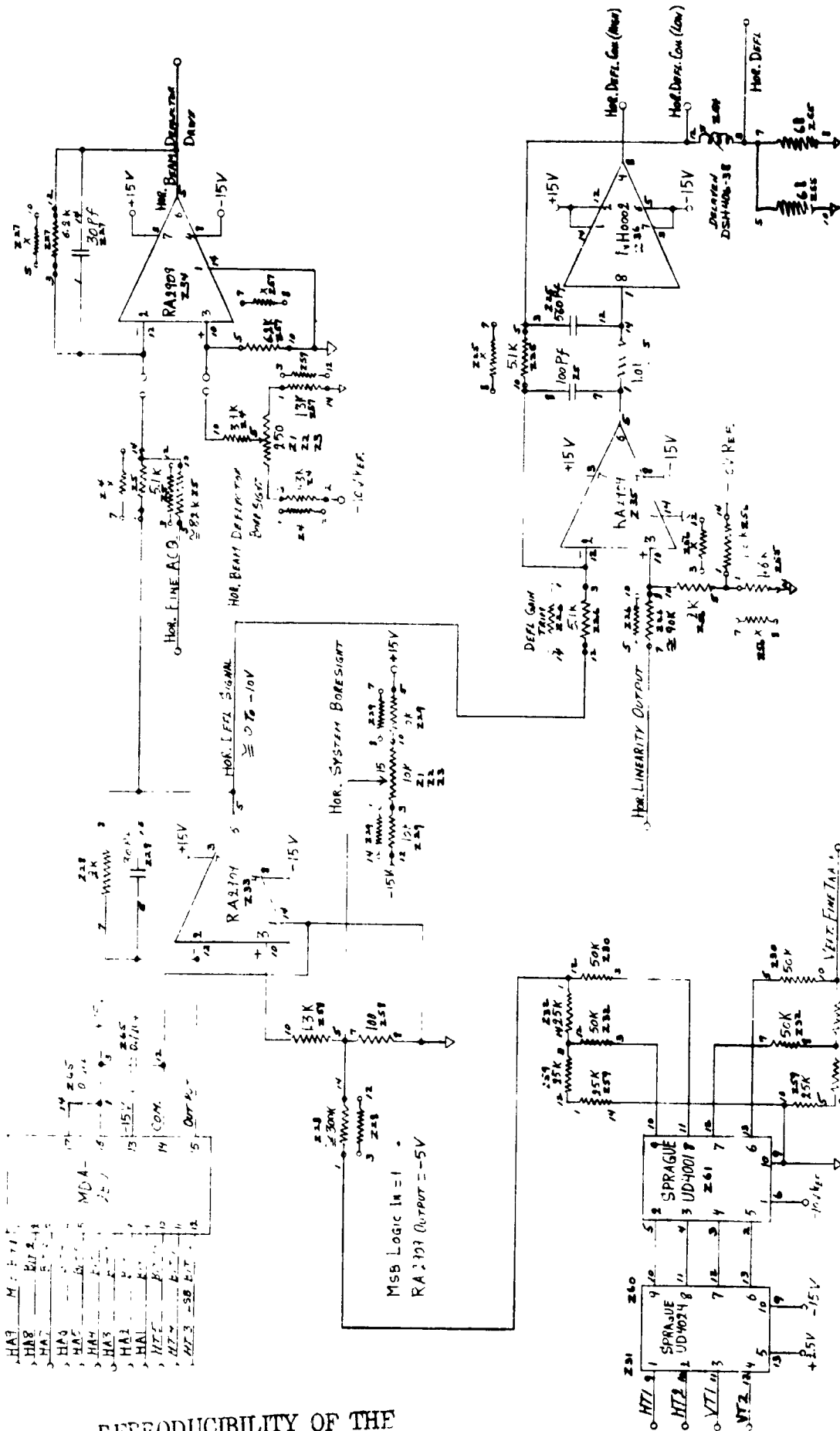
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LINEARITY CORRECTION OUTPUT (Drawing RT6F)



VERTICAL DEFLECTION D/A CONVERTER & DRIVER (Drawing RT7A)

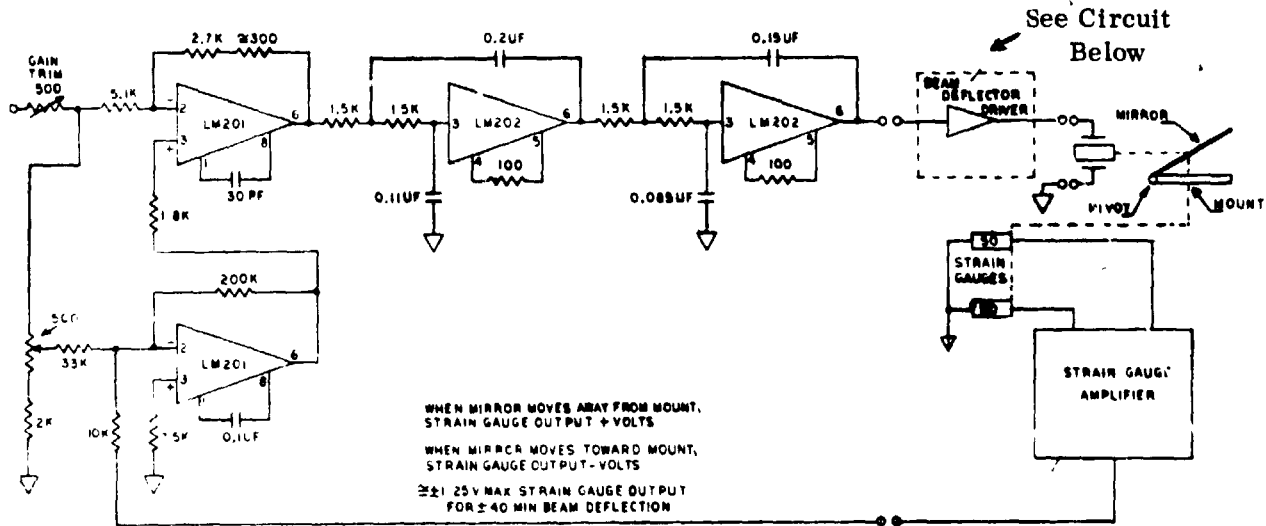


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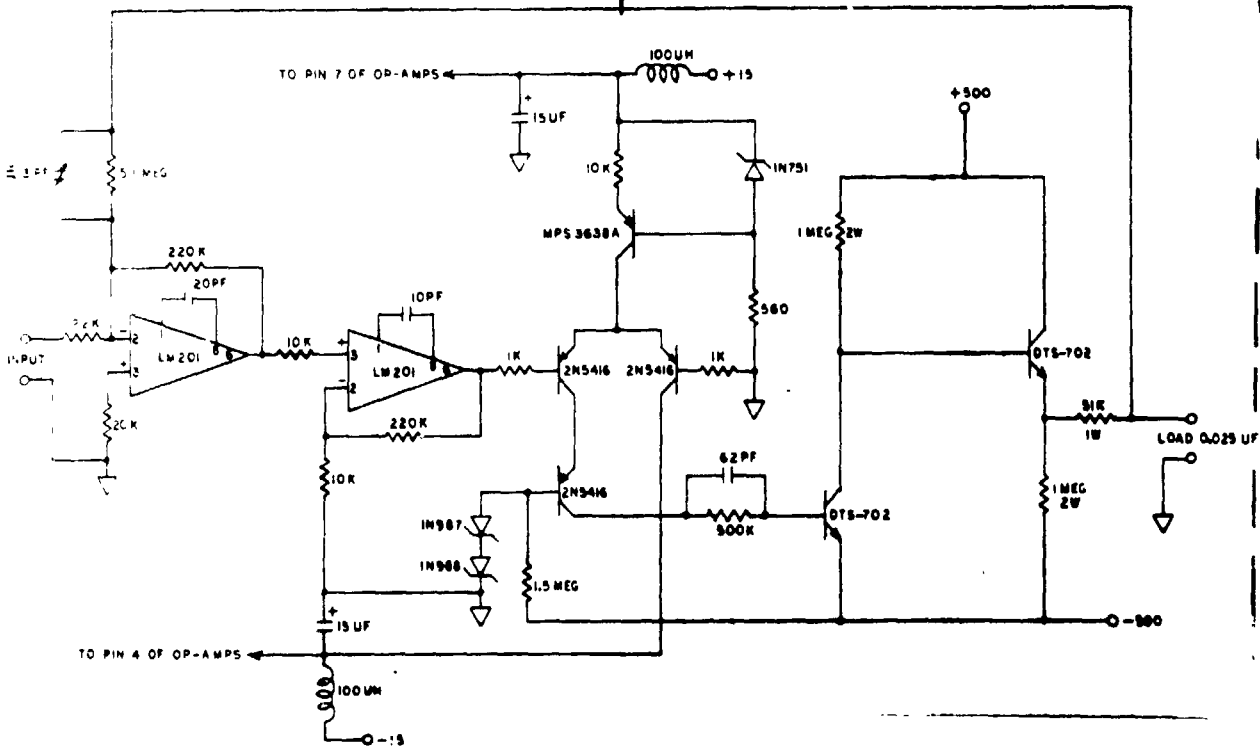
HORIZONTAL DEFLECTION D/A CONVERTER & DRIVER (Drawing RT7E)

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

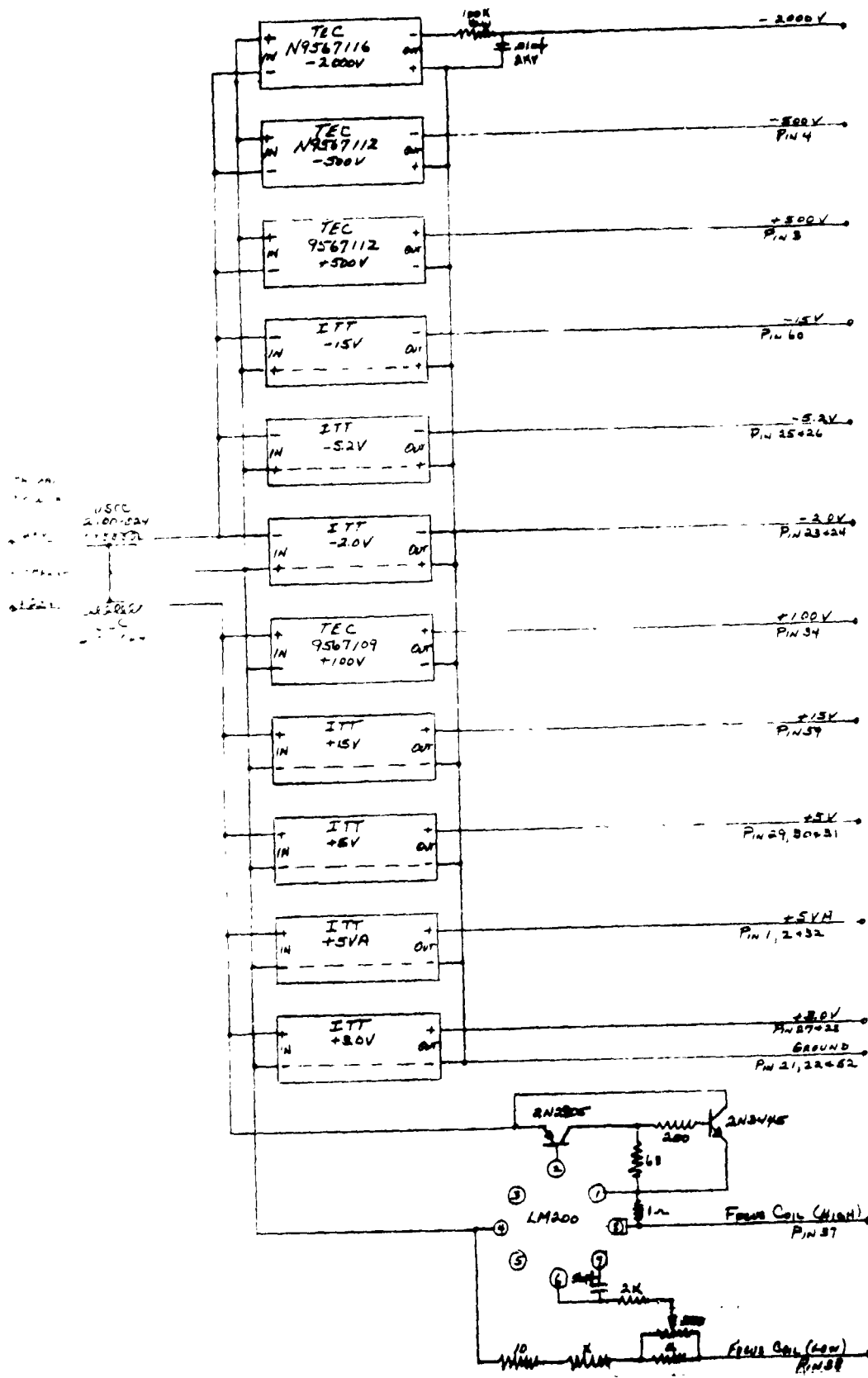
- VOLTS ON XTAL. MOVES MIRROR AWAY FROM MOUNT
+ VOLTS ON XTAL. MOVES MIRROR TOWARD MOUNT



BEAM DEFLECTOR DRIVER



SCHEMATIC OF THE BEAM DEFLECTOR (Drawing RT8)



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

SHIELD

1000000
100000
10000
1000
100
10
1
0.1
0.01
0.001
0.0001
0.00001
0.000001

UL FLECTION Co.
15-VY-376-1

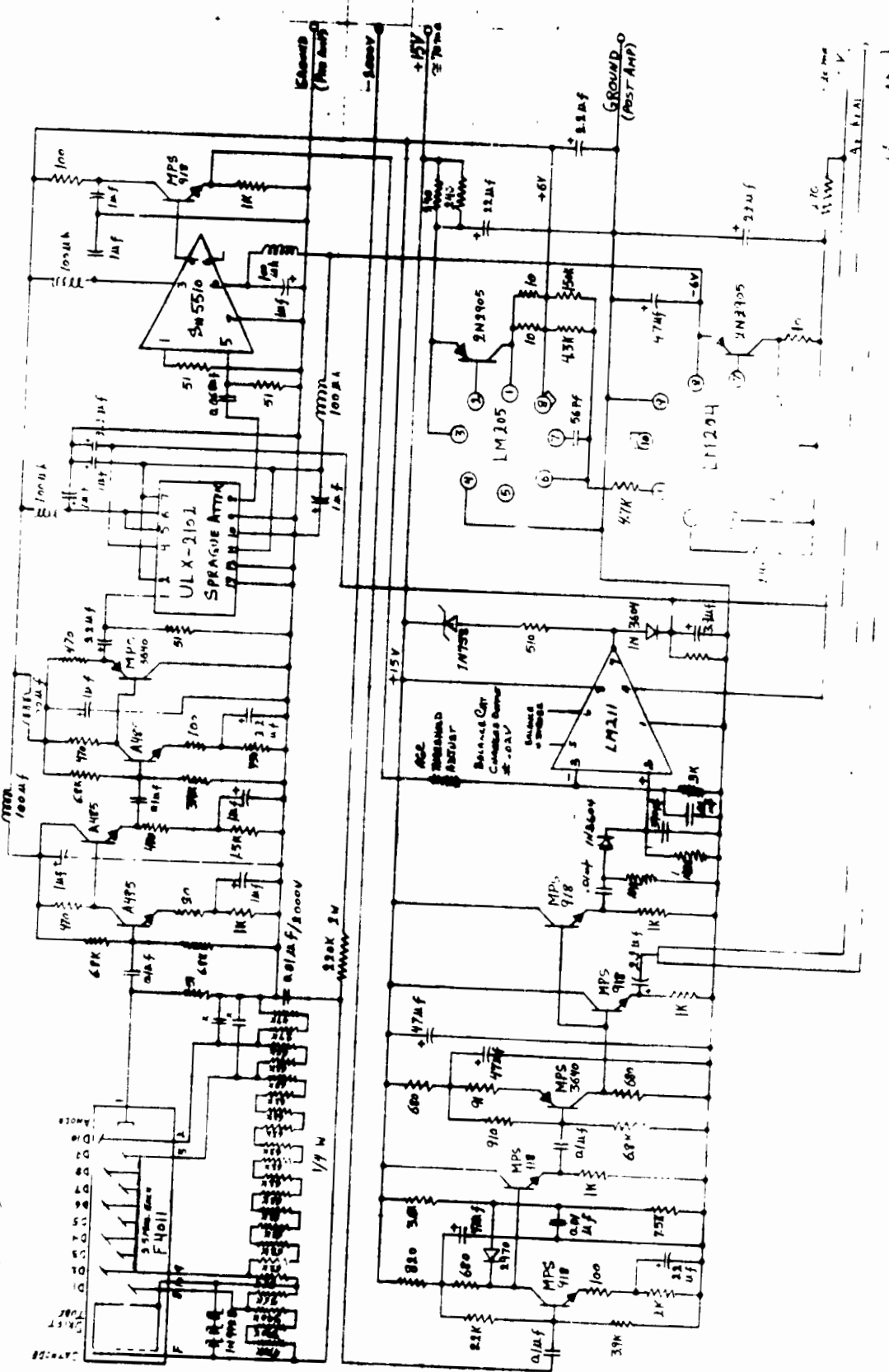
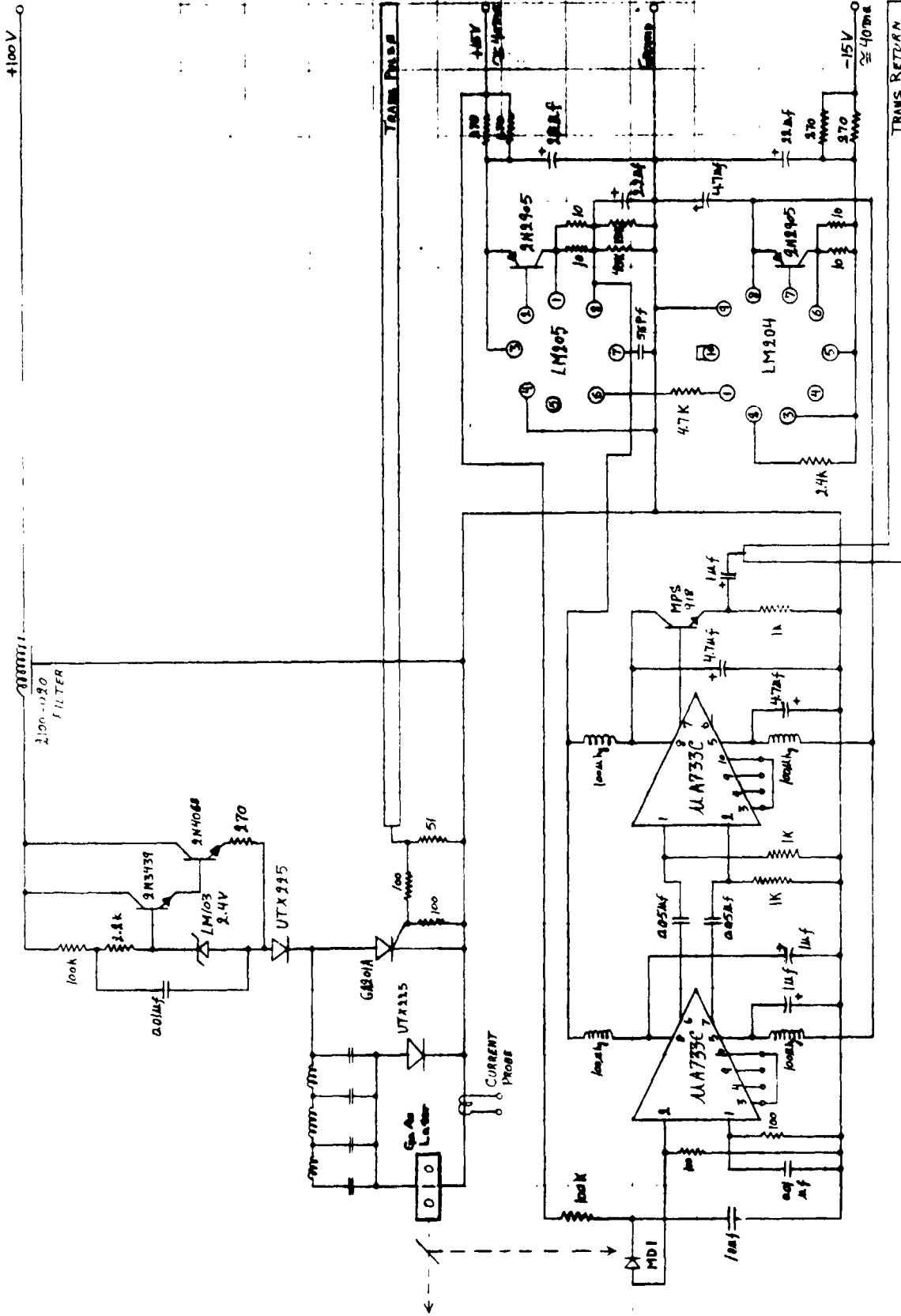


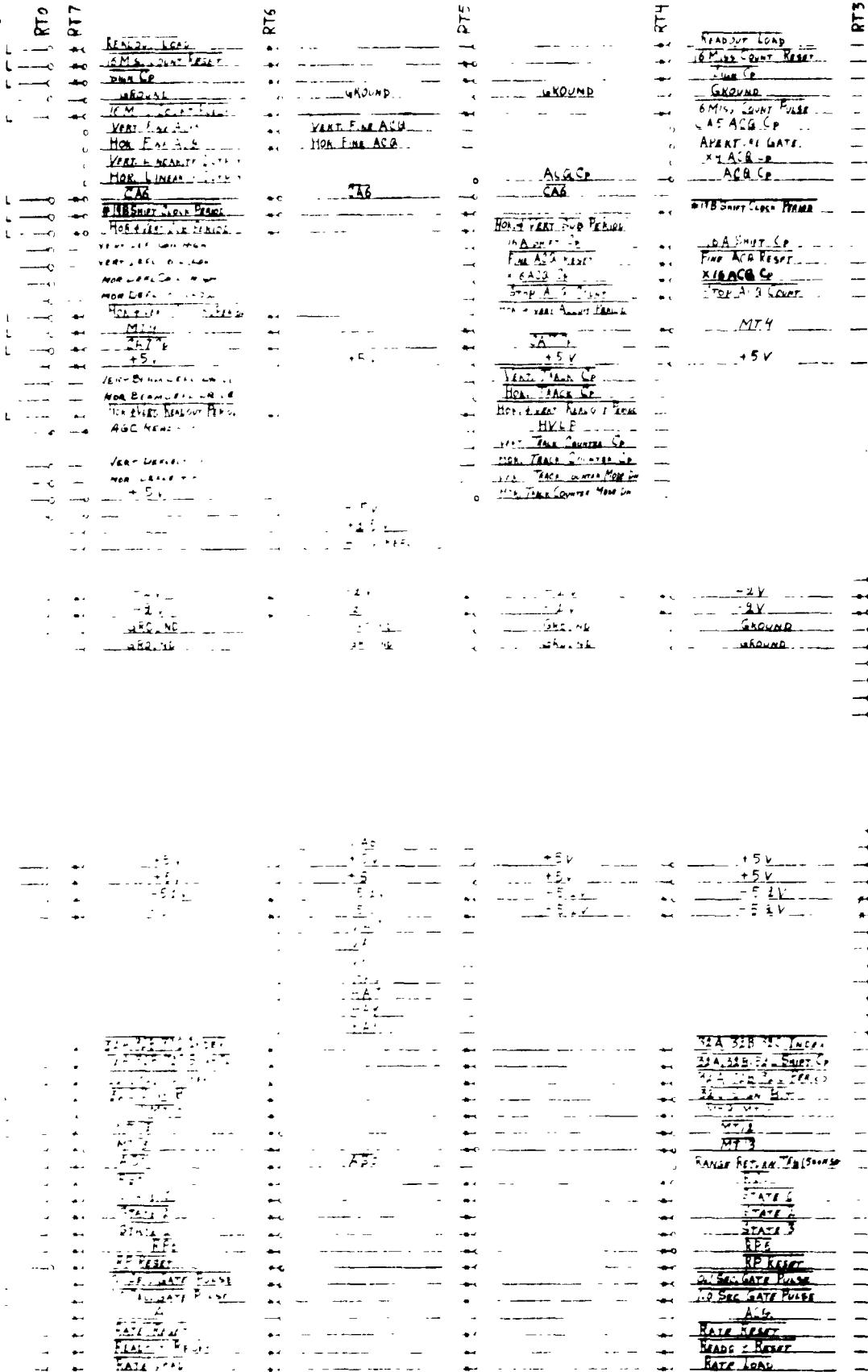
IMAGE DISSECTOR & PRE-AMP SYSTEM (Drawing OH-1)

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

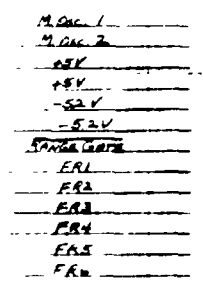
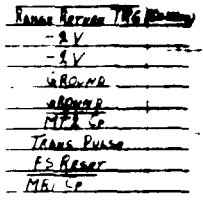


GaAs LASER DRIVER & TRANSMITTER PICKOFF (Drawing OH2)

6-8-58

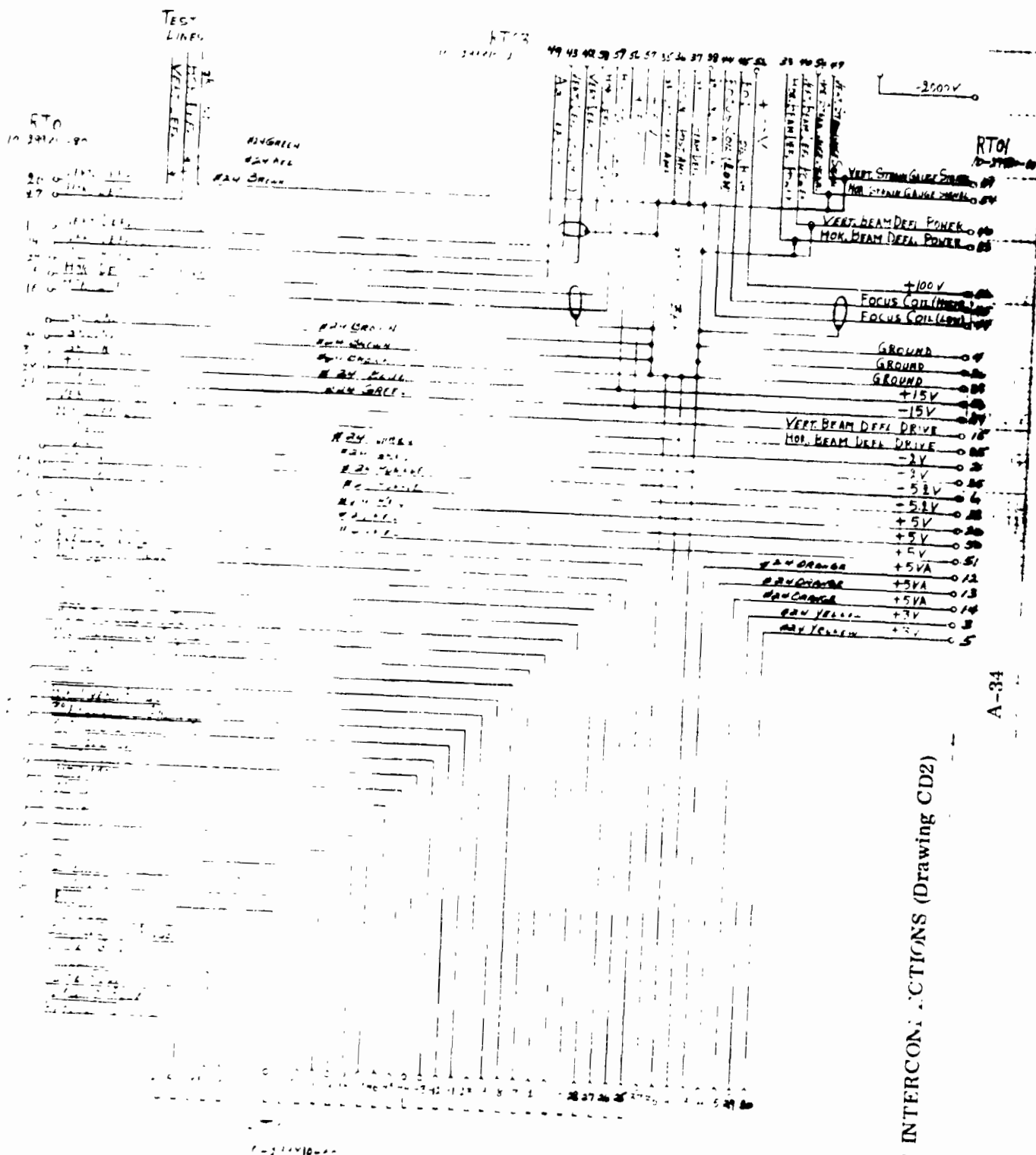


RT2 - RT0 CONNECTOR LAYOUT (Drawing CD 1)



A-33

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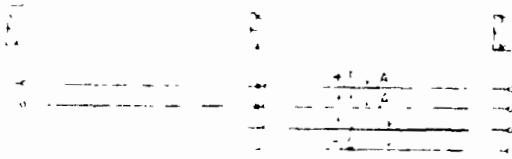


A-34

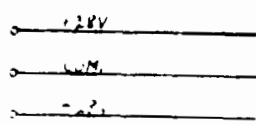
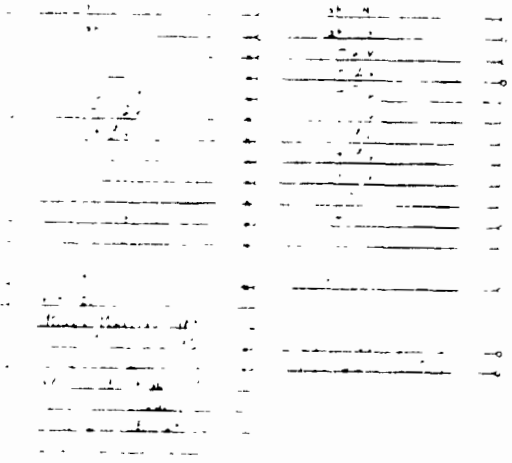
RANGE TRACKER INTERCONNECTIONS (Drawing CD2)

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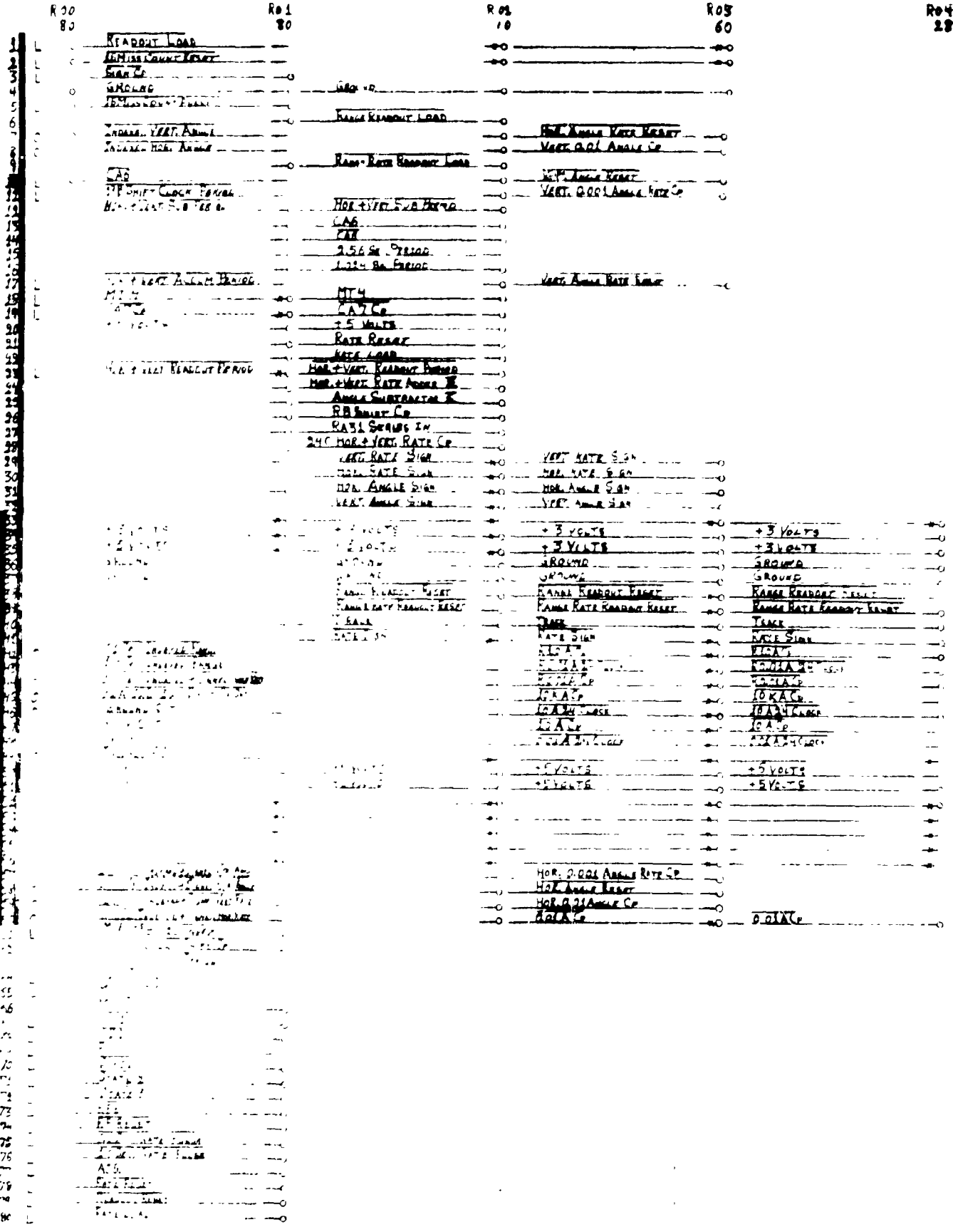
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BEAM DEFLECTOR DRIVER & POWER SUPPLY CONNECTIONS (Drawing CD3)

A-35

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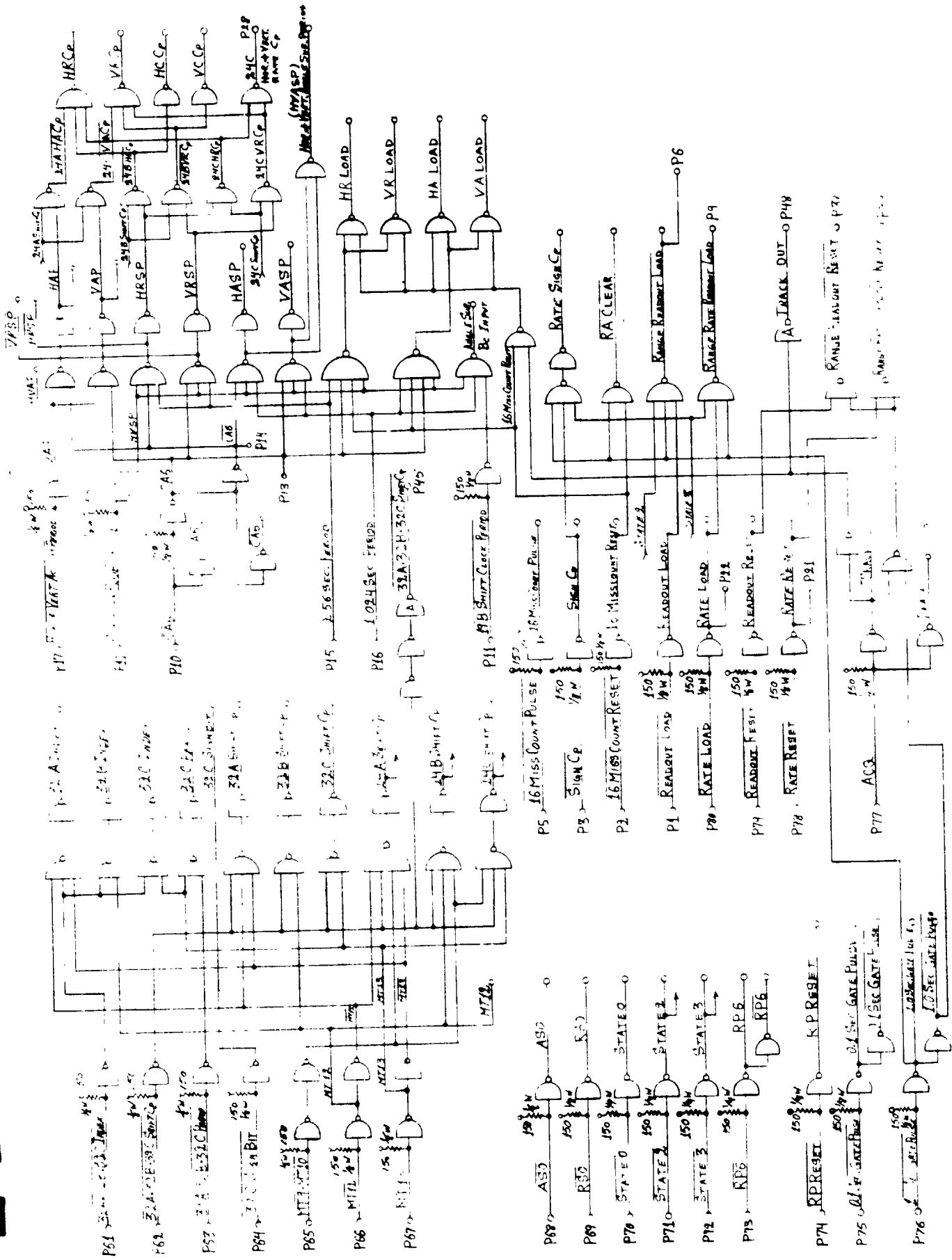


CONNECTOR LAYOUT (DRAWING CD1/R01A)

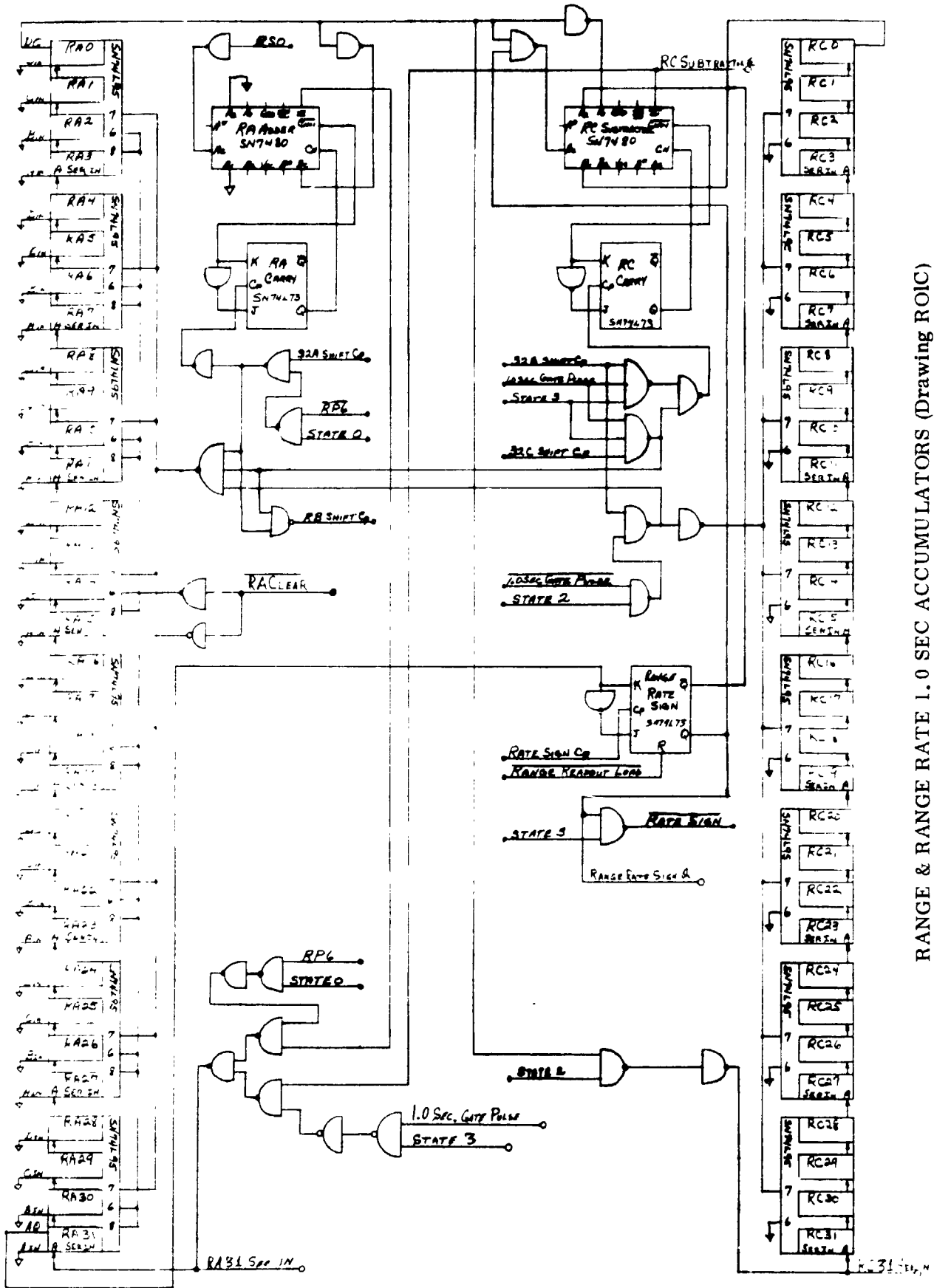
A-36

CABLE JONES #47 #49

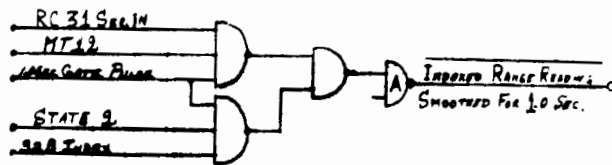
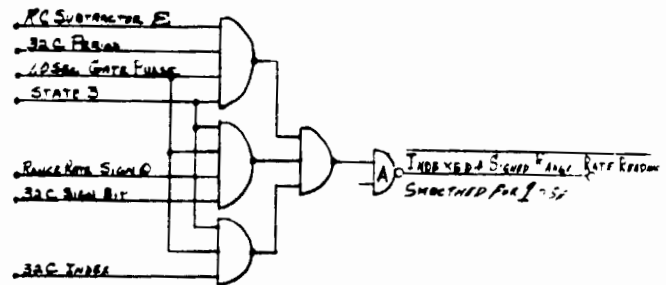
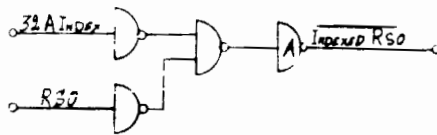
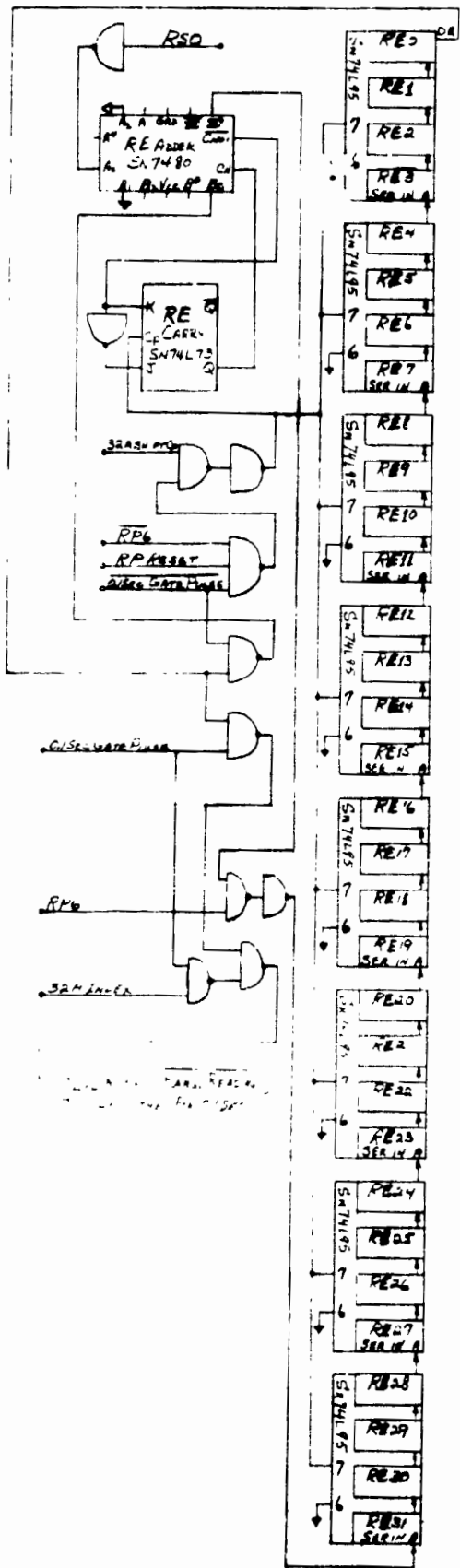
REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR



ROI INTERFACE (Drawing ROIB)



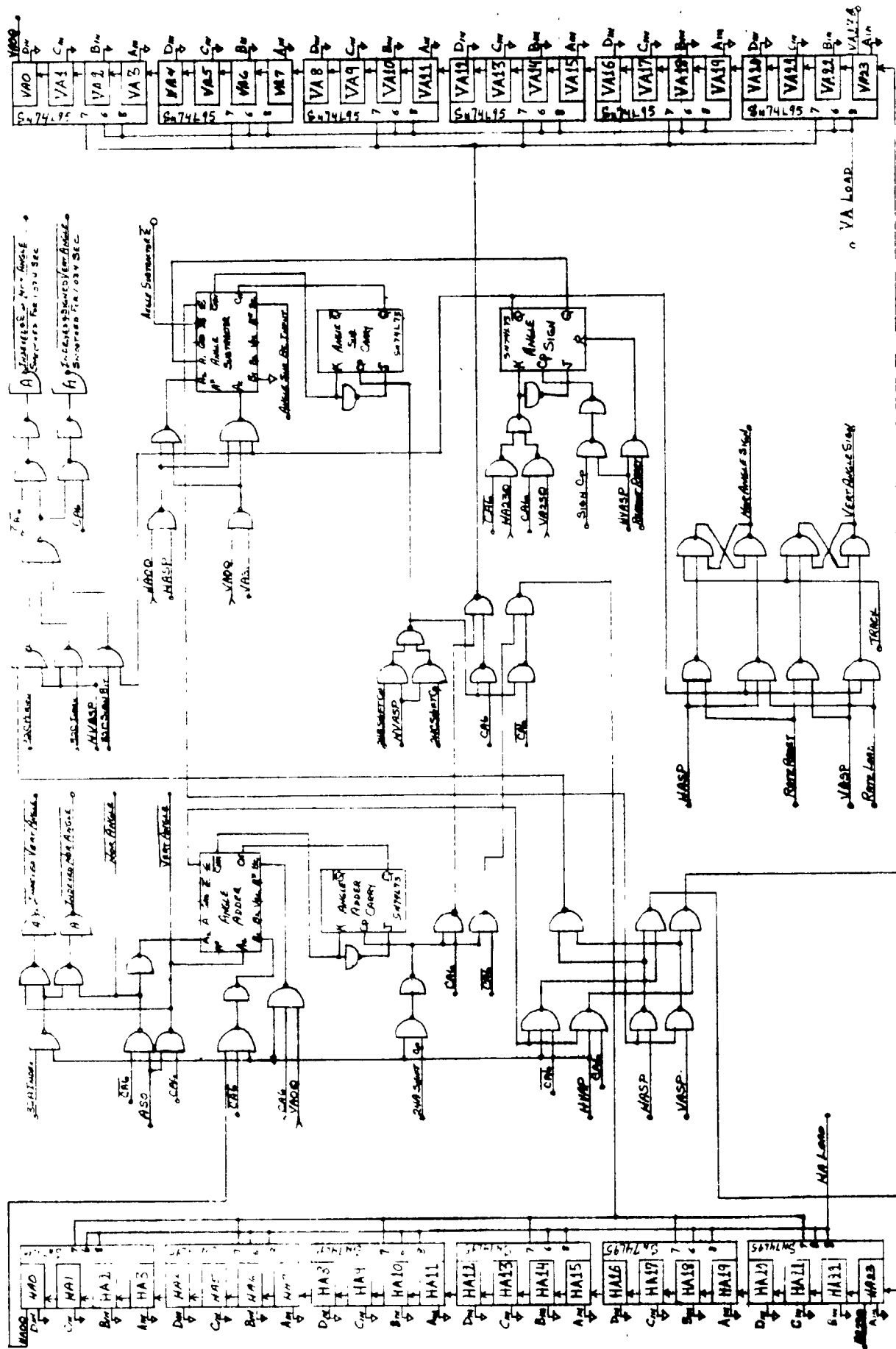
RANGE & RANGE RATE 1.0 SEC ACCUMULATORS (Drawing ROIC)



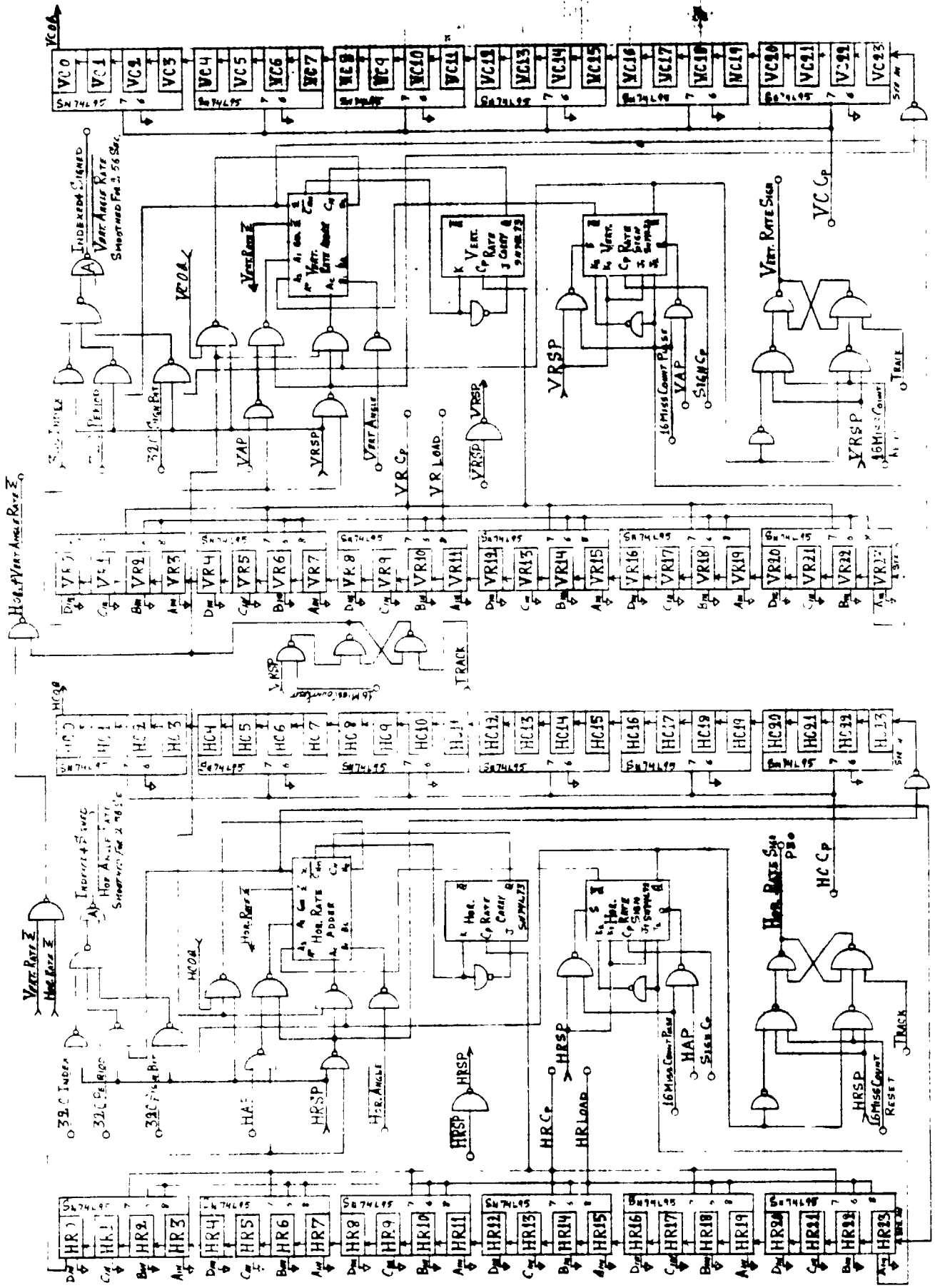
0.1 SEC RANGE ACCUMULATOR SMOOTHED FOR 0.1 SEC (Drawing ROID)

A-39

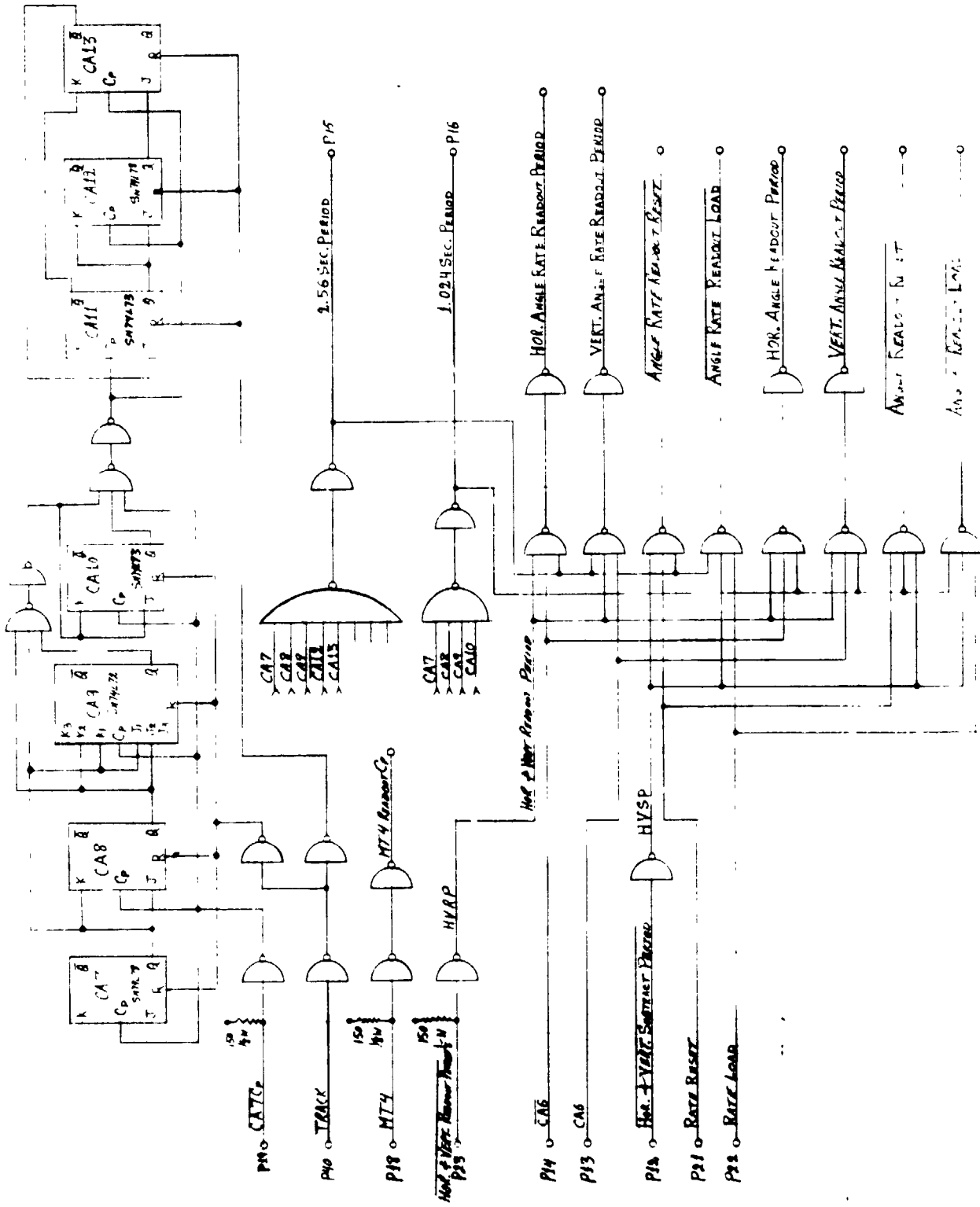
REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR



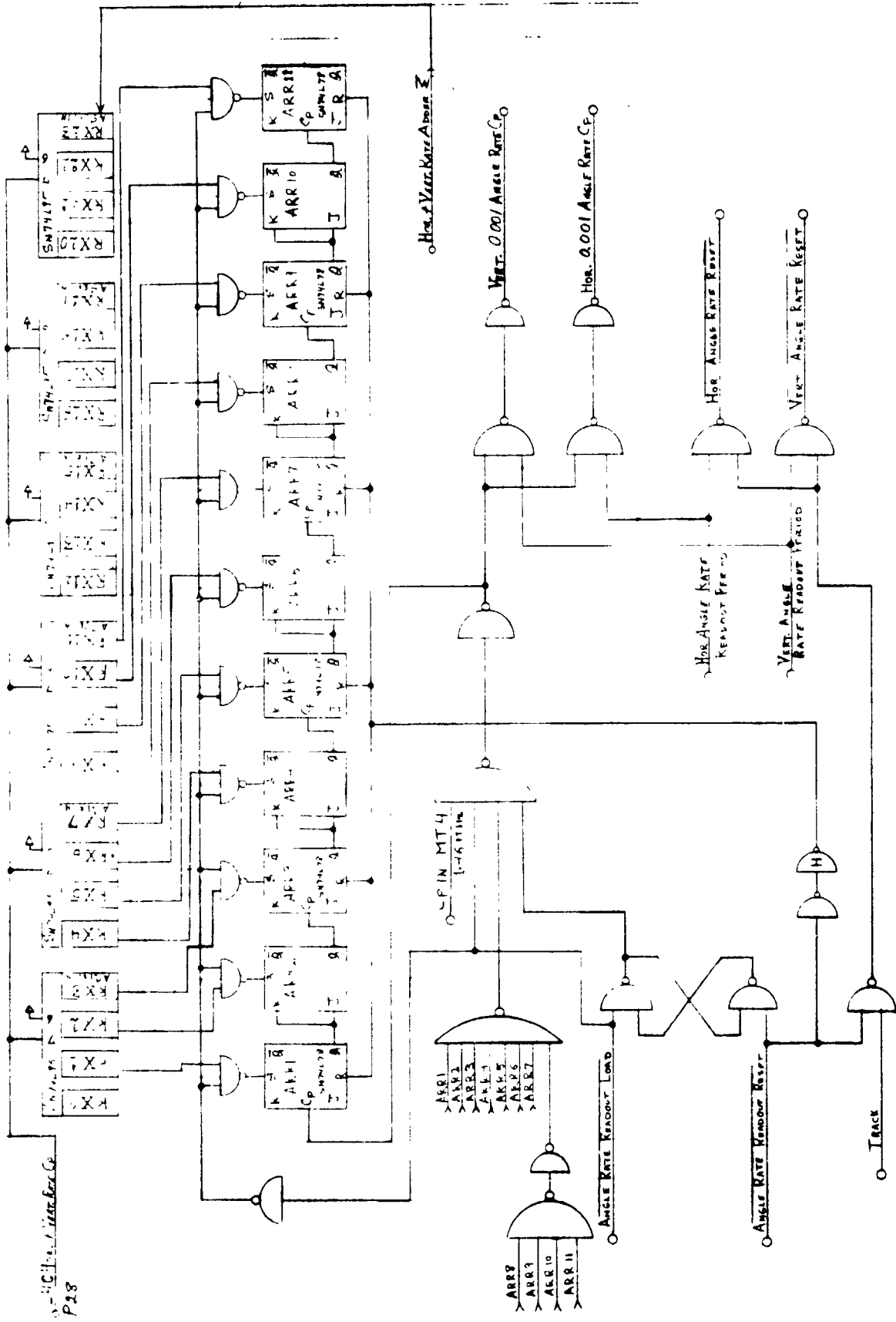
HORIZONTAL & VERTICAL ANGLE ACCUMULATORS (Drawing RO IE)



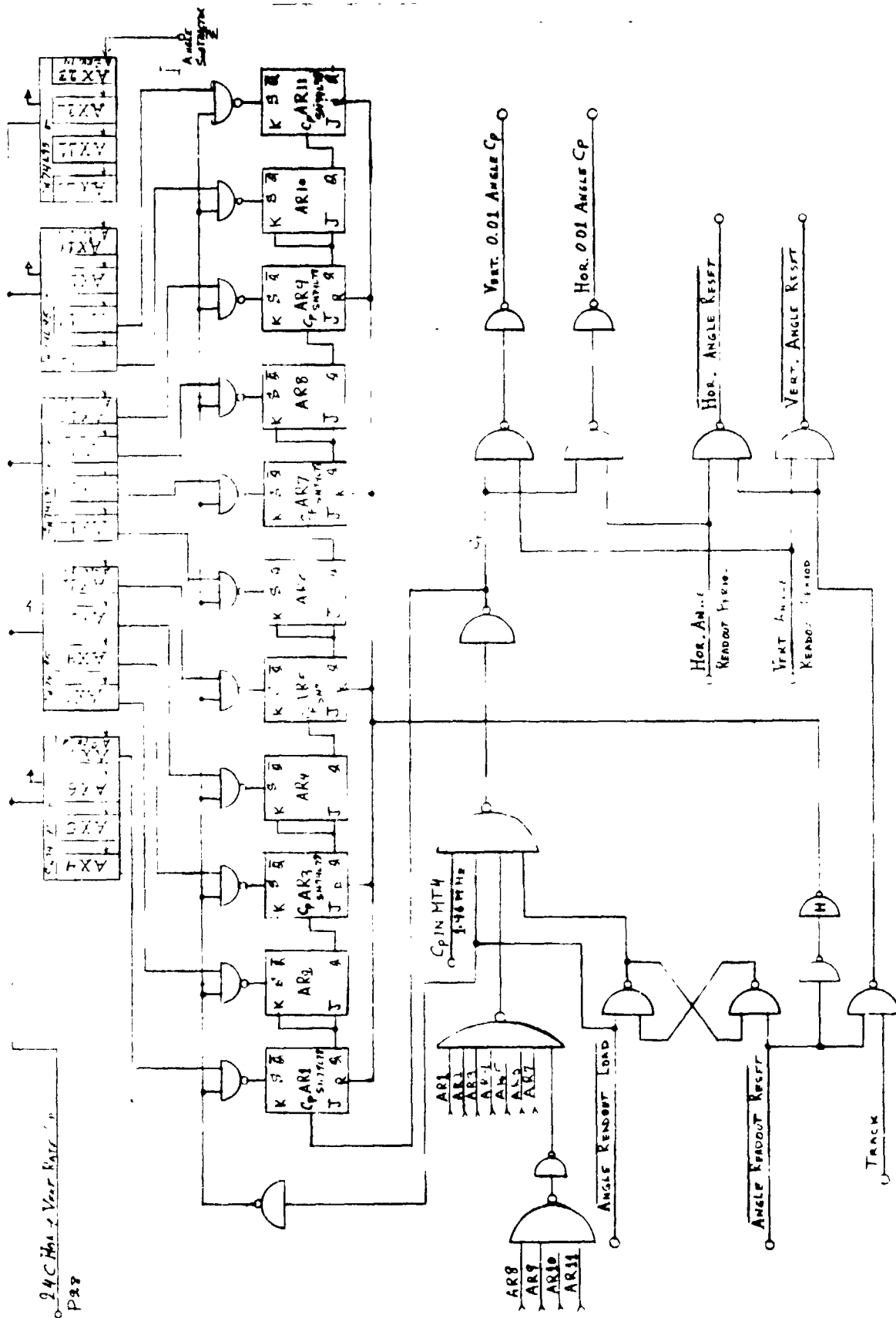
HORIZONTAL & VERTICAL RATE ACCUMULATORS (Drawing ROLF)



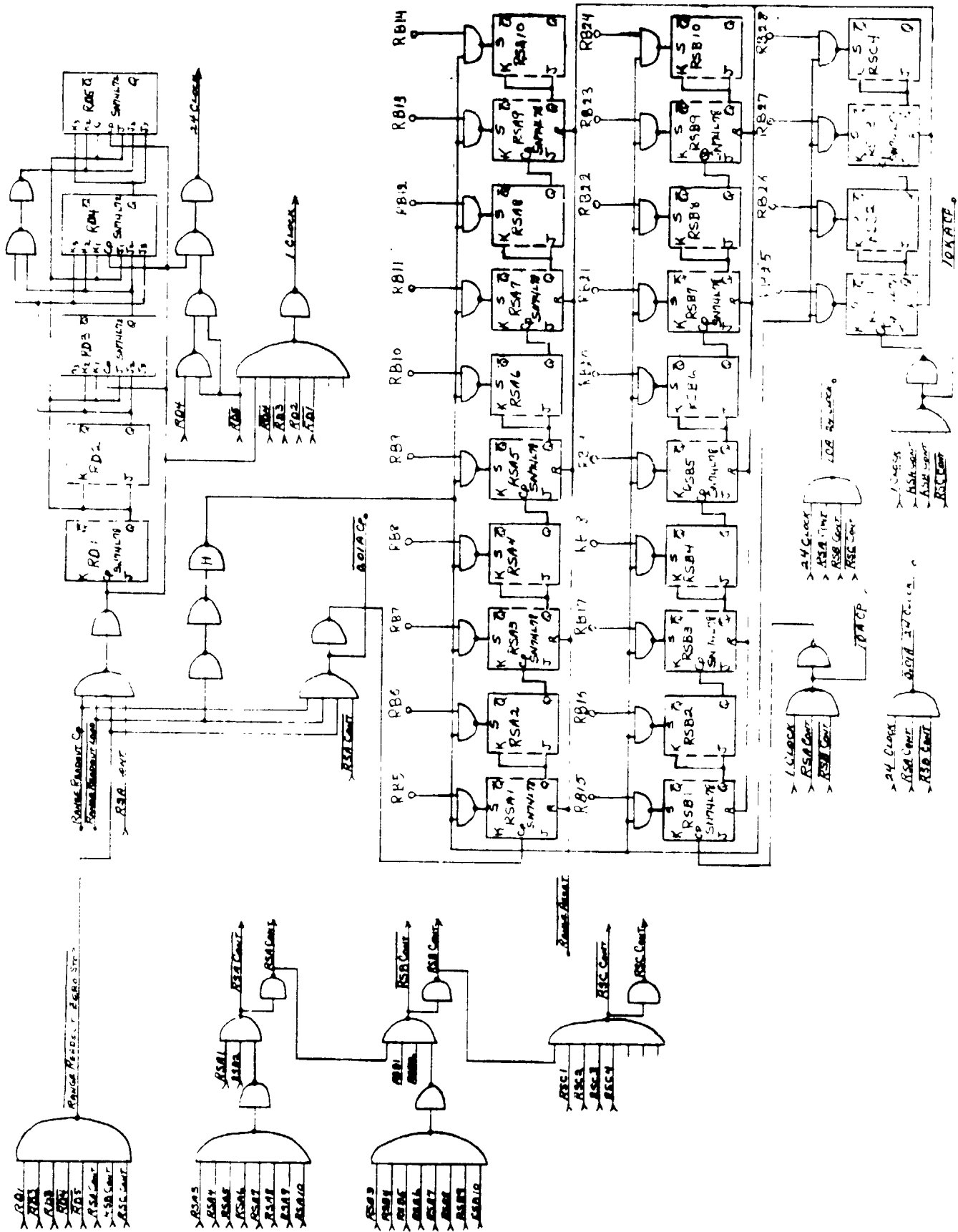
RO2 INTERFACE (Drawing Ro2A)



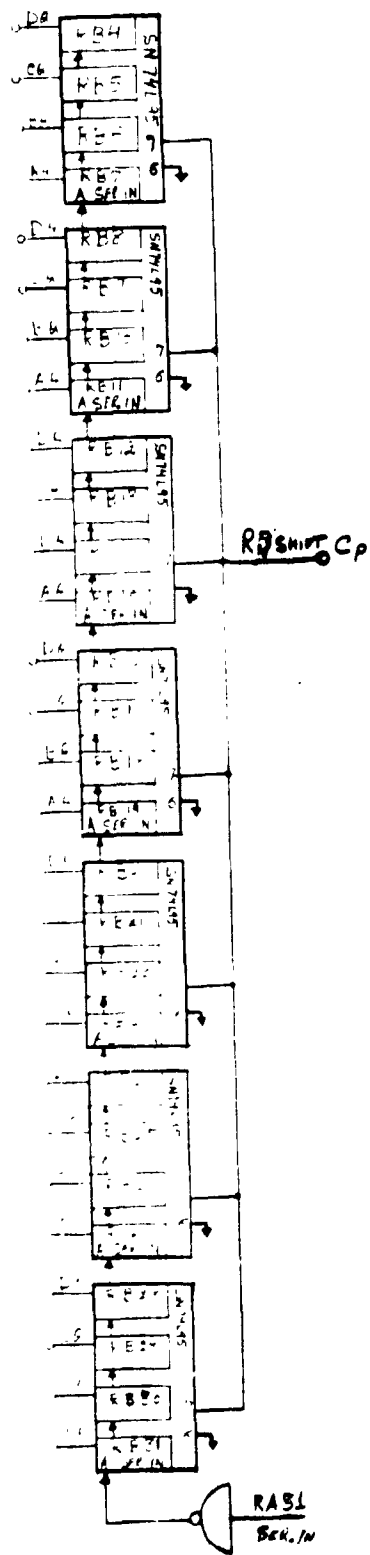
ANGLE RATE BINARY REGISTER (Drawing RO2B)



ANGLE BINARY REGISTER (Drawing RO2C)

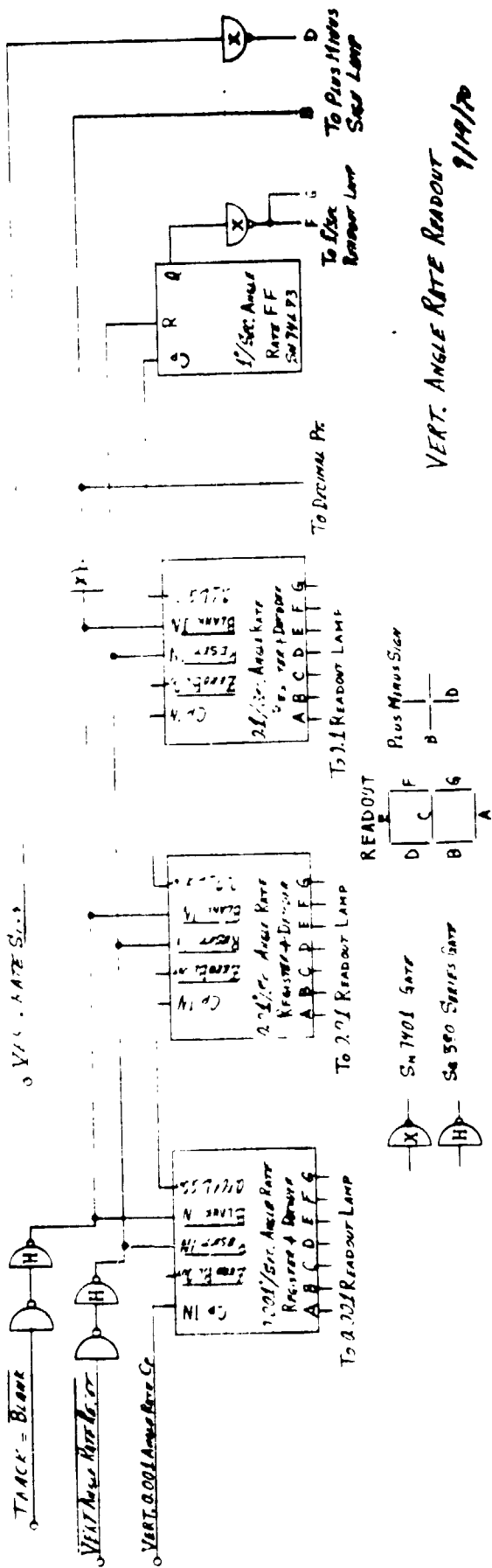


RANGE READOUT CONTROL & SMOOTHED BINARY REGISTER (Drawing RC2F)

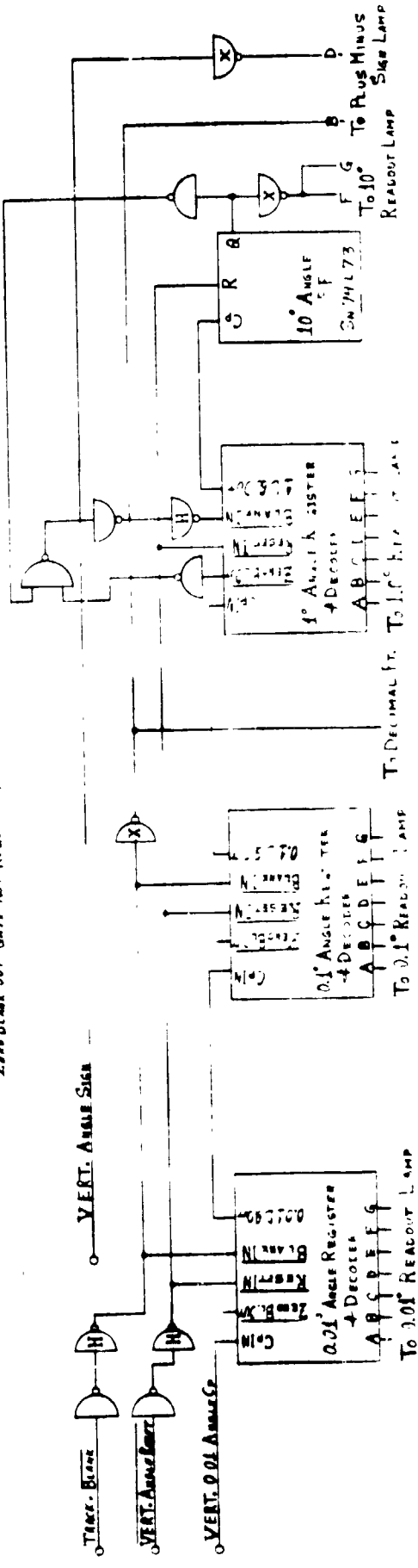


RANGE & RANGE-RATE LOAD REGISTER (Drawing RO2F)

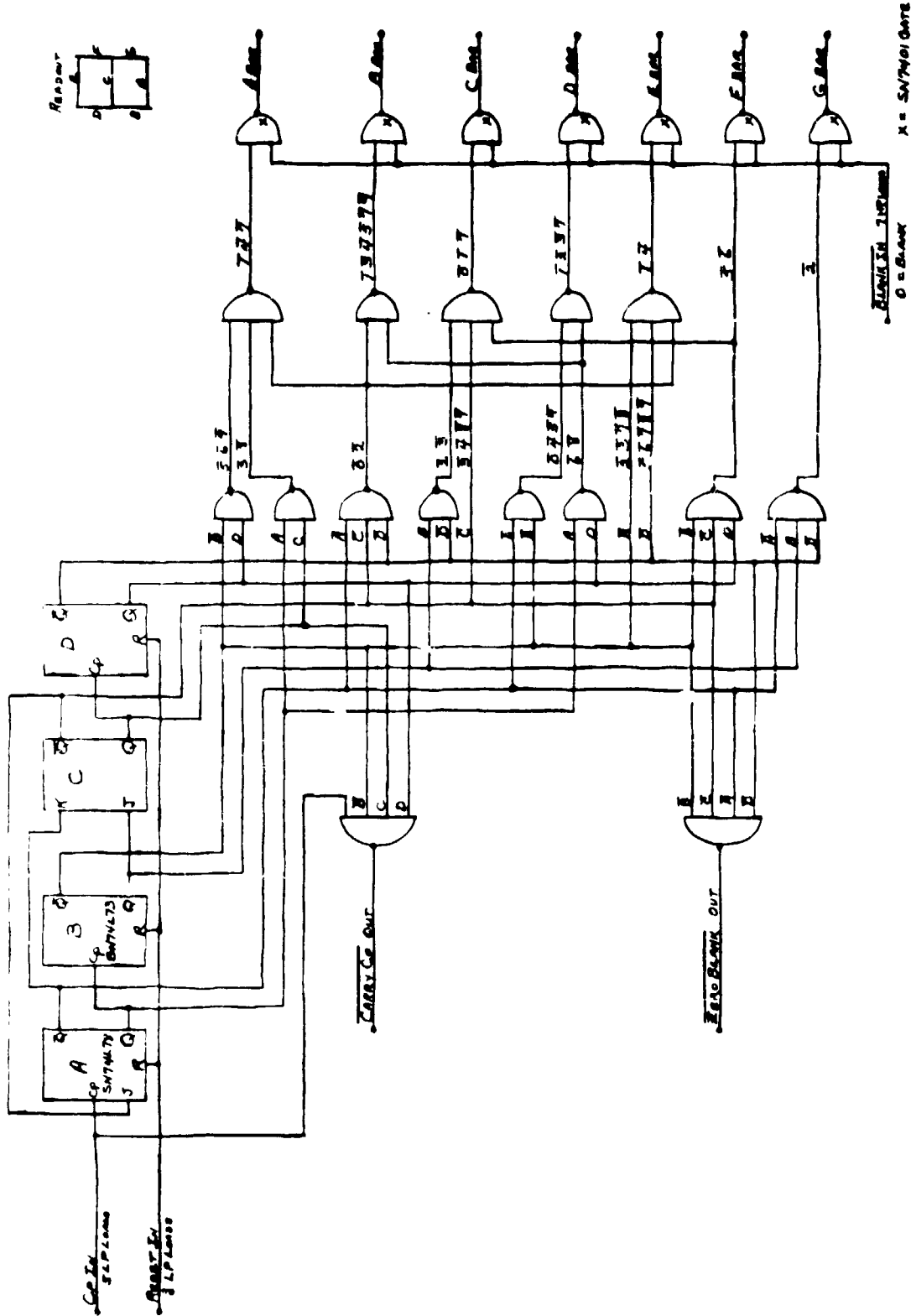
Check for Gate Not Present in Acc. In. Acc. Zero Error



Check for Gate Not Present in Acc. In. Acc. Zero Error

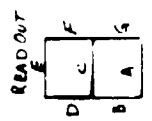
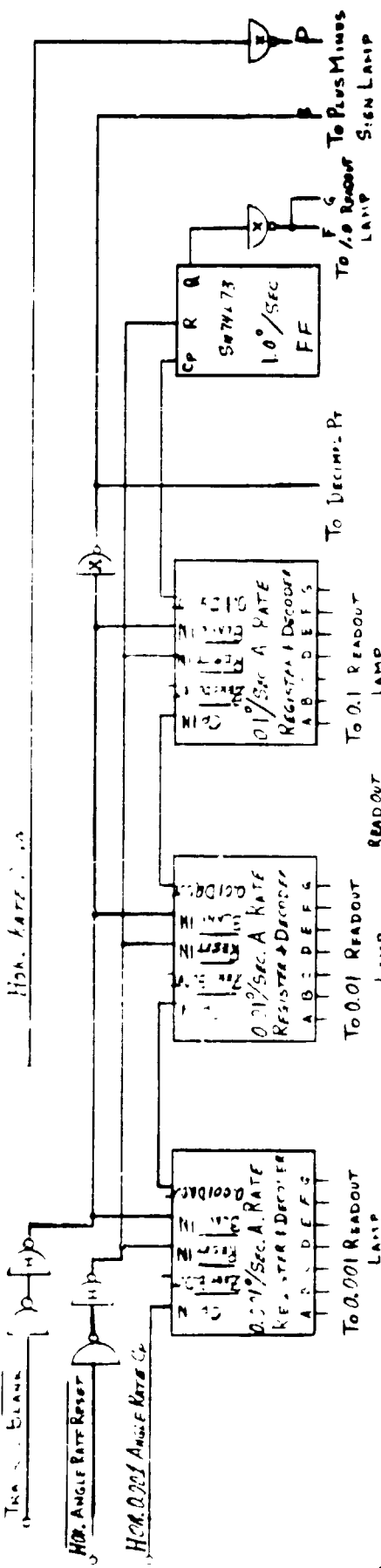


VERTICAL ANGLE READOUT (Drawing RO3A)



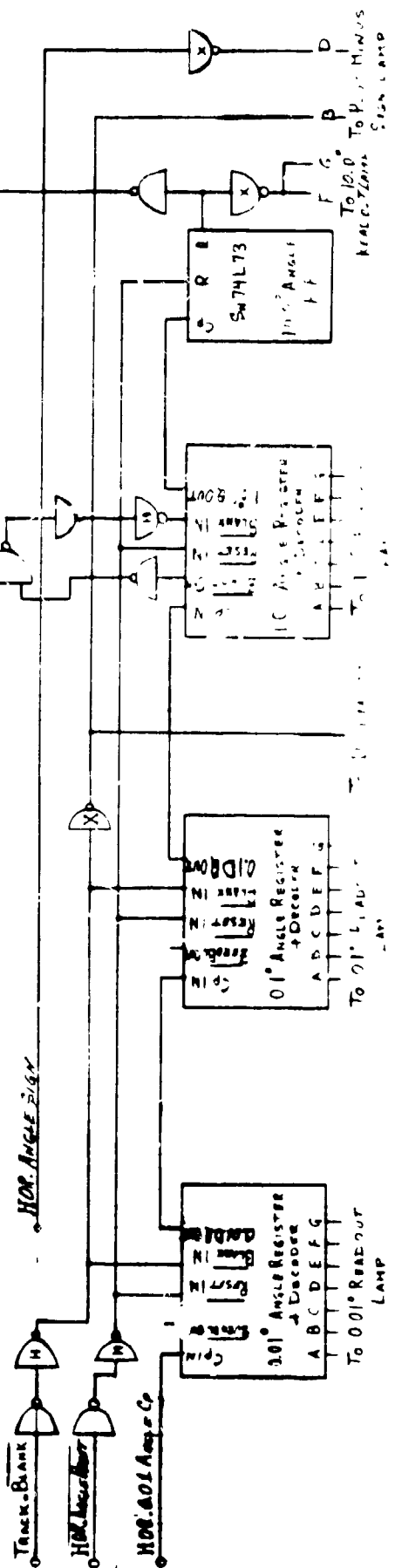
DECADE READOUT REGISTER & SEVEN SEGMENT DECODER (Drawing R03 B thru N, Except H)
 (Drawing R04 B thru N, Except G)

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

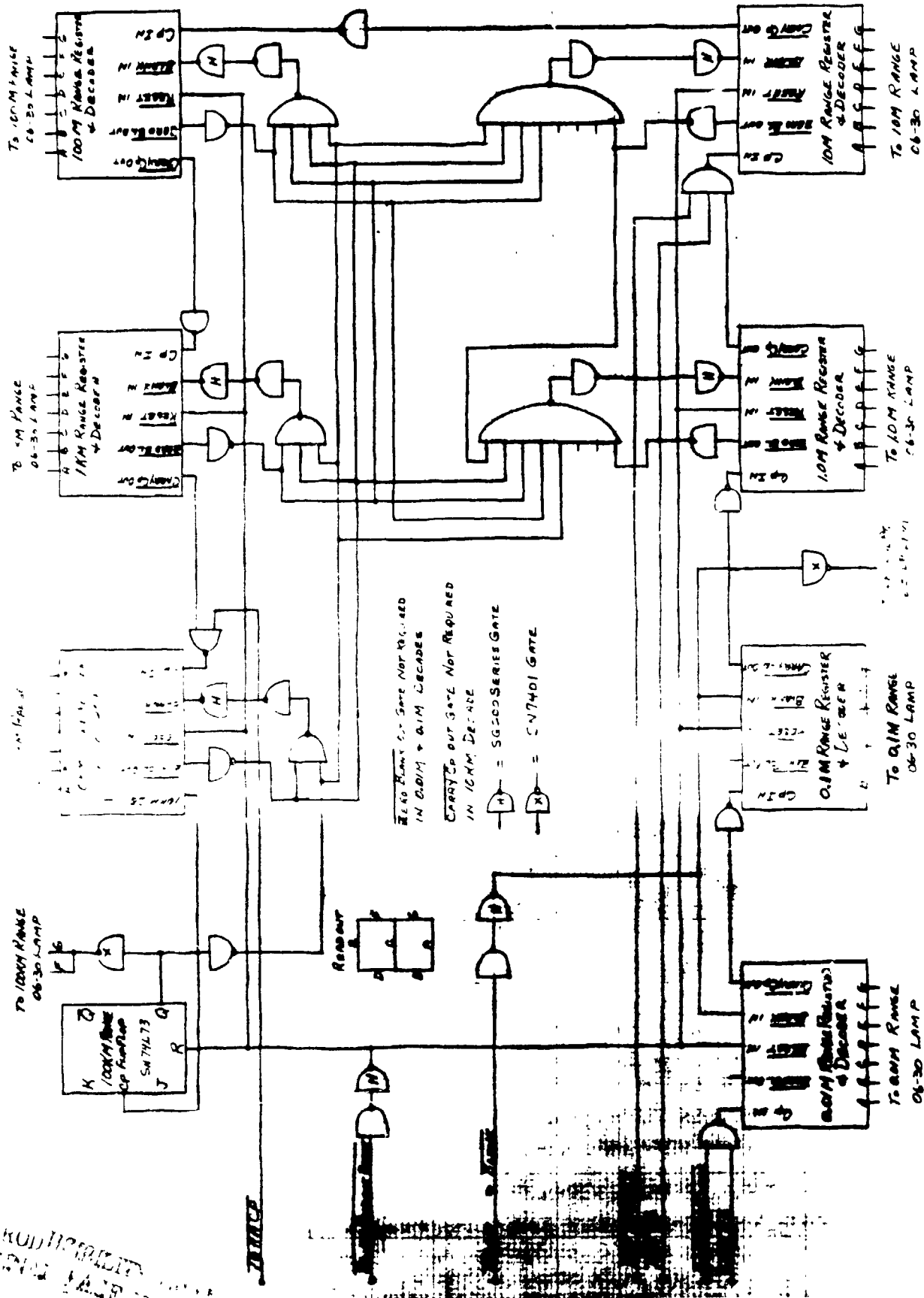


HOR. ANGLE RATE READOUT

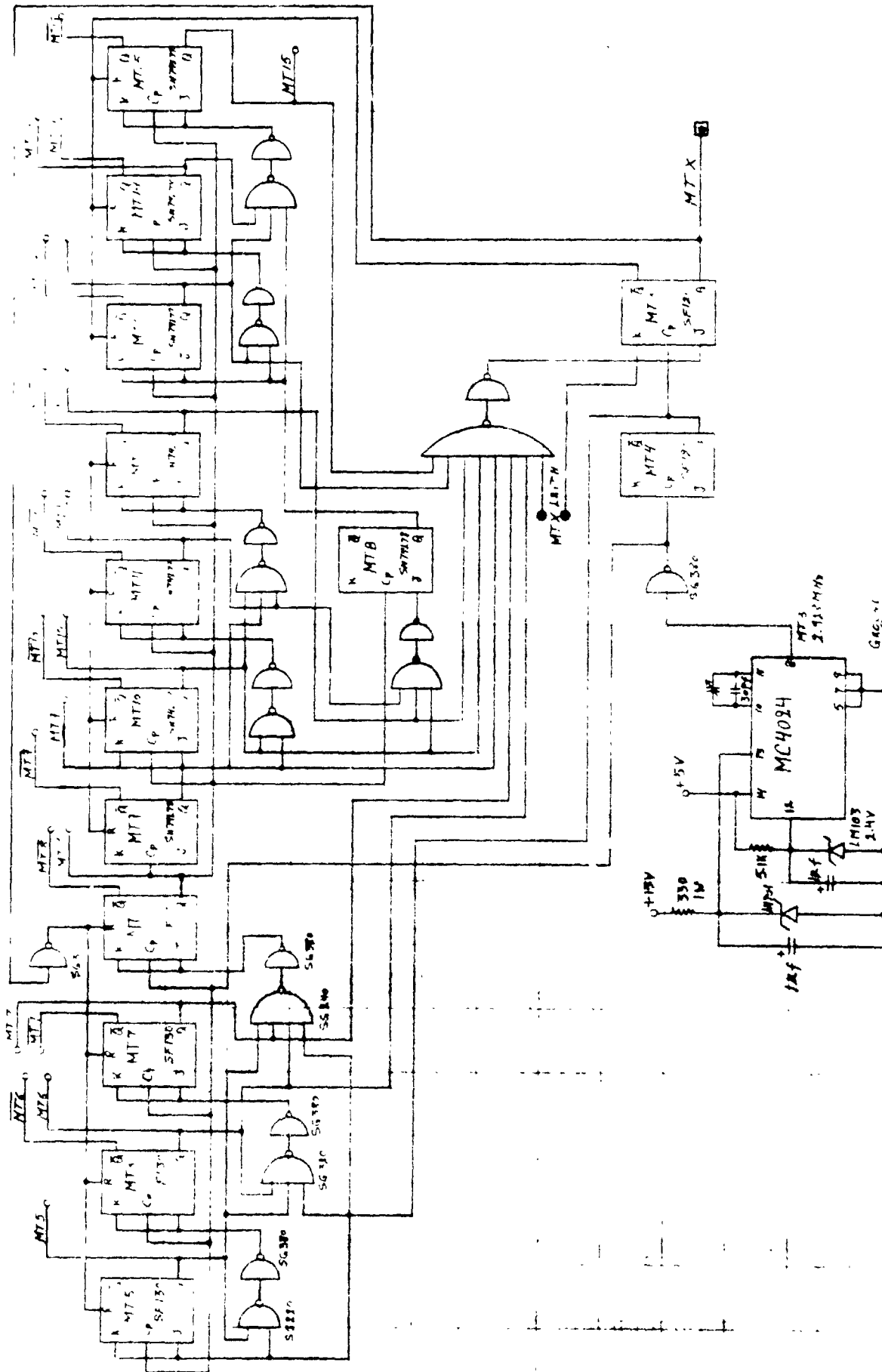
CARRY Cp OUT GATE NOT REQUIRED IN ALL DECADES
 ZERO BLANK OUT GATE NOT REQUIRED IN 0.01° & 0.1° DECADES



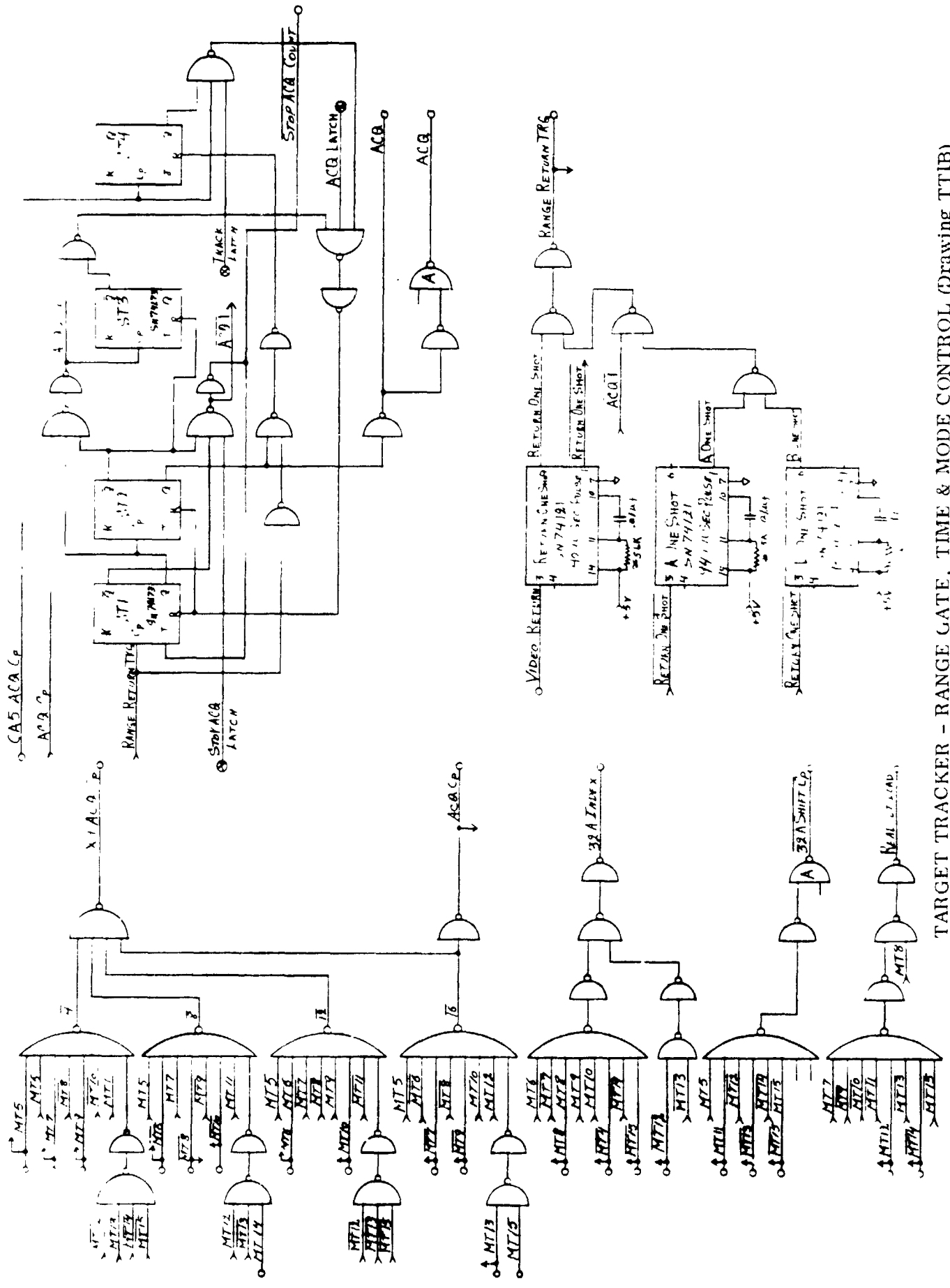
REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR



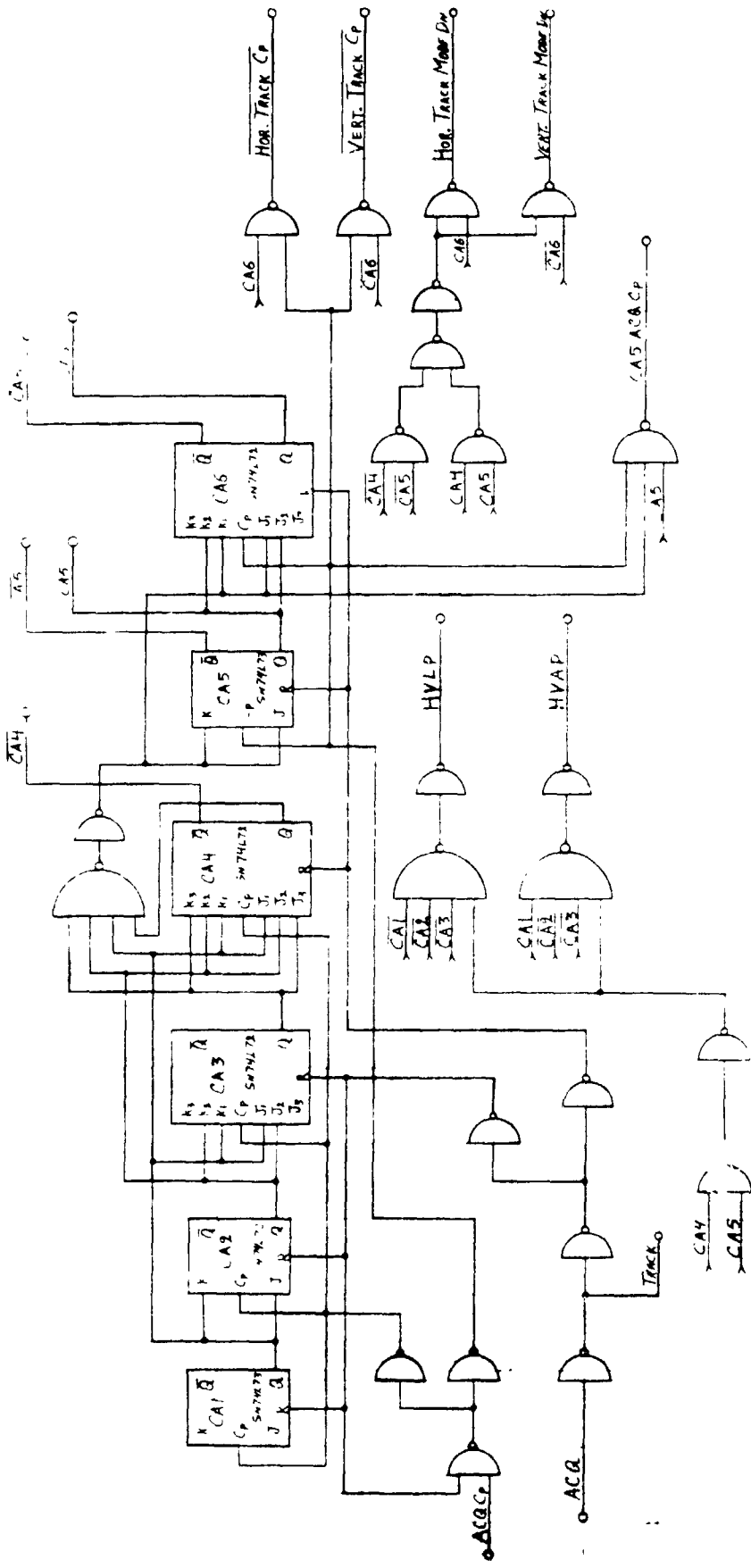
RANGE READOUT SYSTEM (Drawing RO4G)



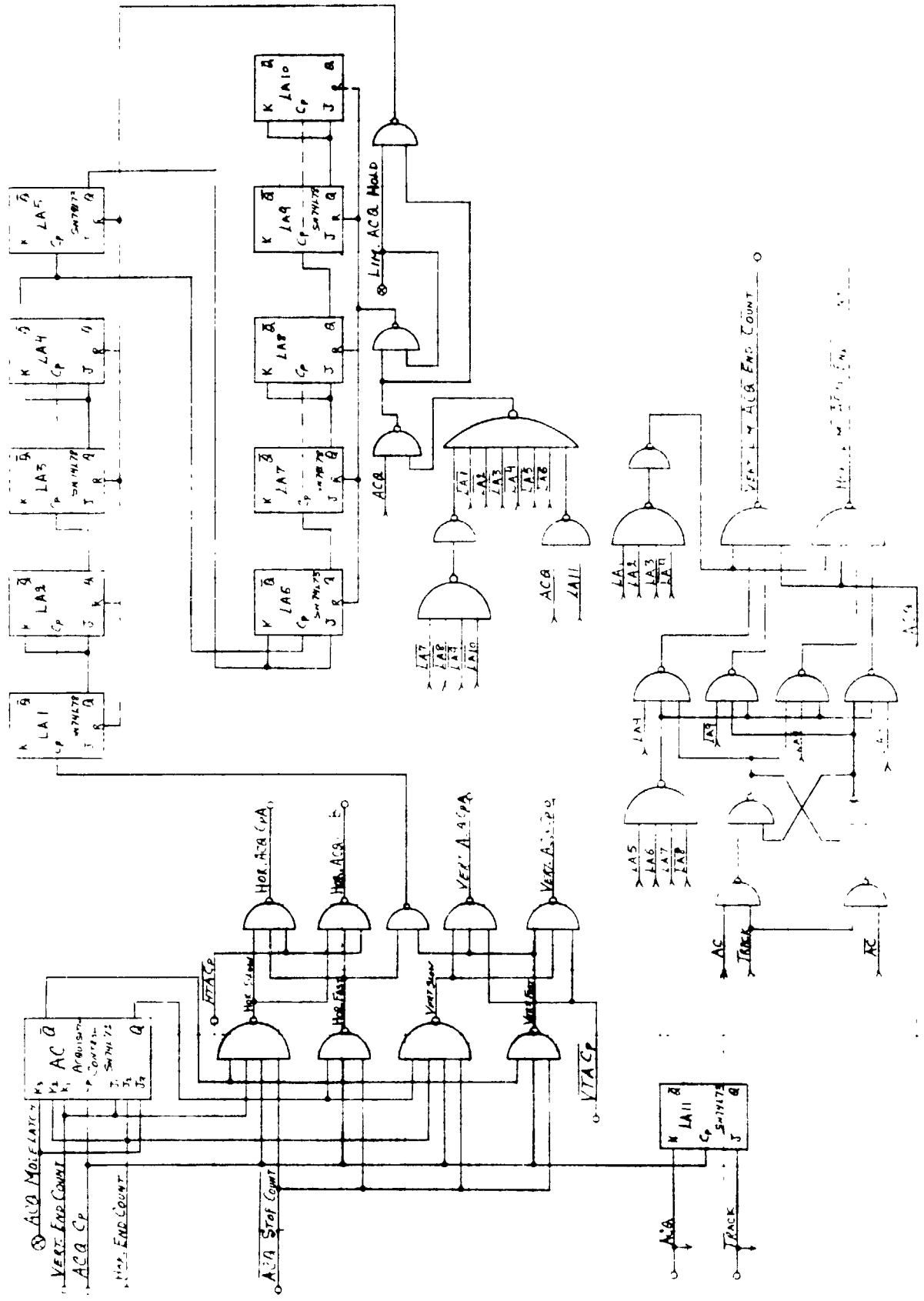
TARGET TRACKER MASTER TIME COUNTER (DRAWING TTIA)



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)

