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# ATCBI-3 ATCRBS Blanker Modification

Leo J. Wapelhorst



October 1985

DOT/FAA/CT-TN85/47

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**Technical Report Documentation Page**

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16. Abstract


The construction of a temporary concrete mixing plant directly in front of the Atlantic City Airport Surveillance Radar (ASR)-4 radar/beacon site at an azimuth of approximately 103 degrees posed a potential problem for the secondary radar coverage area. The plant which will be approximately 60 feet high, will probably cause reflection problems. The Federal Aviation Administration (FAA) Eastern Region personnel proposed a fix which would inhibit transmissions in a wedge at the approximate azimuth of the plant.

A unit was designed by ATC-150, which used pretriggers, azimuth change pulses, and azimuth reference pulses as input. It produced signals which were interfaced to the Air Traffic Control Beacon Interrogator (ATCBI)-3 to inhibit the P1 pulse of the Air Traffic Control Radar Beacon System (ATCRBS) mode transmissions during a selectable wedge surrounding the reflector (concrete plant).


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TABLE OF CONTENTS

## LIST OF ILLUSTRATIONS



## LIST OF TABLES

## EXECUTIVE SUMMARY

During a runway construction project on runway 22 at the Atlantic City Airport, New Jersey, the contractor will erect a cement mixing plant. The plant (approximately 60 feet high and 36 feet wide) will be located at approximately 103 degrees, less than 1,000 feet from the Air Traffic Control Radar Beacon System (ATCRBS) antenna. It is anticipated that this obstruction will cause severe reflection problems for the Air Traffic Control Beacon Interrogator (ATCBI)/Automated Radar Terminal System (ARTS).

On July 1, 1985, a prototype ATCRBS BLANKER unit was checked out at the operational Atlantic City Airport radar site. It used pretriggers, azimuth change pulses, and azimuth reference pulses from the existing Airport Surveillance Radar (ASR)-4/ATCBI-3 equipment. The P1 pulse of both Mode A and Mode C was inhibited (during a selectable azimuth wedge) prior to the modulator of the ATCBI-3. Thus, no valid interrogations were made during this wedge (nominally 4.5 degrees) which could result in reflections from the area of the cement mixing plant. The blanked 4.5-degree wedge was located at approximately 100 degrees from the Atlantic City radar-site which extends out over the Atlantic Ocean.

## INTRODUCTION

On June 27, 1985, ACT-150 received a telephone call from the Federal Aviation Administration (FAA) Eastern Regional Headquarters which asked if it was feasible to design and fabricate a unit which could inhibit the transmitter of the Air Traffic Control Beacon Interrogator (ATCBI)-3 for an azimuth wedge. Construction had begun on a concrete plant to be used in the resurfacing of runway 422 at the Atlantic City Airport. The location of this plant was approximately 750 feet from the Airport Surveillance Radar (ASR)-4 radar/beacon site at an azimuth of approximately 103 degrees.

## GENERAL DESCRIPTION OF SOLUTION

Figure 1. shows a block diagram of the Air Traffic Control Radar Beacon System (ATCRBS) BLANKER developed as a solution to the concrete plant constructed in front of the Atlantic City ASR-4/ATCBI-3 site. The blanker receives Azimuth Change Pulse (ACP's), Azimuth Range Pulse (ARP's), and beacon pretriggers from the ATCBI-3. The triggers synchronize a range counter which produces a range gate that encompasses the P1 pulse position of the next interrogation.

The azimuth data are used to synchronize an azimuth counter used to address a Programmable Read Only Memory (PROM). This PROM contains azimuth data in the area around the reflector. Switches allow the fine tuning of the azimuth wedge. Coincidence of the range and azimuth signals will cause the P1 (and also P2 since it is derived from P1) trigger of the following interrogation to be inhibited

Error detection logic is included for sensing input signal errors. An output signal suitable for display on a Plan Position Indicator (PPI) is also included in order to display the wedge where interrogations are inhibited.

## DETAILED THEORY OF OPERATION

The schematics are shown in figure 2. (eight sheets). The destination sheet of signals leaving each sheet are enclosed in circles (LPUP goes to sheets 3 and 4). The inputs to the blanker are ACP's, ARP's, and beacon pretriggers. The blanker clock is provided by a 40 Megahertz (MHz) crystal oscillator U1 located at V44 (the Integrated Circuits (IC's) are identified by the location of pin 1 on the card). Counter U2 (T43) provides the clock output at R46 by counting down by a factor of eight.

The ACP and ARP interface is provided by U4 (E38). Threshold pots are C44 and G44, respectively. A power-up initialization signal is provided at J47 by U5 and the associated discrete components J47 remains low after power is applied until capacitor K40 can charge via the 51K resistor at J42. This signal is used to initialize various flip-flops in the system.

## RANGE GATING

The pretrigger level at the input is approximately 60 volts. A second trigger of approximately 20 volts was thresholded out by L44. U22 (N43) and the gate of U3 provide a negative going pulse one clock wide at the lead edge of the pretrigger (LDRC). This signal is used to load the range counter comprised of U6 through U9. The counter is loaded with 65153 at the lead edge of pretrigger time. It will produce a "carry" 382 counts later ( approximately 76 microseconds) as it counts at a 5 MHz rate. The "COUT" signal produced at M27 sets flip-flop U10 (K32) which enables the range gate counter comprised of U11 and U12 to count. It counts for a total of 128 clocks which gives a range gate duration of 25.6 microseconds. The carry produced at H18 enables flip-flop K32 to reset via K29. This range gate will encompass the position of the P1 pulse of the next interrogation whether it is Mode A or Mode C.

## AZIMUTH GATING

U13 (G35) and the two gates of U14 (E30) generate pulses which occur at the leading edge of the ACP's and ARP's. The azimuth counter is comprised of U18, U19, and U20 (see figure 2 - sheet 5). The ACP lead edge pulse "HACPLE" enables the azimuth counter to increment once per ACP. When the counter reaches a value of 4095, "L4095" is produced at C32. This signal goes to F35 (see figure 2 - sheet 6) where it is gated with P49 which is the ACP lead edge signal delayed one clock period via U22. The signal produced at F34 (SETWIN) goes to sheet 4 where it enables flip-flop U15 (D41) to set on the following clock. This "WINDOW" should encompass the ARP if the azimuth system is properly synchronized. Sheet 5 shows the ARP error detection logic. If the signal "WINDOW" is still high when the next ACP lead edge occurs (WINDOW is reset by the ARP lead edge), F28 will go low indicating that an ARP was missed. If an ARP occurs which is not in the "L4095" time slot of the azimuth counter, E27 will go low indicating the occurrence of an ARP outside the window. These signals are "OR'ed" at F25 producing a signal called "HARPER" which is sent to F32 (see figure 2 - sheet 6).

The ACP error detection logic is performed by shift register U21 (R36). Each time an ACP occurs, LACPLE clears the shift register. Each time a pretrigger occurs, a "one" is shifted to the right in the shift register. If the "one" arrives at R40, which would mean that three pretriggers occurred without an ACP, an azimuth error will be generated as a result of a missing ACP. This signal is "OR'ed" via U14 and applied to the flip-flop at P44. The "HAZER" signal is sent to driver U29 (A38) which drives the Azimuth Error Indicator.

The azimuth counter outputs (AZ-0 to AZ-11) are used as the address bits of PROM U23 (J12). All the addresses except those in the azimuth wedge are "high." Each output data bit is selectable via a switch on U24 (J1). The selected bits are "OR'ed" by U27 to form the azimuth kill wedge (LAZKILL). An azimuth kill indicator as well as a driver providing the gate for display on a PPI are also connected to this point. The selection criteria are shown in the azimuth tables for several PROMS (see tables 1 through 5).

## OUTPUT INTERFACE

The range and azimuth gates are combined by open collector driver U28. Because of the high impedances involved with the interface to the vacuum tube circuitry of the ATCBI-3, U28 was installed inside the chassis of the ATCBI-3. The interface between the chip and the remainder of the blanker was handled at the input to the chip where it is at a Transistor-Transistor Logic (TTL) level.

Figure 3. shows a portion of the ATCBI-3 transmitter indicating the point of application of the blanker "kill wedge." When the range gate (LRANG) and the azimuth gate (LAZKILL) are coincident, the P1 pulse is inhibited. Outside the "kill wedge" the output transistor of U28 is off and has no effect on the P1 pulses generated by the blocking oscillator of the ATCBI-3. During the wedge, however, the B transistor is turned on and the energy developed by the blocking oscillator is shunted to ground rather than be allowed to form the P1 pulse.

Figure 4. shows the physical installation of the interface to the ATCBI-3. The output integrated circuit is designated IC-1 on this layout. It is, in reality, U28 shown on the schematics (figure 2 - sheet 8).

## TABLE 1 - PROM 95

| AZIMUTH | DEC. ADD | HEX. ADD | DATA | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALL AZIMUTHS UNTIL 95 deg.. | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 95 deg | 1081 | 439 | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| ALL AZIMUTHS UNTIL 96... | | | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 96 deg | 1092 | 444 | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| ALL AZIMUTHS UNTIL 97... | | | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 97 deg | 1104 | 450 | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| ALL AZIMUTHS UNTIL 98... | | | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 98 deg | 1115 | 45B | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| ALL AZIMUTHS UNTIL 99... | | | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 99 deg | 1126 | 466 | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 100... | | | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 100 deg | 1138 | 472 | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 101... | | | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 101 deg | 1149 | 47D | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 102... | | | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 102 deg | 1161 | 489 | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 103... | | | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 103 deg | 1172 | 494 | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 104... | | | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 104 deg | 1183 | 49F | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 360... | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

TABLE 1 - PROM 95 (CONTINUED)

| SWITCH NUMBER | | FROM | TO |
|---|---|---|---|
| S1 | ALL AZIMUTHS | 95 | 97 |
| S2 | ALL AZIMUTHS | 96 | 98 |
| S3 | ALL AZIMUTHS | 97 | 99 |
| S4 | ALL AZIMUTHS | 98 | 100 |
| S5 | ALL AZIMUTHS | 99 | 101 |
| S6 | ALL AZIMUTHS | 100 | 102 |
| S7 | ALL AZIMUTHS | 101 | 103 |
| S8 | ALL AZIMUTHS | 102 | 104 |

TABLE 2 - PROM 102

| AZIMUTH | DEC. ADD | HEX. ADD | DATA | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALL AZIMUTHS UNTIL 102 deg.. | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 102 deg | 1161 | 489 | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| ALL AZIMUTHS UNTIL 103... | | | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 103 deg | 1172 | 494 | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| ALL AZIMUTHS UNTIL 104... | | | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 104 deg | 1183 | 49F | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| ALL AZIMUTHS UNTIL 105... | | | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 105 deg | 1195 | 4AB | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| ALL AZIMUTHS UNTIL 106... | | | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 106 deg | 1206 | 4B6 | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 107... | | | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 107 deg | 1217 | 4C1 | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 108... | | | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 108 deg | 1229 | 4CD | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 109... | | | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 109 deg | 1240 | 4D8 | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 110... | | | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 110 deg | 1252 | 4E4 | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 111... | | | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 111 deg | 1263 | 4EF | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 360... | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

TABLE 2 - PROM 102 (CONTINUED)

| SWITCH NUMBER | | FROM | TO |
|---|---|---|---|
| S1 | ALL AZIMUTHS | 102 | 104 |
| S2 | ALL AZIMUTHS | 103 | 105 |
| S3 | ALL AZIMUTHS | 104 | 106 |
| S4 | ALL AZIMUTHS | 105 | 107 |
| S5 | ALL AZIMUTHS | 106 | 108 |
| S6 | ALL AZIMUTHS | 107 | 109 |
| S7 | ALL AZIMUTHS | 108 | 110 |
| S8 | ALL AZIMUTHS | 109 | 111 |

TABLE 3 - PROM 109

| AZIMUTH | DEC. ADD | HEX. ADD | DATA | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALL AZIMUTHS UNTIL 109 deg.. | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 109 deg | 1240 | 4D8 | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| ALL AZIMUTHS UNTIL 110... | | | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 110 deg | 1252 | 4E4 | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| ALL AZIMUTHS UNTIL 111... | | | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 111 deg | 1263 | 4EF | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| ALL AZIMUTHS UNTIL 112... | | | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 112 deg | 1274 | 4FA | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| ALL AZIMUTHS UNTIL 113... | | | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 113 deg | 1286 | 506 | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 114... | | | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 114 deg | 1297 | 511 | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 115... | | | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 115 deg | 1308 | 51C | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 116... | | | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 116 deg | 1320 | 528 | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 117... | | | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 117 deg | 1331 | 533 | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 118... | | | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 118 deg | 1343 | 53F | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 360... | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

TABLE 3 - PROM 109 (CONTINUED)

| SWITCH NUMBER | | FROM | TO |
|---|---|---|---|
| S1 | ALL AZIMUTHS | 109 | 111 |
| S2 | ALL AZIMUTHS | 110 | 112 |
| S3 | ALL AZIMUTHS | 111 | 113 |
| S4 | ALL AZIMUTHS | 112 | 114 |
| S5 | ALL AZIMUTHS | 113 | 115 |
| S6 | ALL AZIMUTHS | 114 | 116 |
| S7 | ALL AZIMUTHS | 115 | 117 |
| S8 | ALL AZIMUTHS | 116 | 118 |

TABLE 4 - PROM 116

| AZIMUTH | DEC. ADD | HEX. ADD | DATA | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALL AZIMUTHS UNTIL 116 deg.. | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 116 deg | 1320 | 528 | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| ALL AZIMUTHS UNTIL 117... | | | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 117 deg | 1331 | 533 | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| ALL AZIMUTHS UNTIL 118... | | | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 118 deg | 1343 | 53F | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| ALL AZIMUTHS UNTIL 119... | | | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 119 deg | 1354 | 54A | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| ALL AZIMUTHS UNTIL 120... | | | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 120 deg | 1365 | 555 | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 121... | | | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 121 deg | 1377 | 561 | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 122... | | | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 122 deg | 1388 | 56C | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 123... | | | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 123 deg | 1399 | 577 | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 124... | | | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 124 deg | 1411 | 583 | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 125... | | | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 125 deg | 1422 | 58E | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 360... | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

TABLE 4 - PROM 116 (CONTINUED)

| SWITCH NUMBER | | FROM | TO |
|---|---|---|---|
| S1 | ALL AZIMUTHS | 116 | 118 |
| S2 | ALL AZIMUTHS | 117 | 119 |
| S3 | ALL AZIMUTHS | 118 | 120 |
| S4 | ALL AZIMUTHS | 119 | 121 |
| S5 | ALL AZIMUTHS | 120 | 122 |
| S6 | ALL AZIMUTHS | 121 | 123 |
| S7 | ALL AZIMUTHS | 122 | 124 |
| S8 | ALL AZIMUTHS | 123 | 125 |

TABLE 5 - PROM 123

| AZIMUTH | DEC. ADD | HEX. ADD | DATA | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALL AZIMUTHS UNTIL 123 deg.. | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 123 deg | 1399 | 577 | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| ALL AZIMUTHS UNTIL 124... | | | FE | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 124 deg | 1411 | 583 | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| ALL AZIMUTHS UNTIL 125... | | | FC | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 125 deg | 1422 | 58E | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| ALL AZIMUTHS UNTIL 126... | | | F9 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 |
| 126 deg | 1434 | 59A | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| ALL AZIMUTHS UNTIL 127... | | | F3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 |
| 127 deg | 1445 | 5A5 | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 128... | | | E7 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 128 deg | 1456 | 5B0 | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 129... | | | CF | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 129 deg | 1468 | 5BC | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 130... | | | 9F | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 130 deg | 1479 | 5C7 | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 131... | | | 3F | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 131 deg | 1490 | 5D2 | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 132... | | | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 132 deg | 1502 | 5DE | 7F | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| ALL AZIMUTHS UNTIL 360... | | | FF | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

TABLE 5 - PROM 123 (CONTINUED)

| SWITCH NUMBER | | FROM | TO |
|---|---|---|---|
| S1 | ALL AZIMUTHS | 123 | 125 |
| S2 | ALL AZIMUTHS | 124 | 126 |
| S3 | ALL AZIMUTHS | 125 | 127 |
| S4 | ALL AZIMUTHS | 126 | 128 |
| S5 | ALL AZIMUTHS | 127 | 129 |
| S6 | ALL AZIMUTHS | 128 | 130 |
| S7 | ALL AZIMUTHS | 129 | 131 |
| S8 | ALL AZIMUTHS | 130 | 132 |

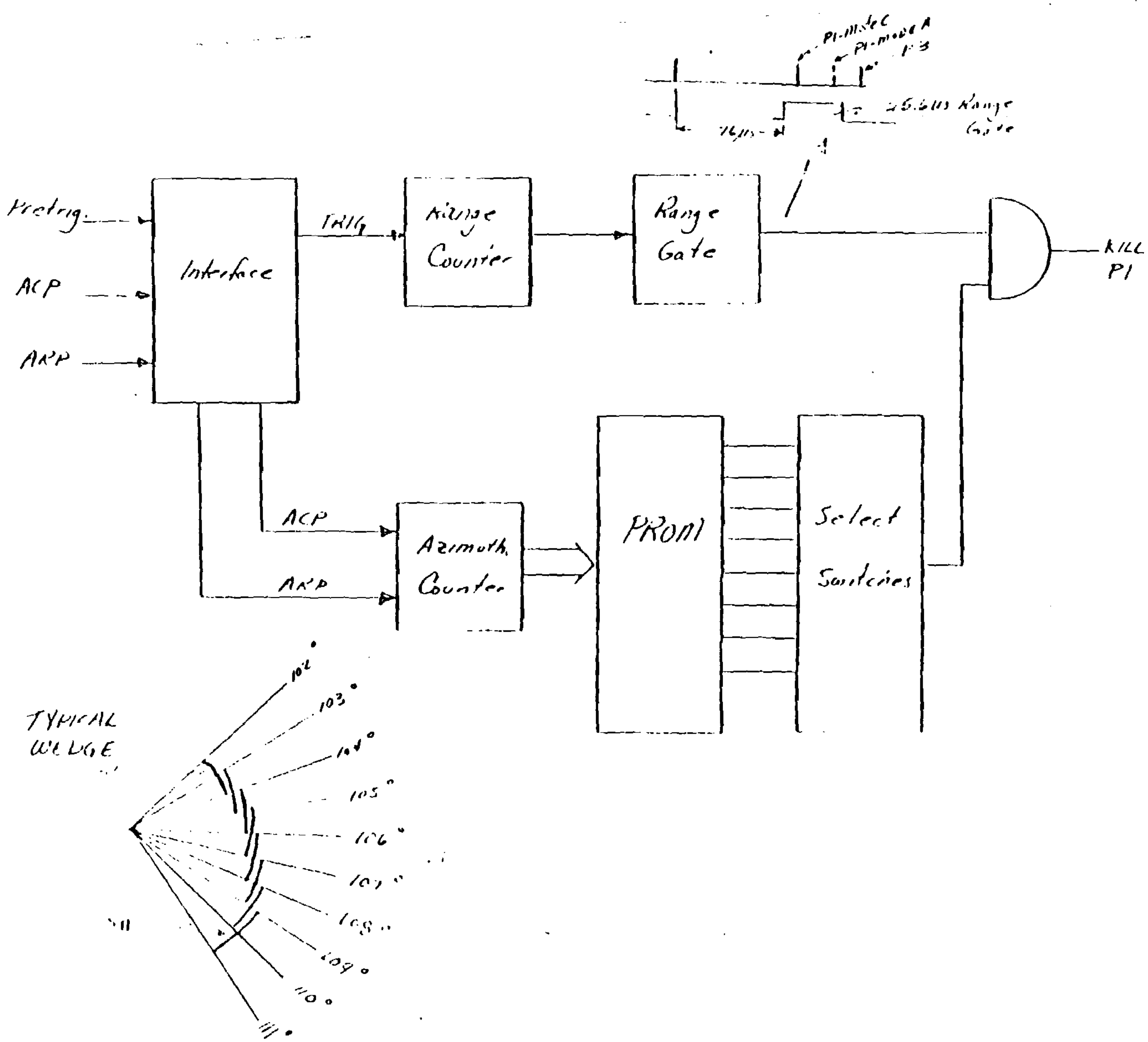
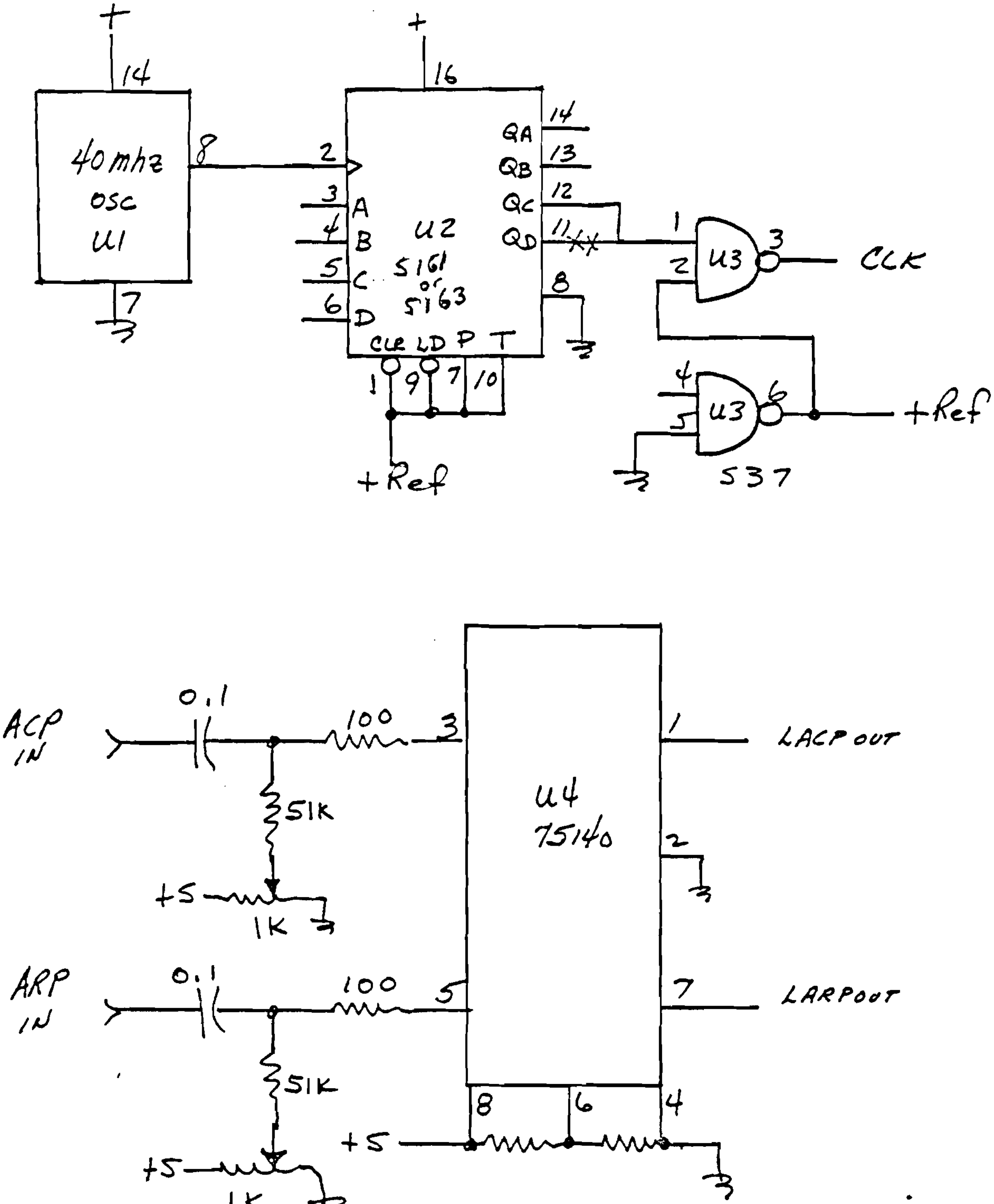



FIGURE 1. BLOCK DIAGRAM FOR ATCRBS BLANKER



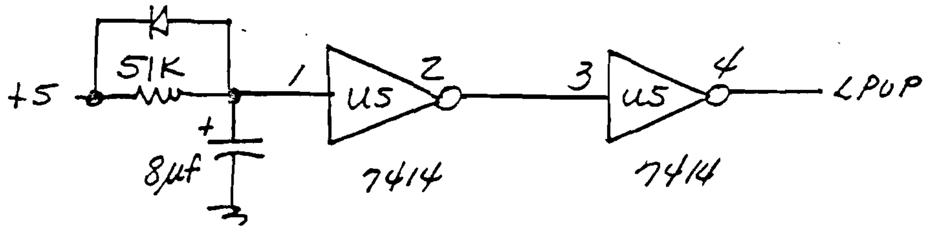


FIGURE 2. ATCRBS BLANKER SCHEMATICS (SHEET 1 of 8)

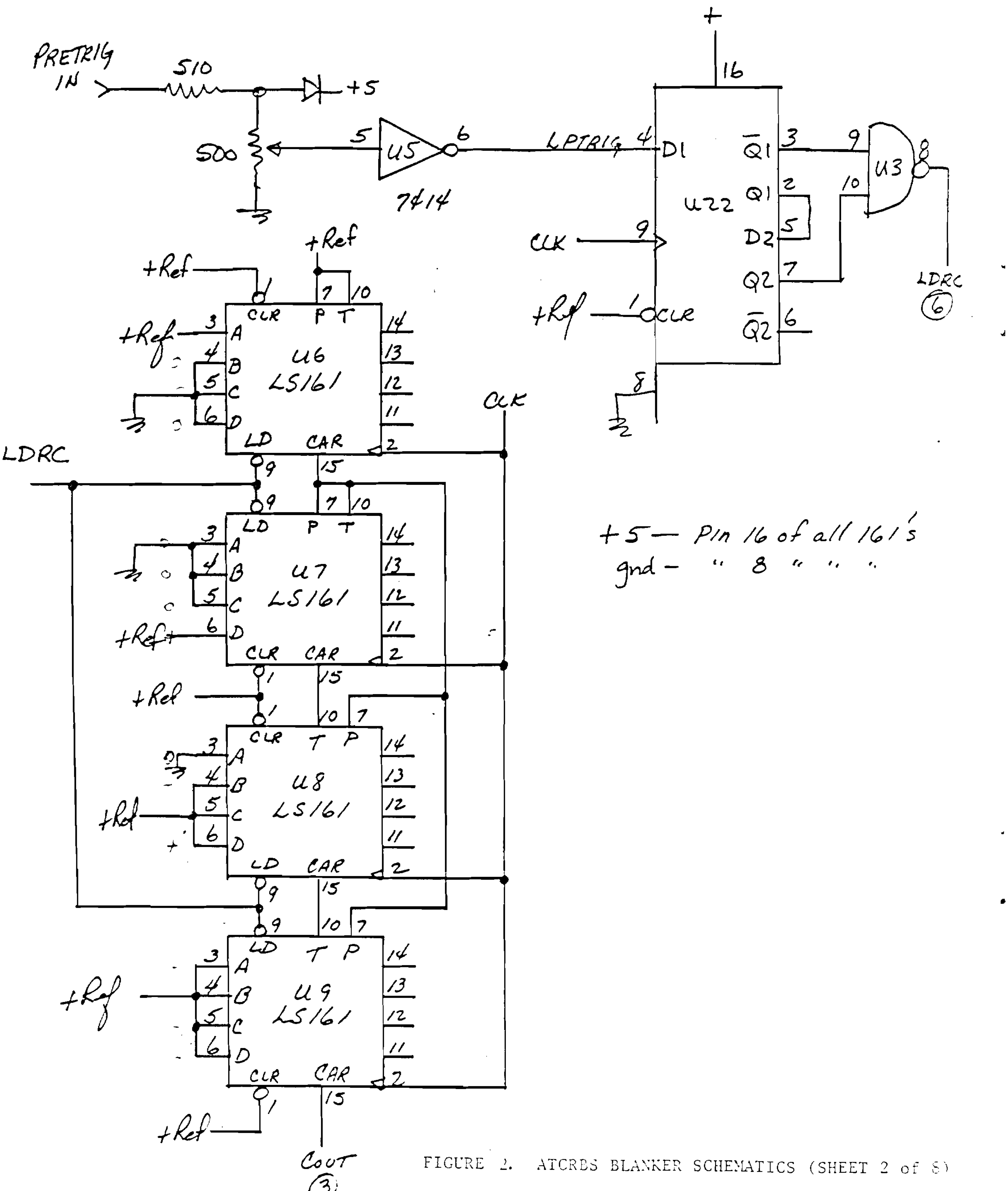



FIGURE 2. ATCRBS BLANKER SCHEMATICS (SHEET 2 of 8)

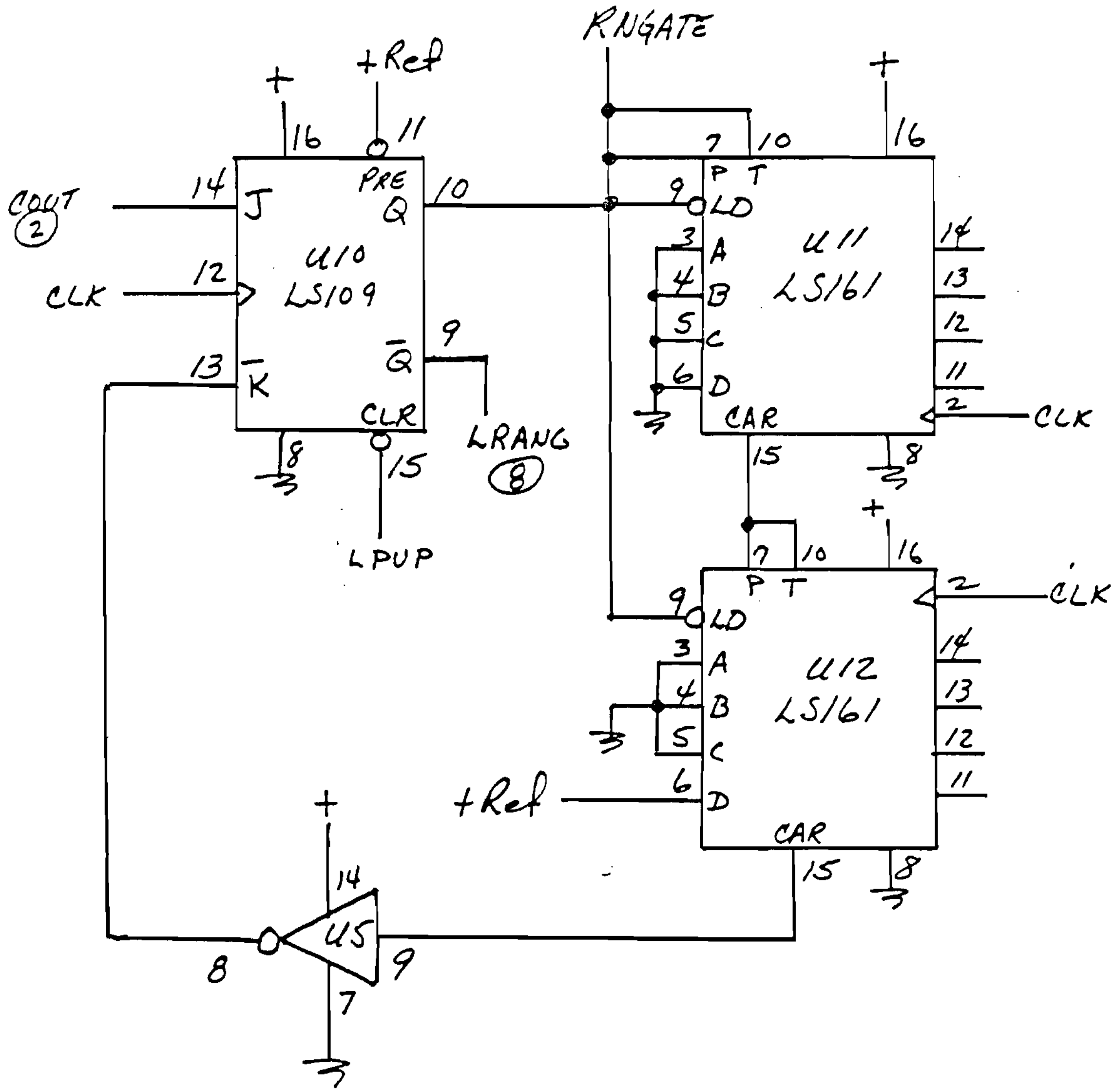



FIGURE 2. ATCRBS BLANKER SCHEMATICS (SHEET 3 of 8)

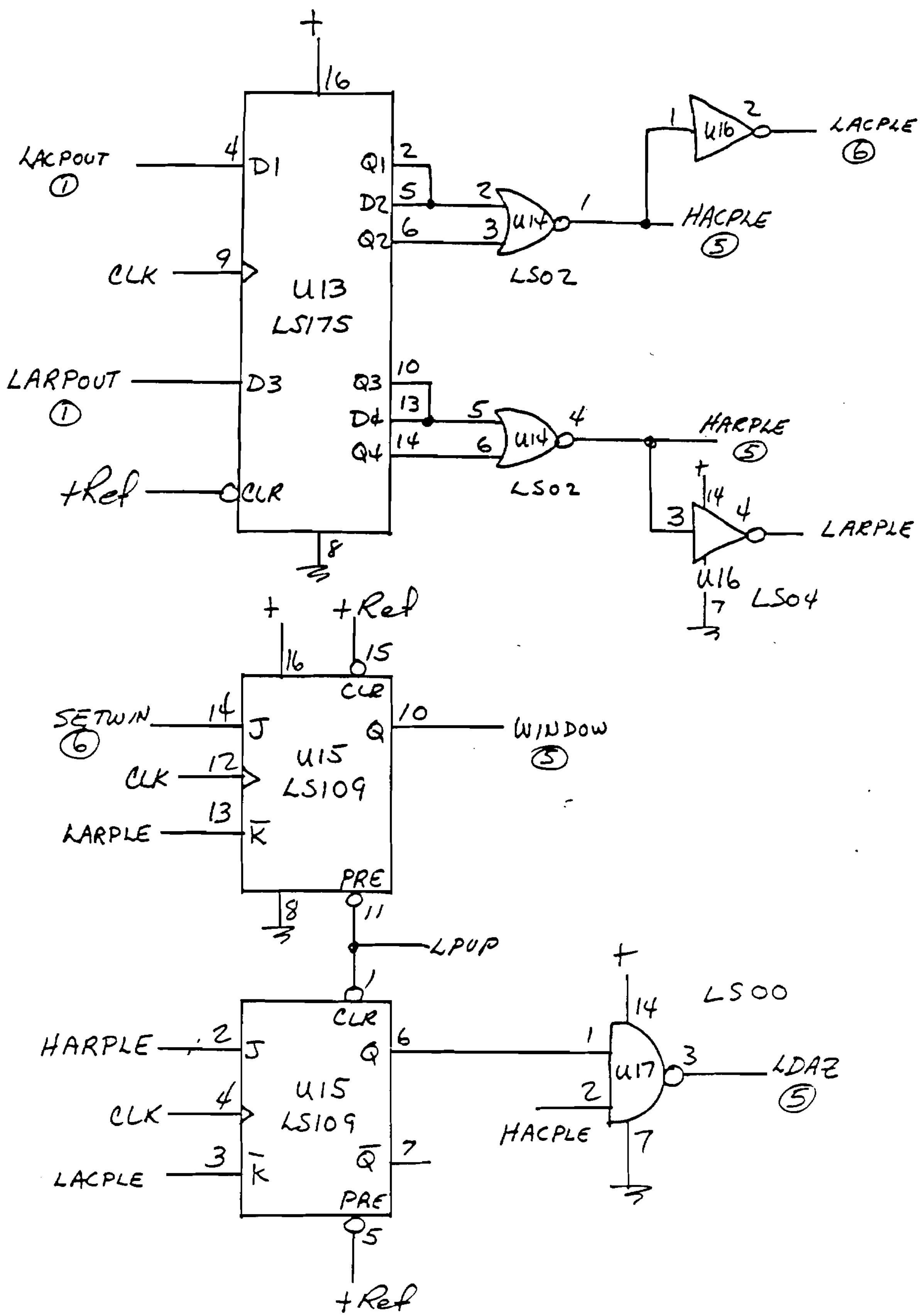



FIGURE 2. ATCRBS BLANKER SCHEMATICS (SHEET 4 of 8)

Pin 16 of all LS161's → +
" 8 " " " → g

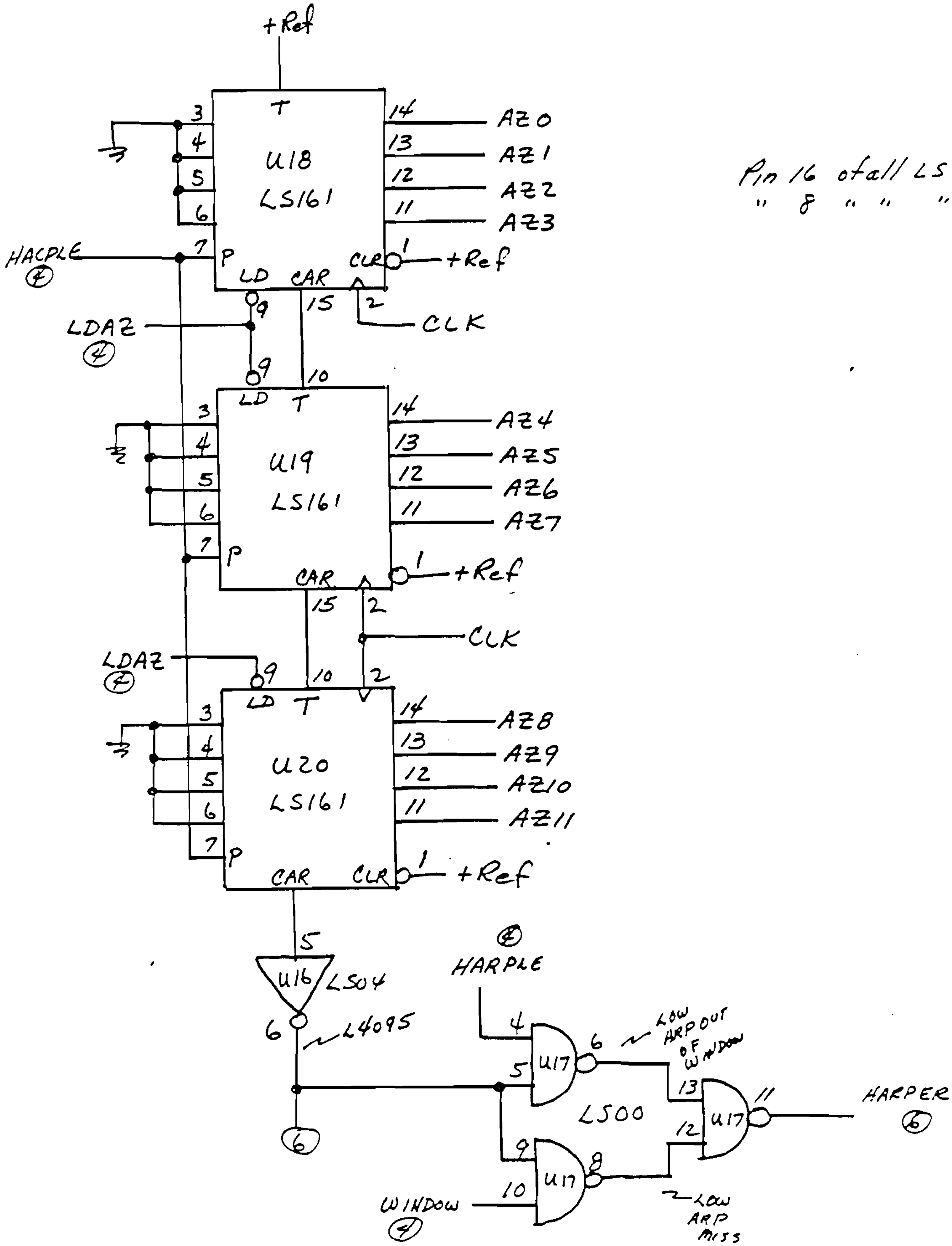



FIGURE 2. ATCRBS BLANKER SCHEMATICS (SHEET 5 of 8)

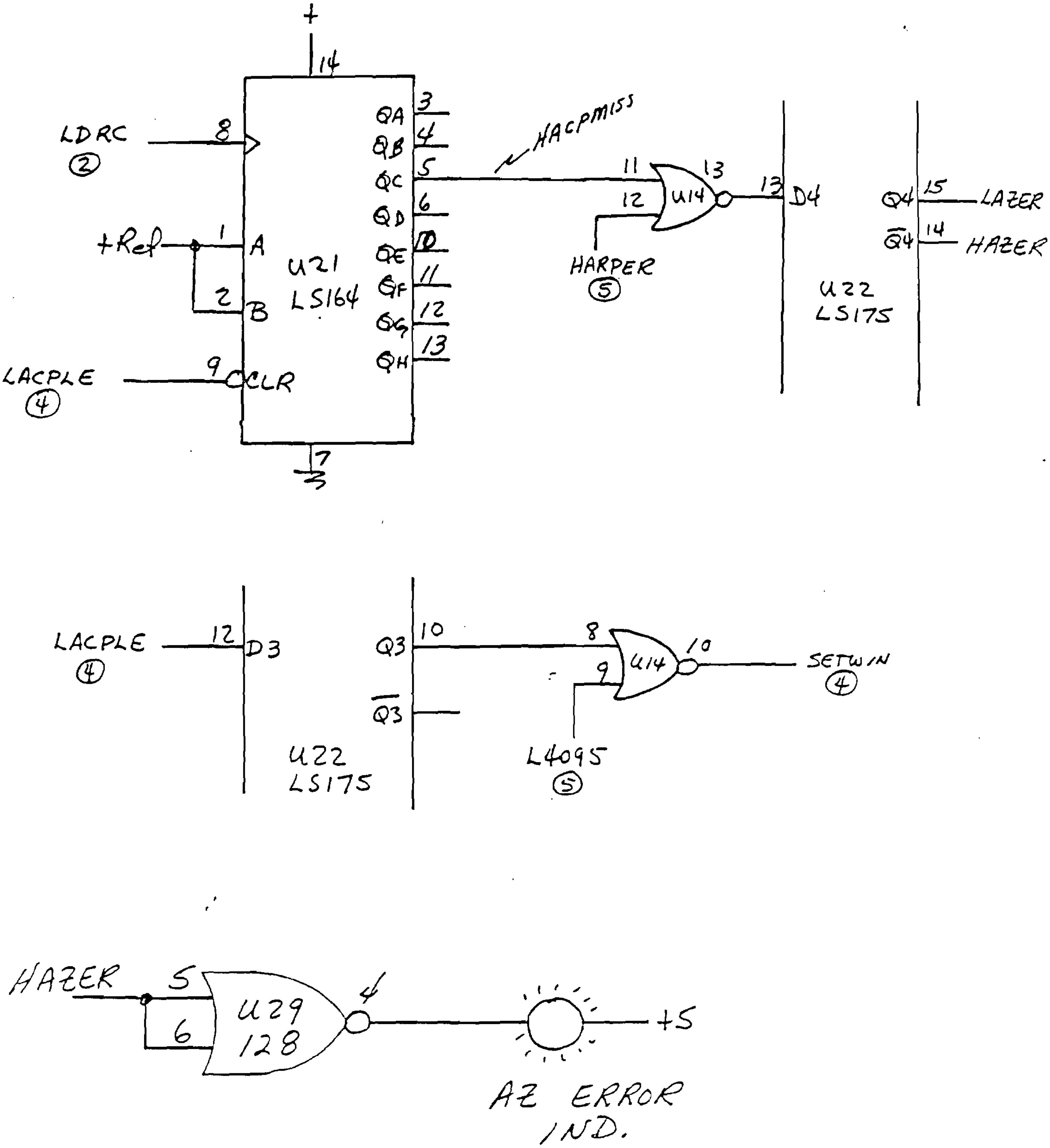



FIGURE 2. ATCRBS BLANKER SCHEMATICS (SHEET 6 of 8)

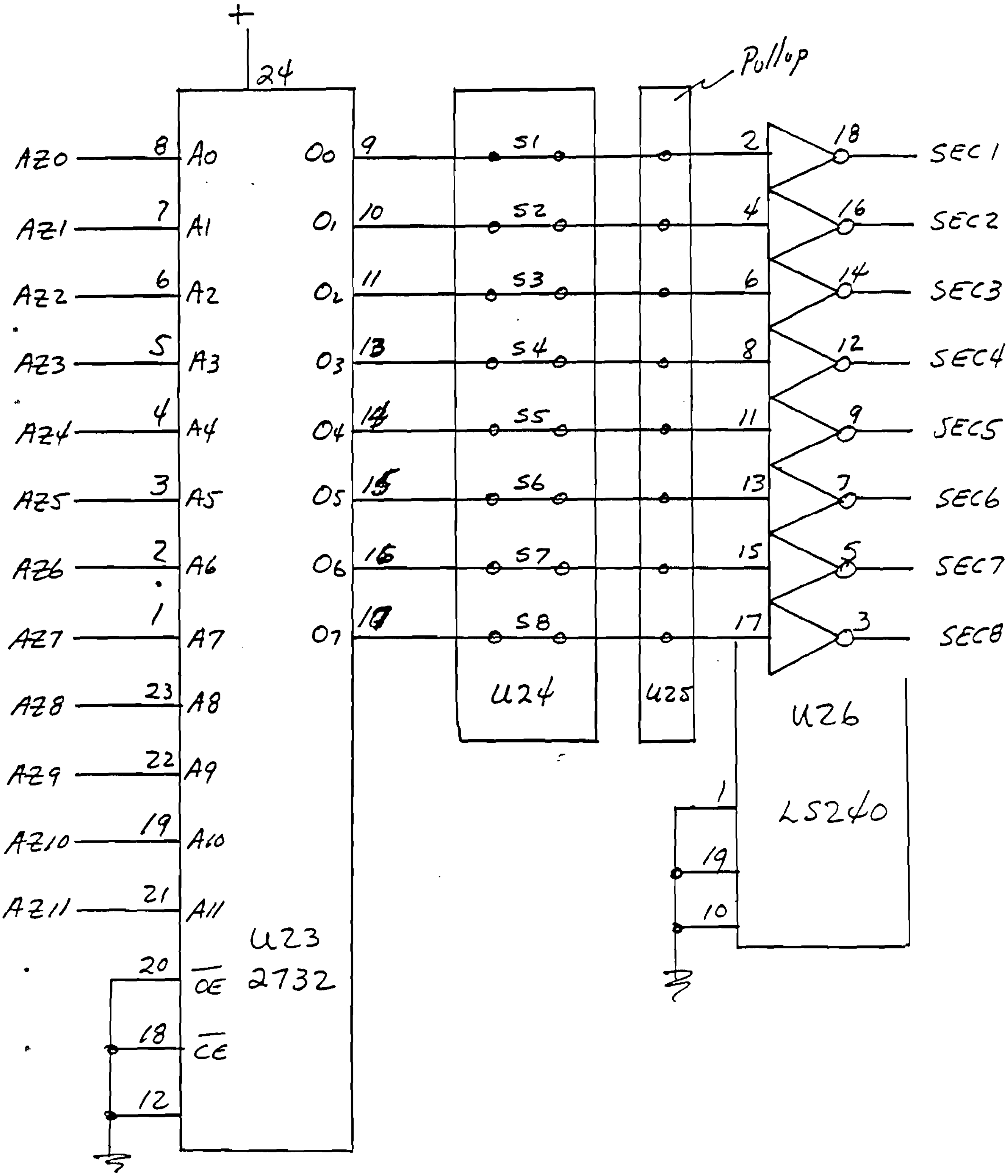



FIGURE 2. ATCRBS BLANKER SCHEMATICS (SHEET 7 of 8)

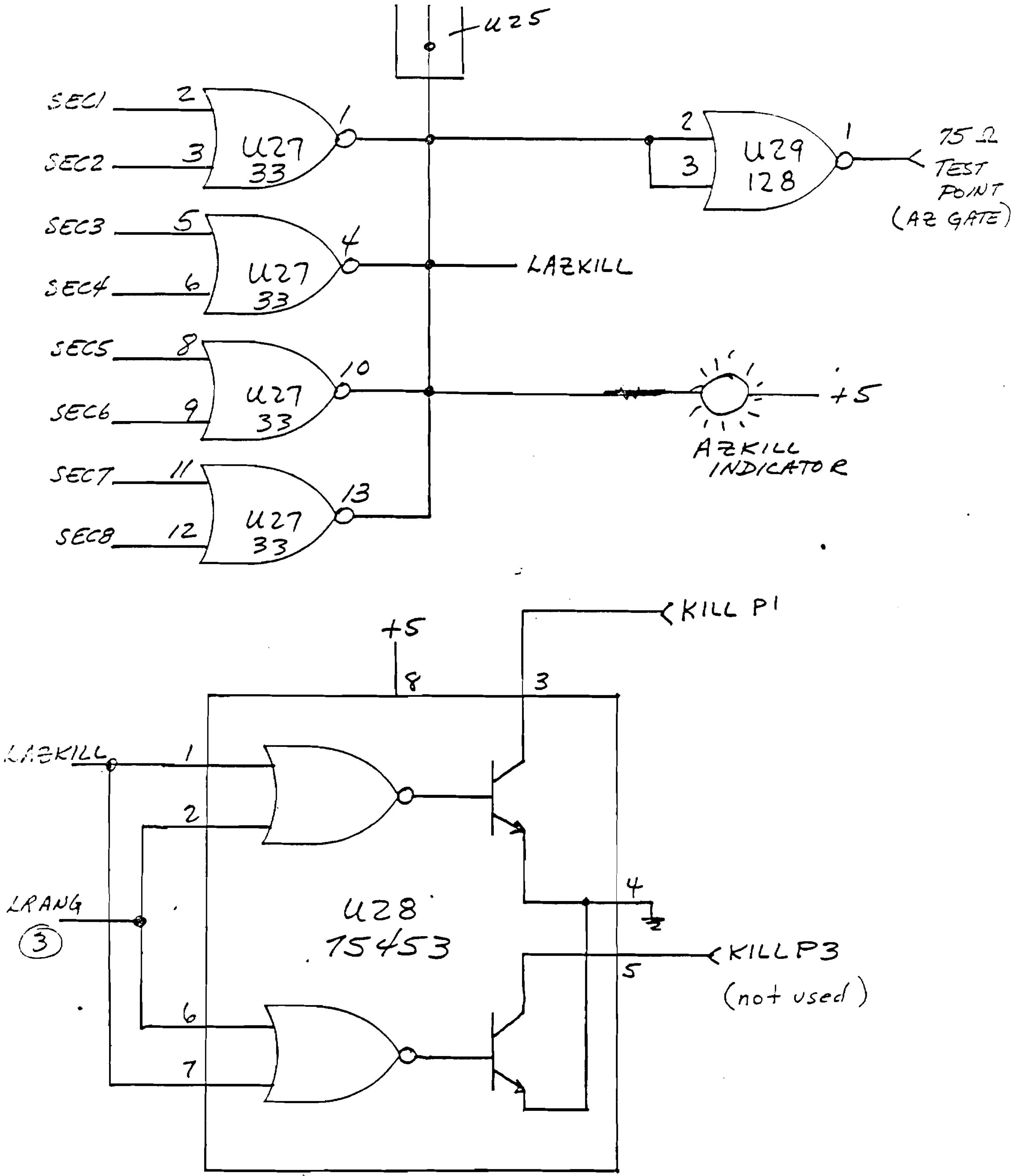



FIGURE 2. ATCRBS BLANKER SCHEMATICS (SHEET 8 of 8)

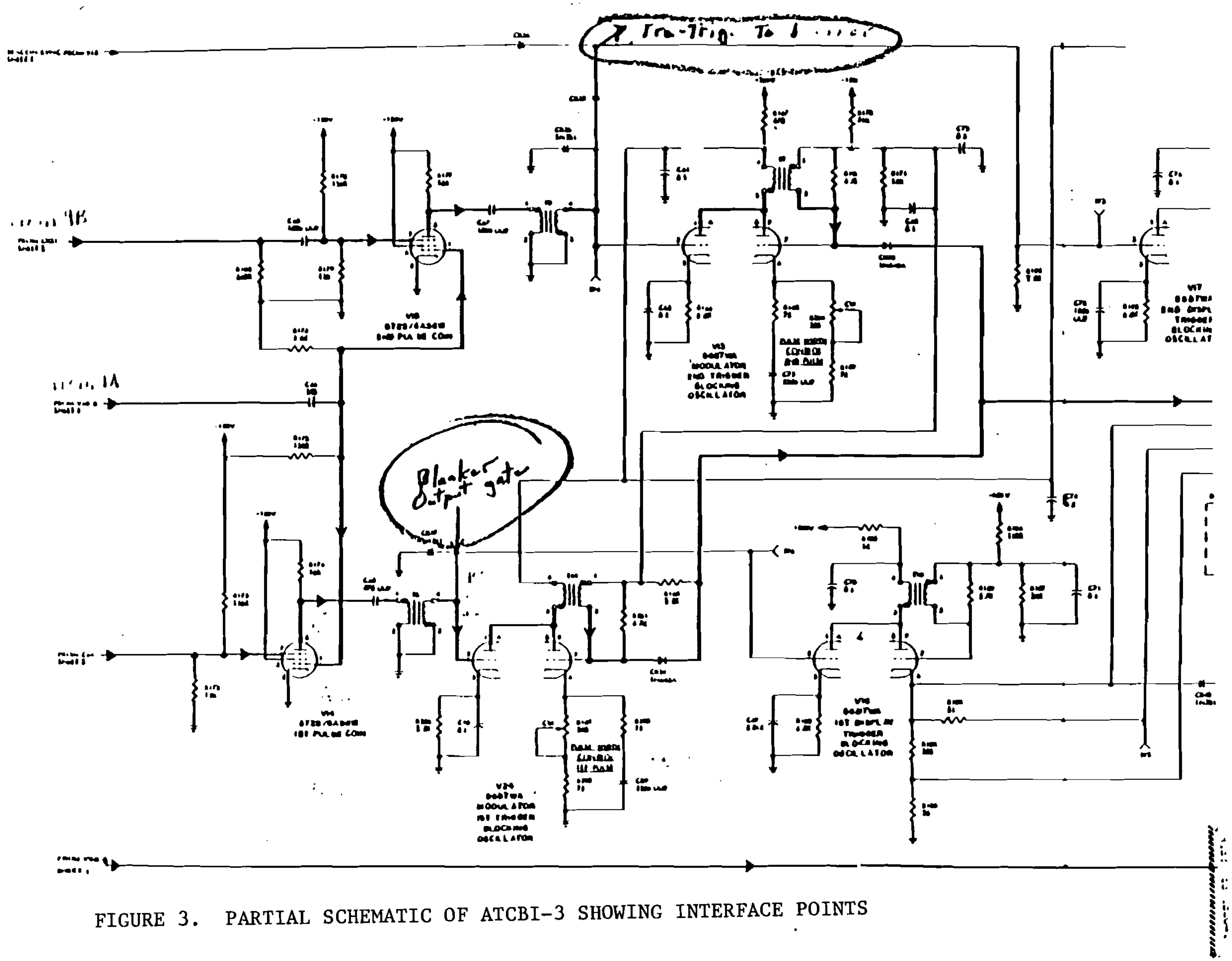



FIGURE 3. PARTIAL SCHEMATIC OF ATCBI-3 SHOWING INTERFACE POINTS

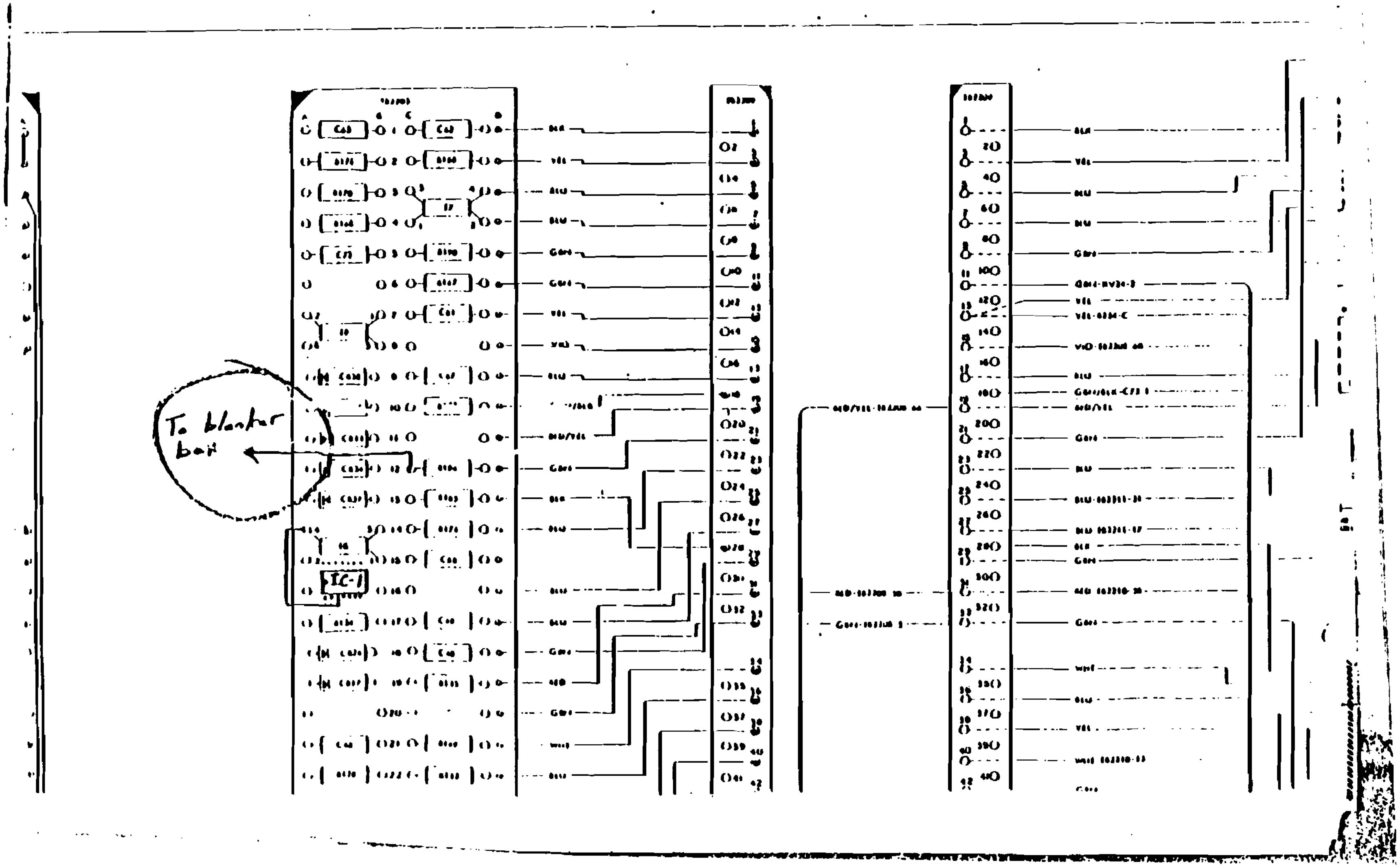



FIGURE 4. ATCBI-3 SCHEMATIC SHOWING PHYSICAL INTERFACE