HEWLETT hp PACKARD

SIGNAL ANALYZER 5480AB WITH 5485A 5486AB,5487A,5488A PLUG-INS
SERVICE VOL. II III & IV
PART NO. 05480-90013 (MANUAL)
APRIL 1971

SERIAL PFX ALL SERIALS
05480-90016 (FICHE)
2 of 8

A2A11 ± 19.5 V REGULATOR (05480-60020)

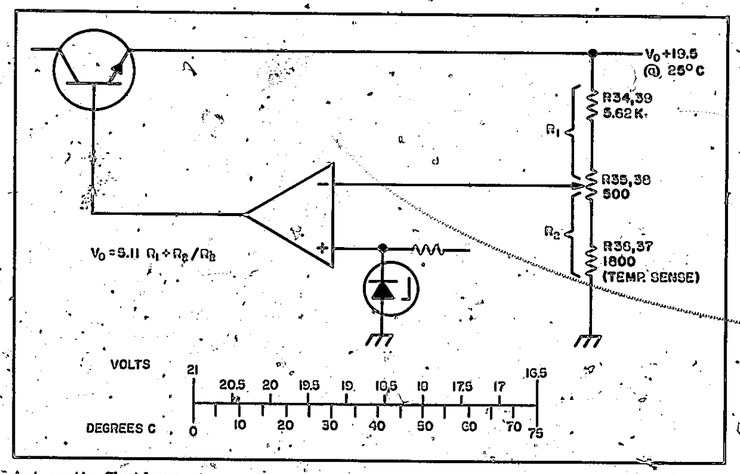
DESCRIPTION

General

This circuit is a temperature-sensitive dual power supply regulator, with nominal room temperature output voltages of plus and minus 19.5 volts. The supplies are short-circuit proof, and automatically shut off when very low line voltages occur.

Temperature Compensation

Resistors R36 and R37 have temperature coefficients of +4400 PPM; as the temperature changes, so do their resistances. The regulator block diagram (below) shows that as the resistance of one of these resistors changes, the voltage of its supply must also change.



Automatic Shutdown

Automatic Shutdown is provided to protect memory contents in case of power failure. Triacs CR16 and CR17 are prevented from firing if either MM1 or MM2 is low. If the Memory Timer (A2A13) is working properly, one or both of these lines will be held low while the memory is operating. Also, if the memory has been READ, the memory supplies must not be shutdown until a WRITE operation has occurred; MM1 and MM2 assure this.

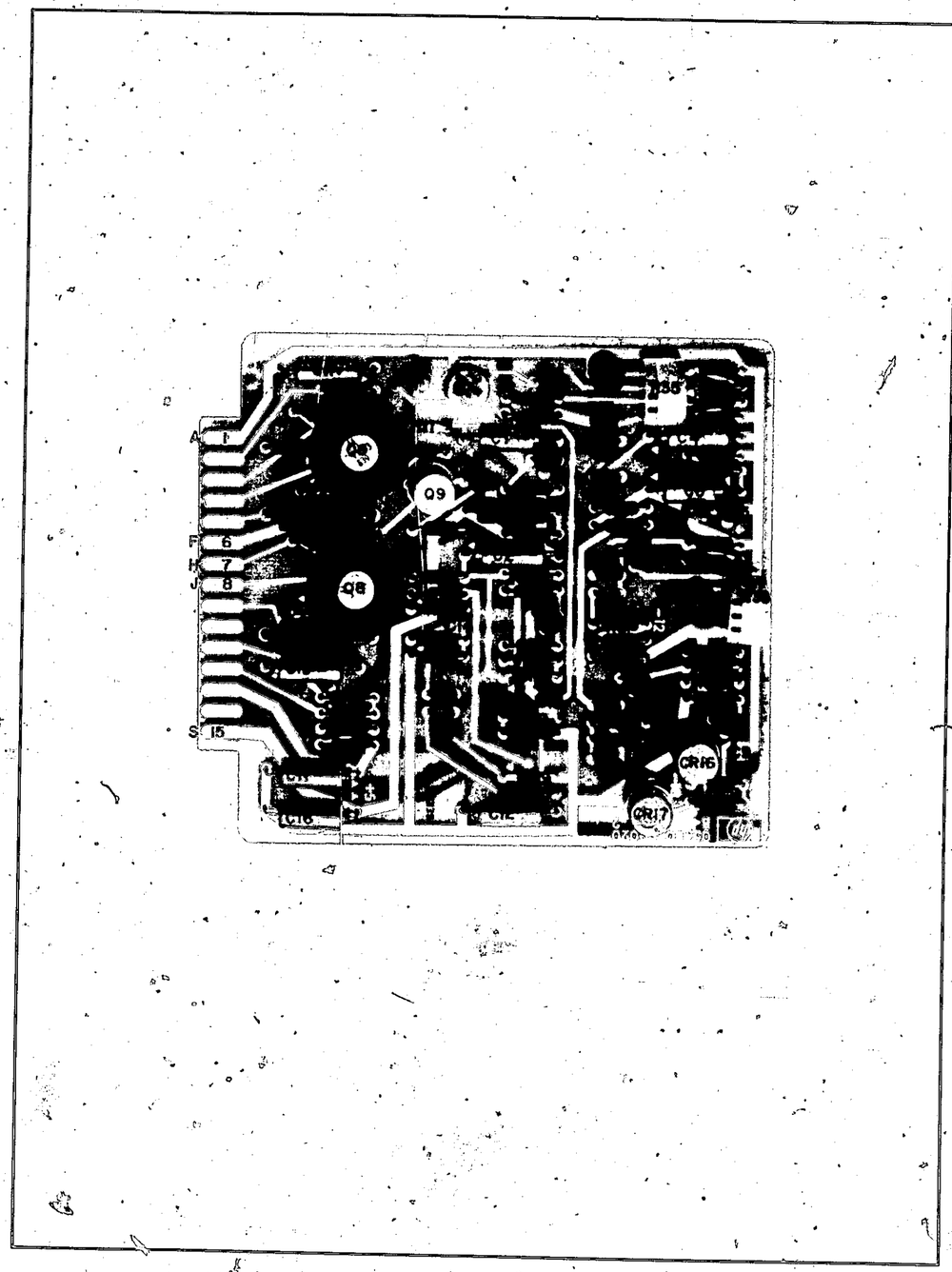
The voltage difference between the two supplies is measured on A4A1, and the front-panel RESET lamp lights if this difference becomes less than 30 volts.

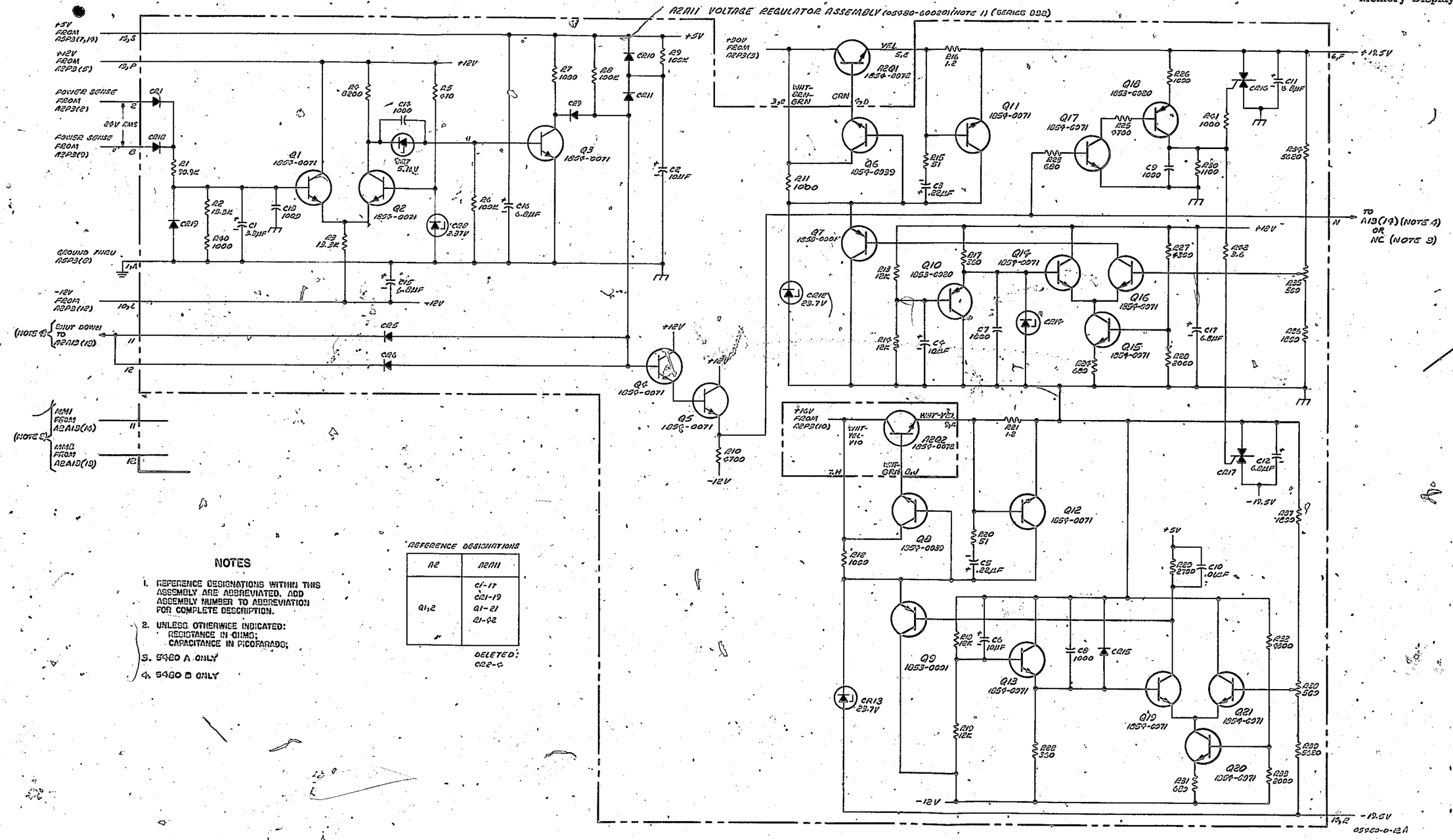
CHANGES FOR OLDER BOARDS

Current Series: 832

Some boards with this series number have a 680 ohm resistor for R113. The 430 ohm value is the preferred replacement, and improves linearity at the high-end of the ramp.

Older Series: None.





NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED:
   RESISTANCE IN OHMS;
   CAPACITANCE IN PICOFARADS;
3. 5480 A ONLY
4. 5480 B ONLY

REFERENCE DESIGNATIONS

A2	A2A11
Q1,2	C1-17 CR1-19 Q1-21 R1-42

DELETED:
C22-25

05480-0-12A

Figure 2-12
A2A11 Voltage Regulator Series 832

A2A12 20 MHz CLOCK (05480-60073, 05480-60021)

DESCRIPTION

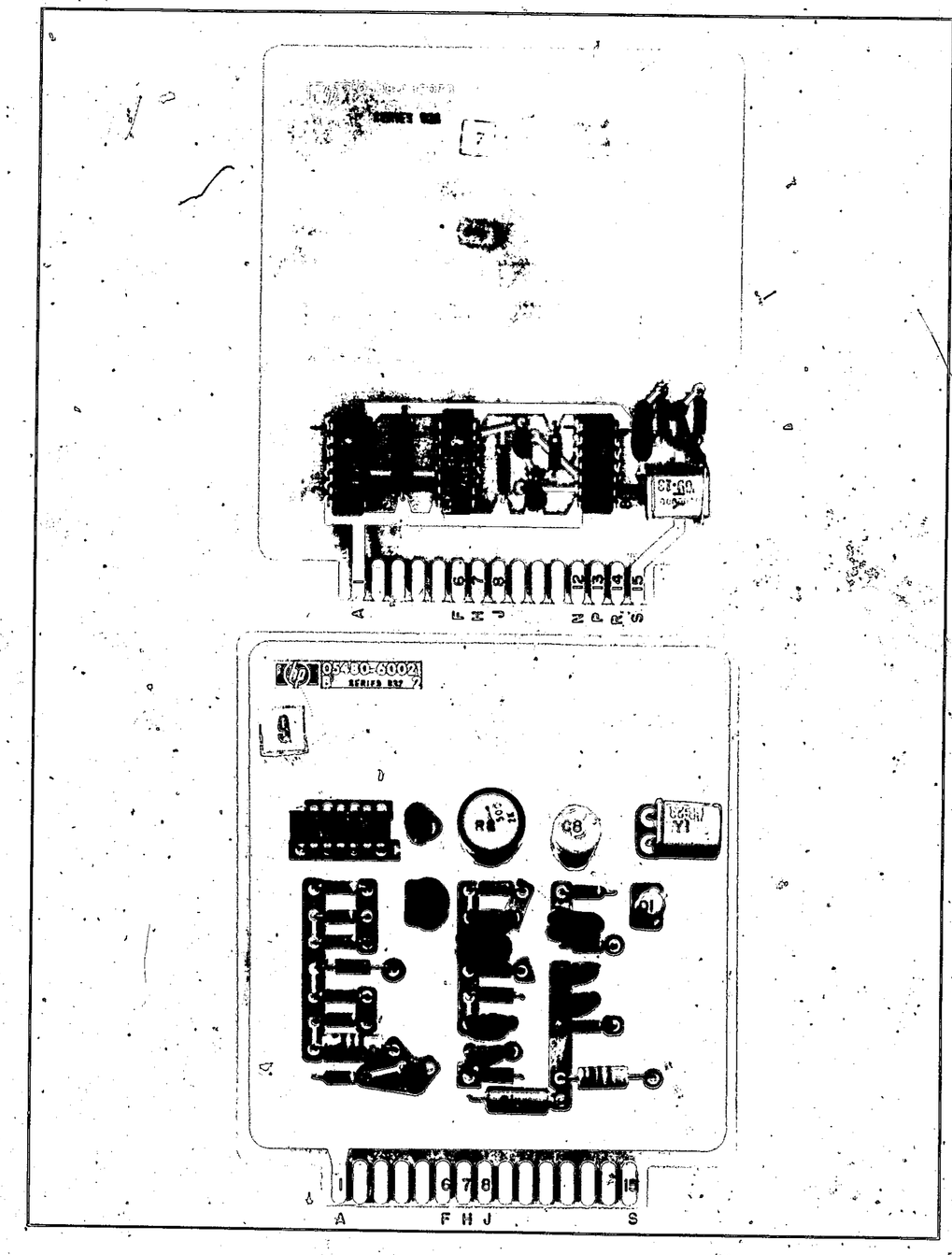
This circuit is a crystal-controlled 20 MHz rectangular wave oscillator. The oscillator output is buffered before it leaves the board.

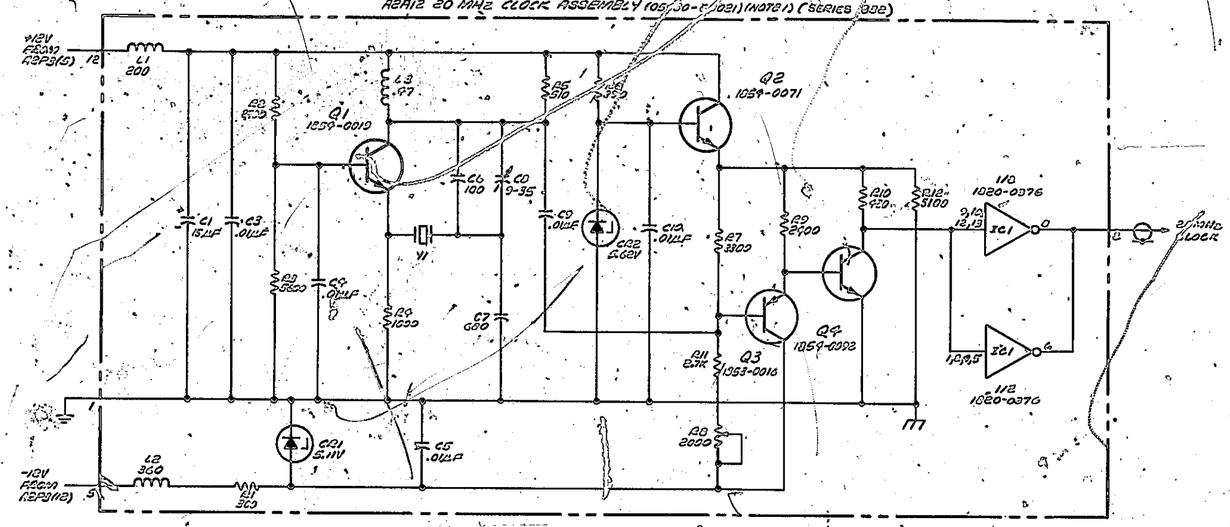
CHANGES FOR OLDER BOARDS

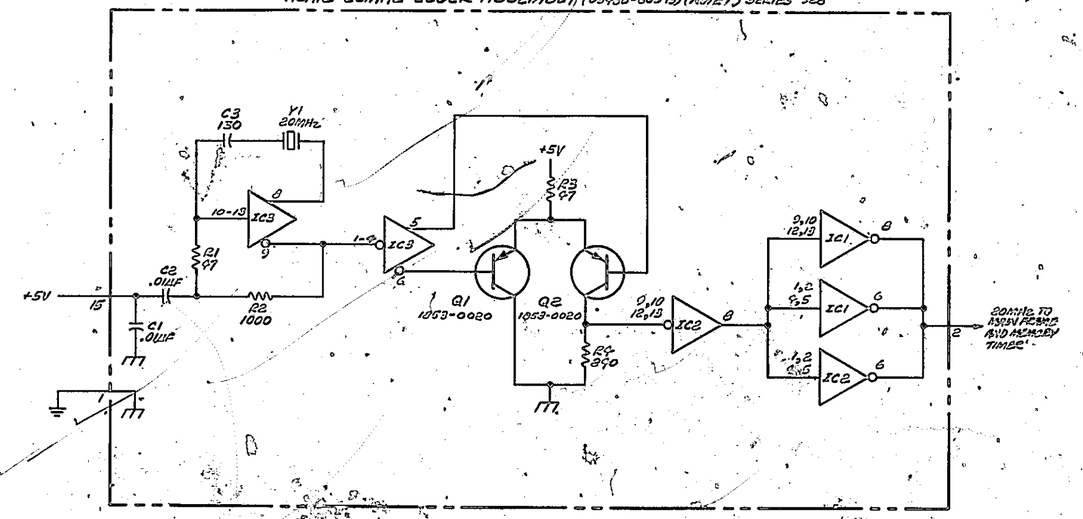
Current Series: 05480-60073, Series 928

Older Boards: 05480-60021, Series 832

The current board can be used as a direct replacement for the older board in 5480A's having serial number 852-00161 or higher. When the current board is used to replace the older board in 5480A's having serial number 852-00161 and lower, a short jumper wire must be added between A2A11(15) and A2A12(15) to provide +5 V to the board.







NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED:
   RESISTANCE IN OHMS;
   CAPACITANCE IN PICOFARADS;
   INDUCTANCE IN MICROHENRIES

REFERENCE DESIGNATIONS

A2A12	A2A12 (SERIES 928)
C1-10	C1-3
CR1,2	
IC1	IC1-3
L1-3	
Q1-2	Q1,2
R1-12	R1-4
Y1	Y1

05930-0-19

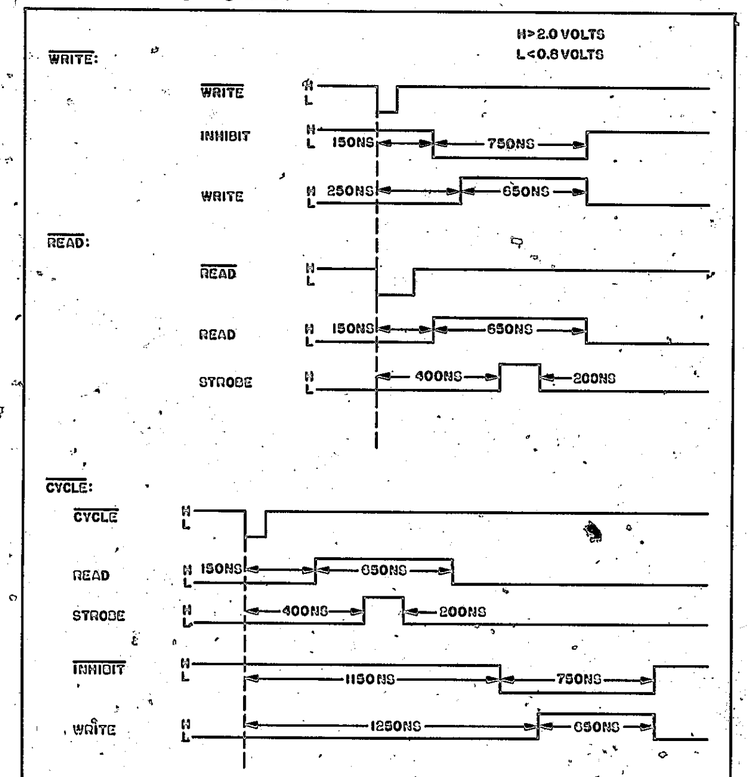
DELETED: C2

Figure 2-13
A2A12 20 MHz Clock Series 928, 832

A2A13 MEMORY TIMER (05480-60011)

DESCRIPTION

The Memory Timer provides the correct timing for operation of the magnetic core memory. The timing reference for the board is the 20 MHz clock input. There are six control inputs to the board, two each (WRITE, READ, and CYCLE). The six inputs control four outputs (WRITE, INHIBIT, READ, and STROBE) as shown in the timing diagrams.



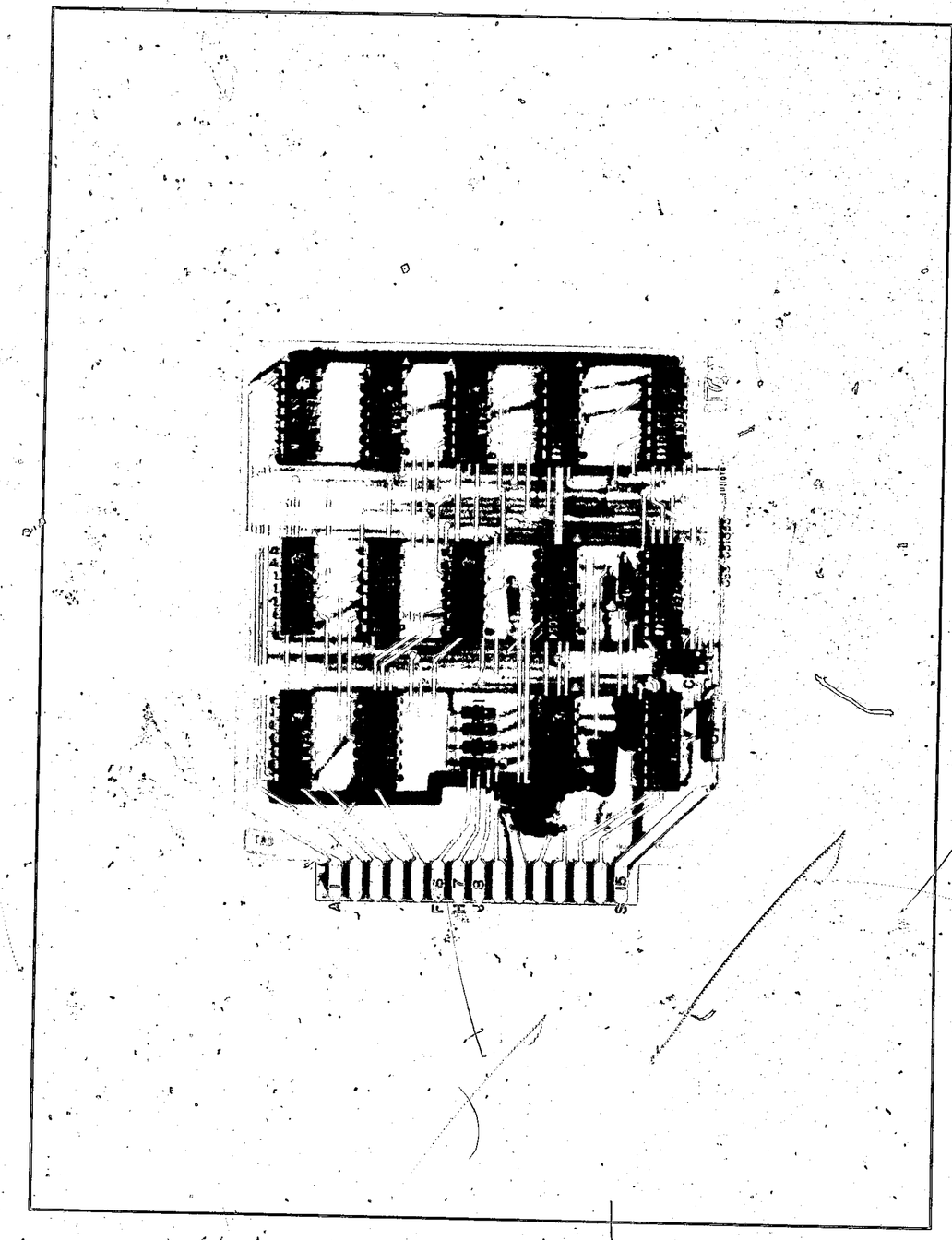
There are two additional outputs ($\overline{Q10}$ and $\overline{Q1}$). Both of which will be high at the completion of a READ or a WRITE operation. These two outputs go to A2A11, the Memory Supply and allow it to shutdown only at the completion of a READ or a WRITE operation.

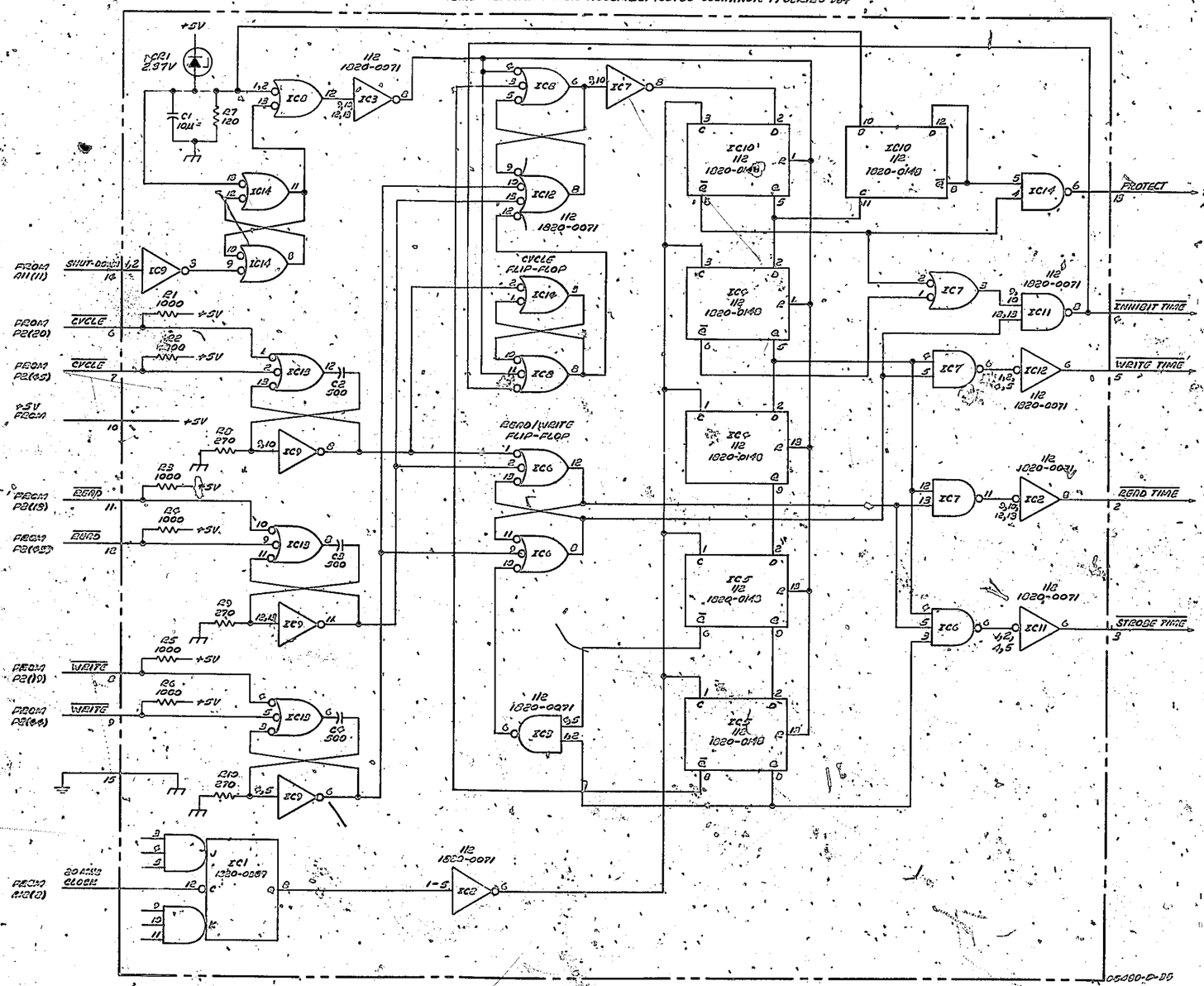
CHANGES FOR OLDER BOARDS

Current Series: 964

Older Series: 852, 832

1. The current board is a direct replacement for the older board.
2. The schematic diagrams for the older boards are provided in Figures 2-15 and 2-16.
3. Reference designations for the current board do not necessarily apply to the Series 832 board. Parts usage differences between the current board and the older boards are shown in schematics.





NOTES

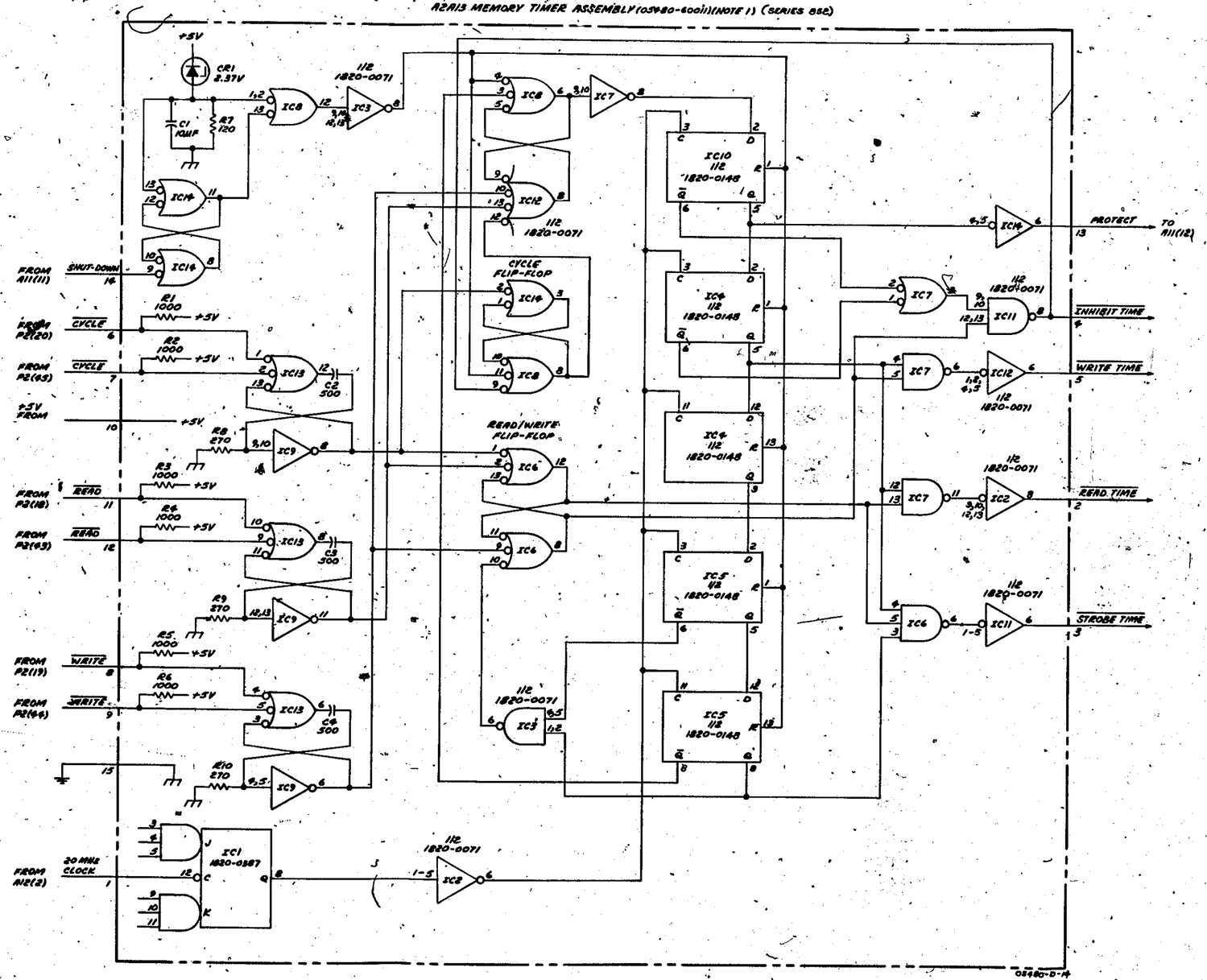
1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS; CAPACITANCE IN PICOFARADS.

REFERENCE DESIGNATIONS

A2A13
C1 - 4
C21
IC1 - 12
R1 - 10

Figure 2-14
A2A13 Memory Timer Series 964

See Figure 2-14 for board description.



NOTES

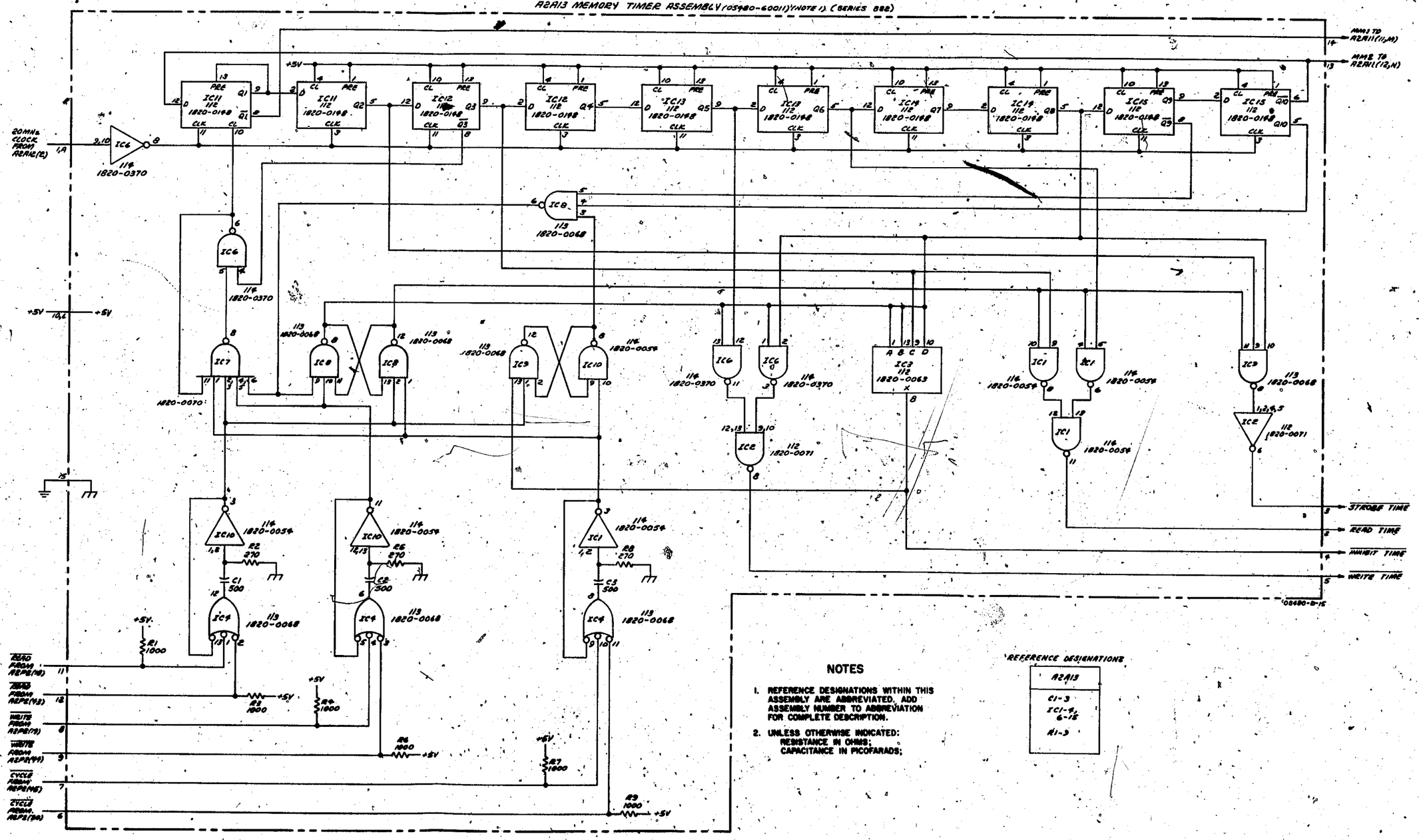
1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED:
   RESISTANCE IN OHMS;
   CAPACITANCE IN PICOFARADS;

REFERENCE DESIGNATIONS

A2A13
C1-4 CR1 IC1-14 R1-10

Figure 2-15
A2A13 Memory Timer Series 852

See Figure 2-14 for board description.



NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS; CAPACITANCE IN PICOFARADS;

REFERENCE DESIGNATIONS

A2A13
C1-3
IC1-9, 11-15
R1-9

Figure 2-16
A2A13 Memory Timer Series 832

A2A14 MEMORY LOGIC ASSEMBLY (05480-60022)

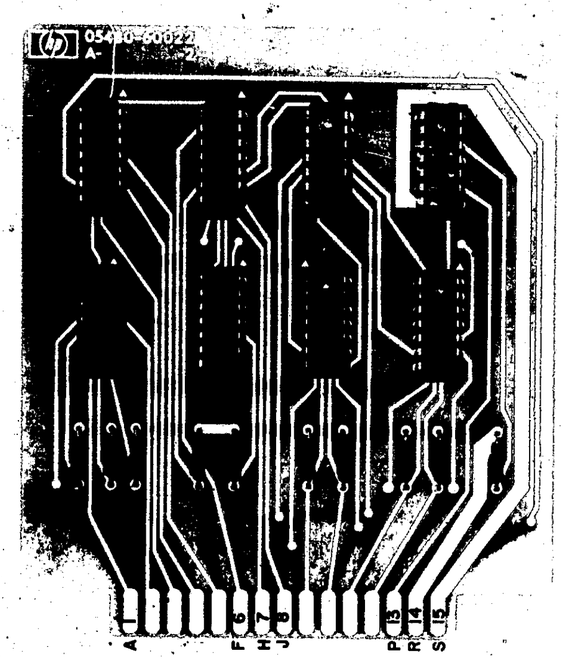
DESCRIPTION

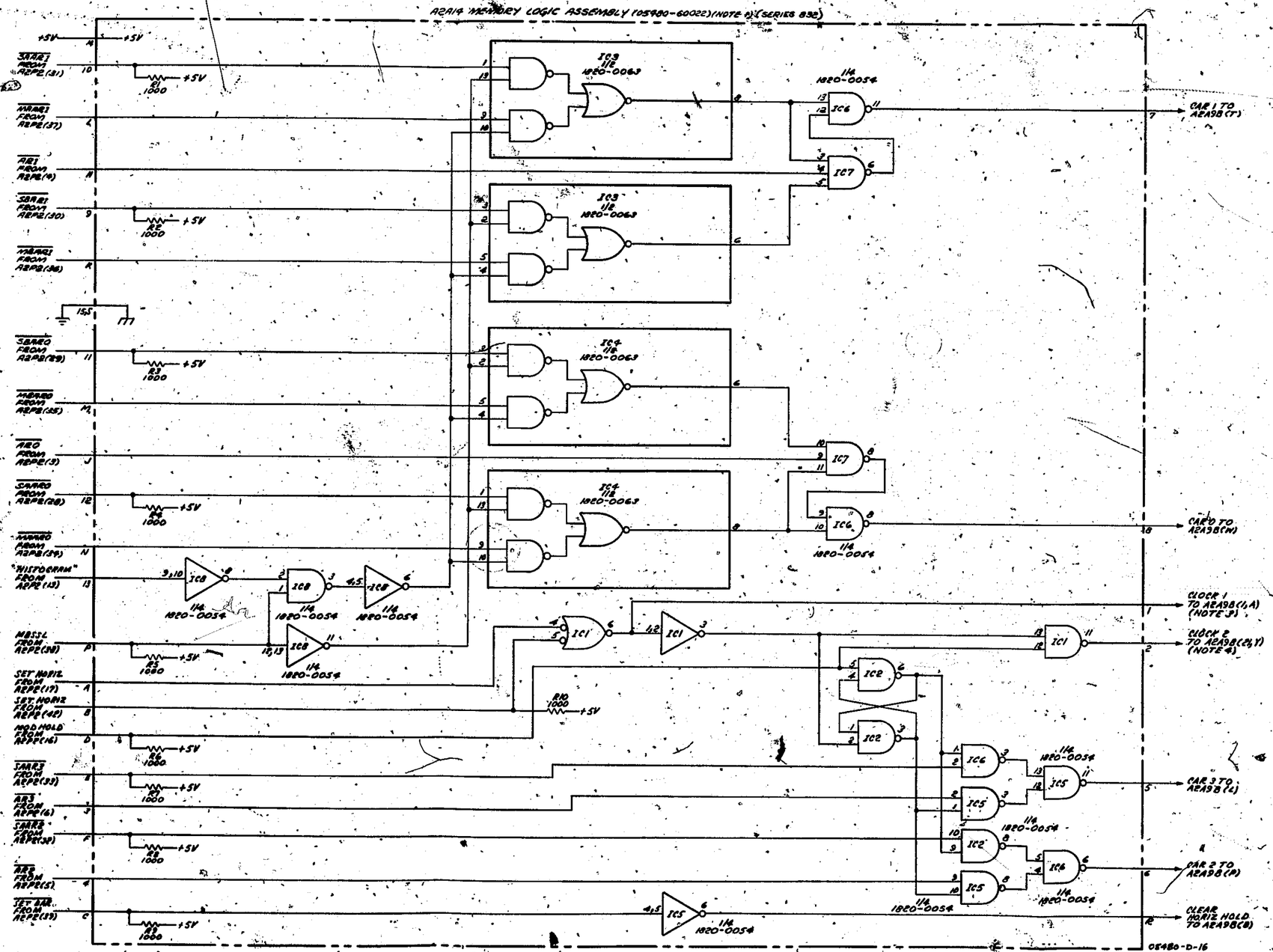
The 05480-60022 operates as a control on the four least-significant bits of the Memory Address Register (bits AR0-3). Histogram quarters and halves are selected by altering the two least-significant bits (AR0, 1). Twelve locations of temporary storage are accessed from this board by setting the memory address register to all ones ("1's") and then modifying the four least-significant bits (AR0-3).

CHANGES FOR OLDER BOARDS

Current Series: 832

Older Series: None.





NOTES

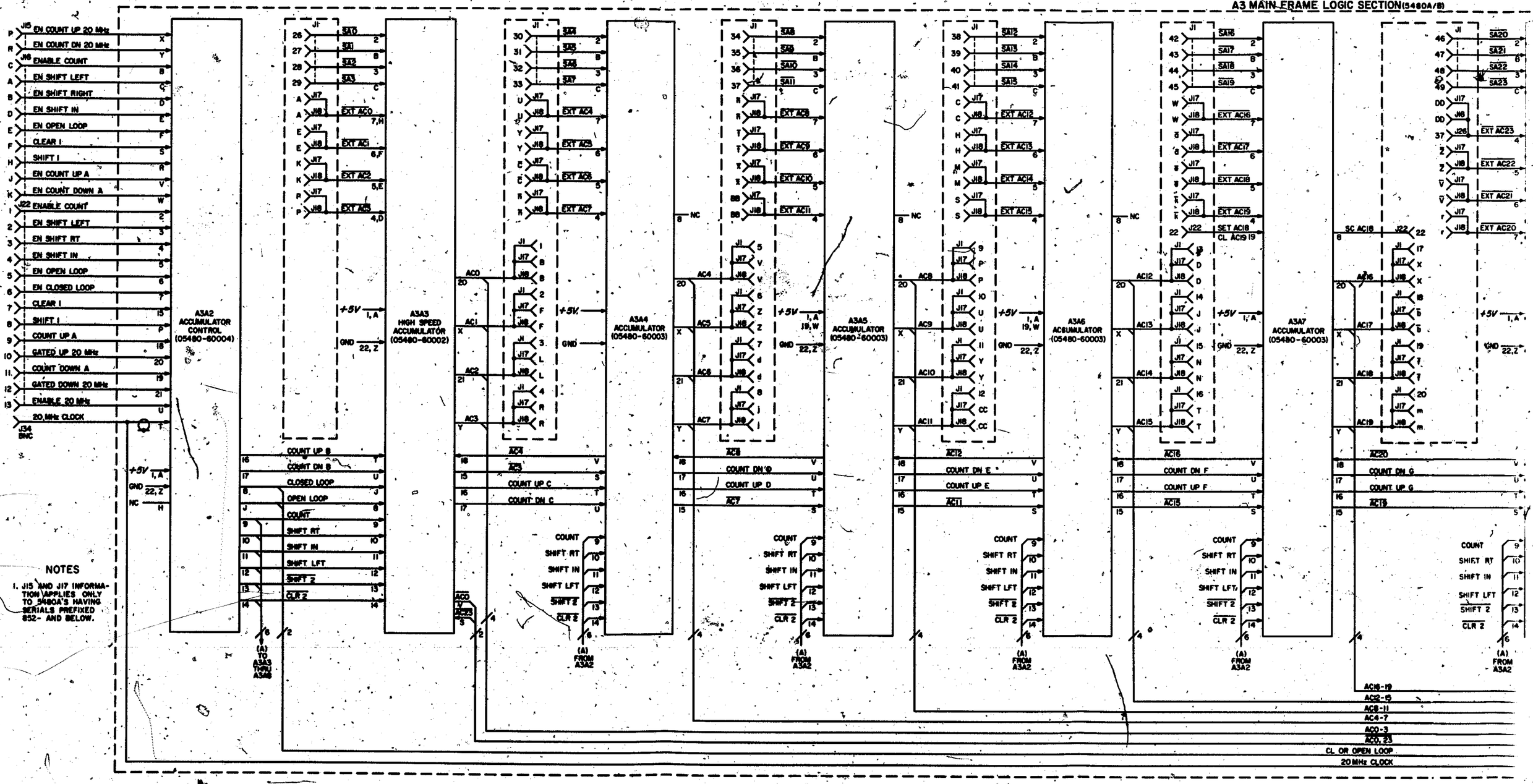
1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS.
3. CLOCK 1 ACTIVE DURING AR BITS 4-9
4. CLOCK 2 ACTIVE DURING AR BITS 0-3

REFERENCE DESIGNATIONS
A2A14
IC1-8
R1-10

Figure 2-17
A2A14 Memory Logic Series 832

A3 MAIN FRAME LOGIC

Main Frame Logic Section (A3) is located at the lower left-hand rear corner of the 5480A/B. Board assemblies are numbered, in order, from the rear to the front of the instrument; there is a vacant (spare) board location between A1 and A2.



NOTES

1. J15 AND J17 INFORMATION APPLIES ONLY TO 5480A'S HAVING SERIALS PREFIXED 852- AND BELOW.

LOGIC SECTION (5480A/B)

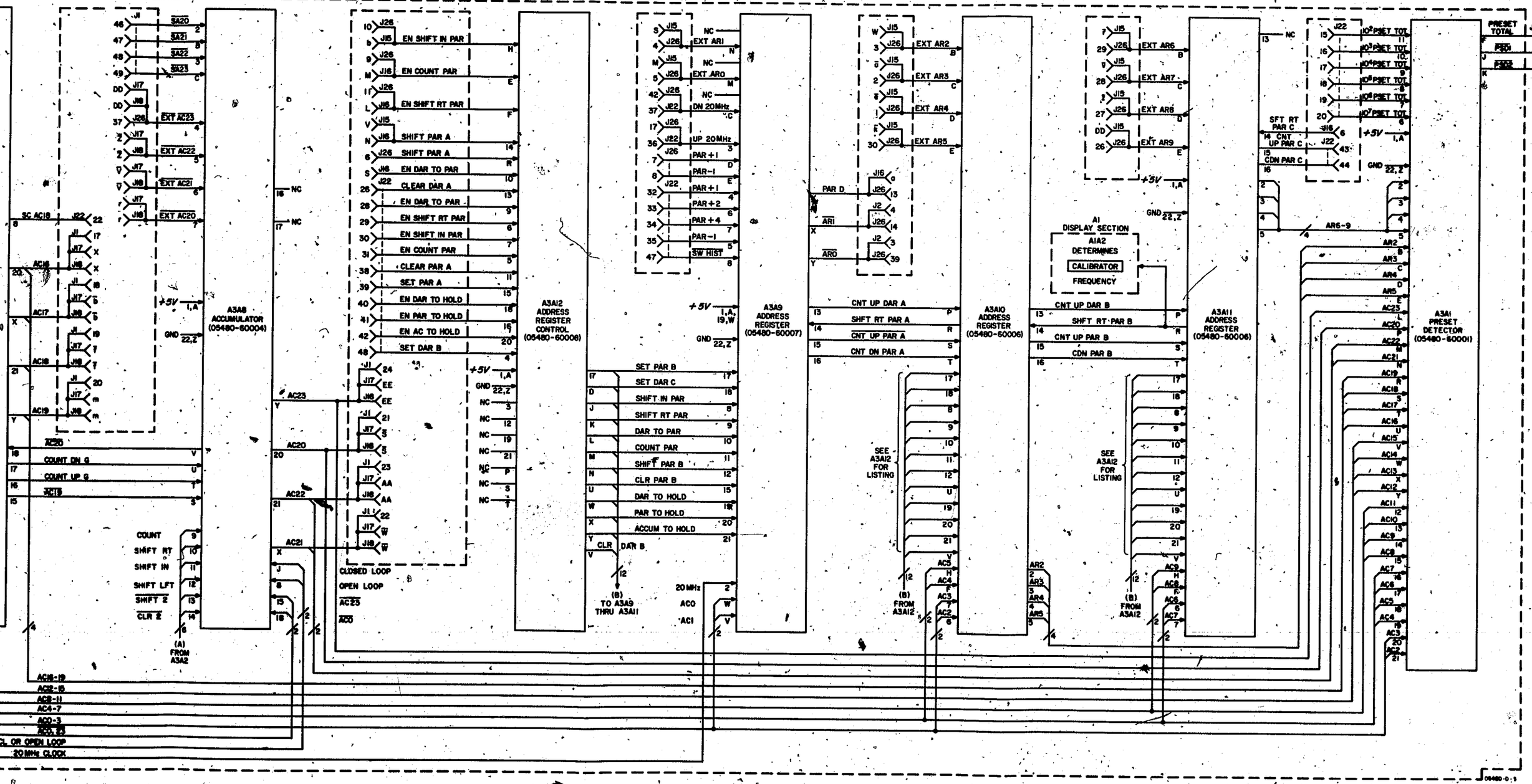


Figure 2-18
A3 Main Frame Logic Wiring Diagram

A3A1 PRESET DETECTOR (05480-60001)

DESCRIPTION

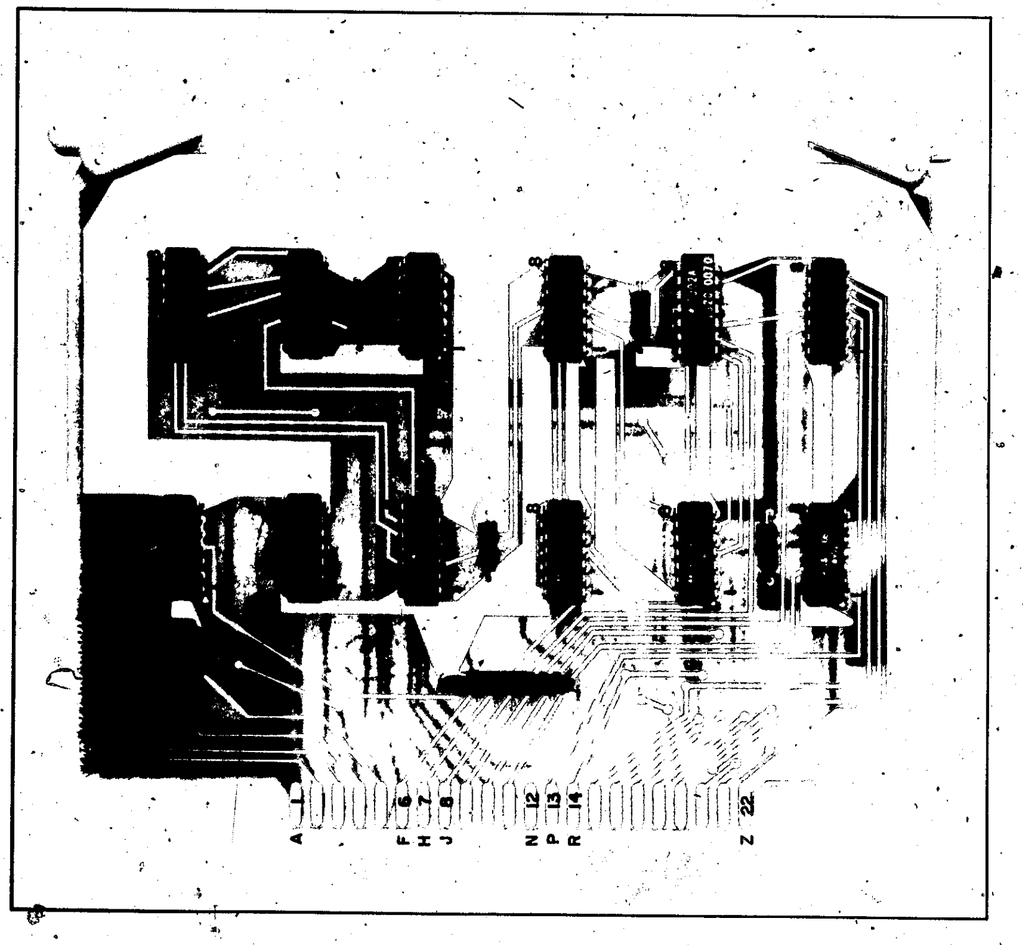
The Preset Detector indicates when the contents of an addressed memory location are 100, 1000, 10^4, 10^5, 10^6, or 10^7; this information is used during histogramming functions to stop processing after a specified number of counts have been accumulated in any memory location. The Preset Detector also indicates when the Address Register contains an address between 1000 and 1019, or between 1020 and 1023.

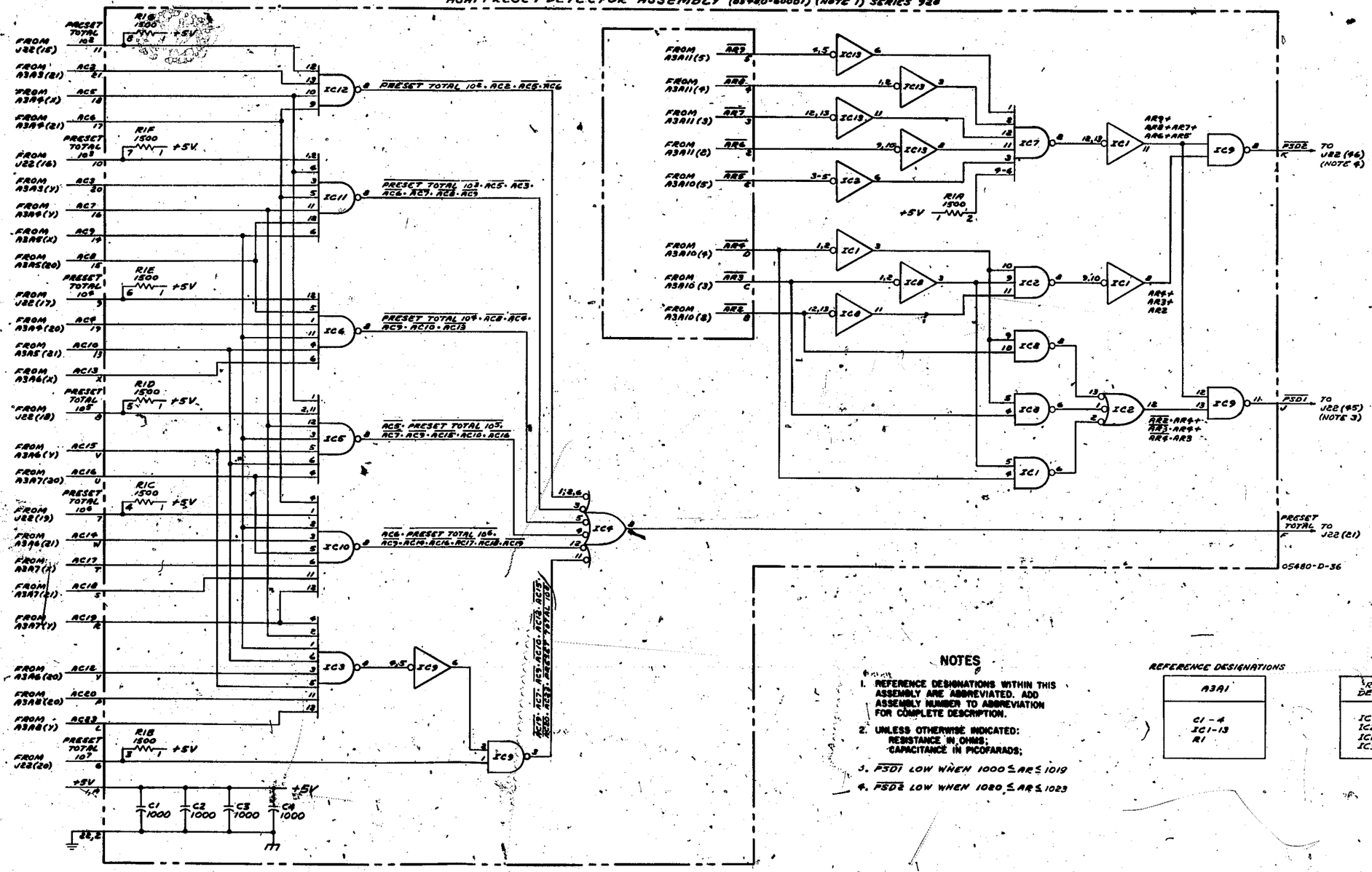
CHANGES FOR OLDER INSTRUMENTS

Current Series: 928

Older Series: 832 (see Figure 2-20)

The current board is a direct replacement for the older board.





NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS; CAPACITANCE IN PICOFARADS;
3. $\overline{PSD1}$ LOW WHEN $1000 \leq AR \leq 1019$
4. $\overline{PSD2}$ LOW WHEN $1020 \leq AR \leq 1023$

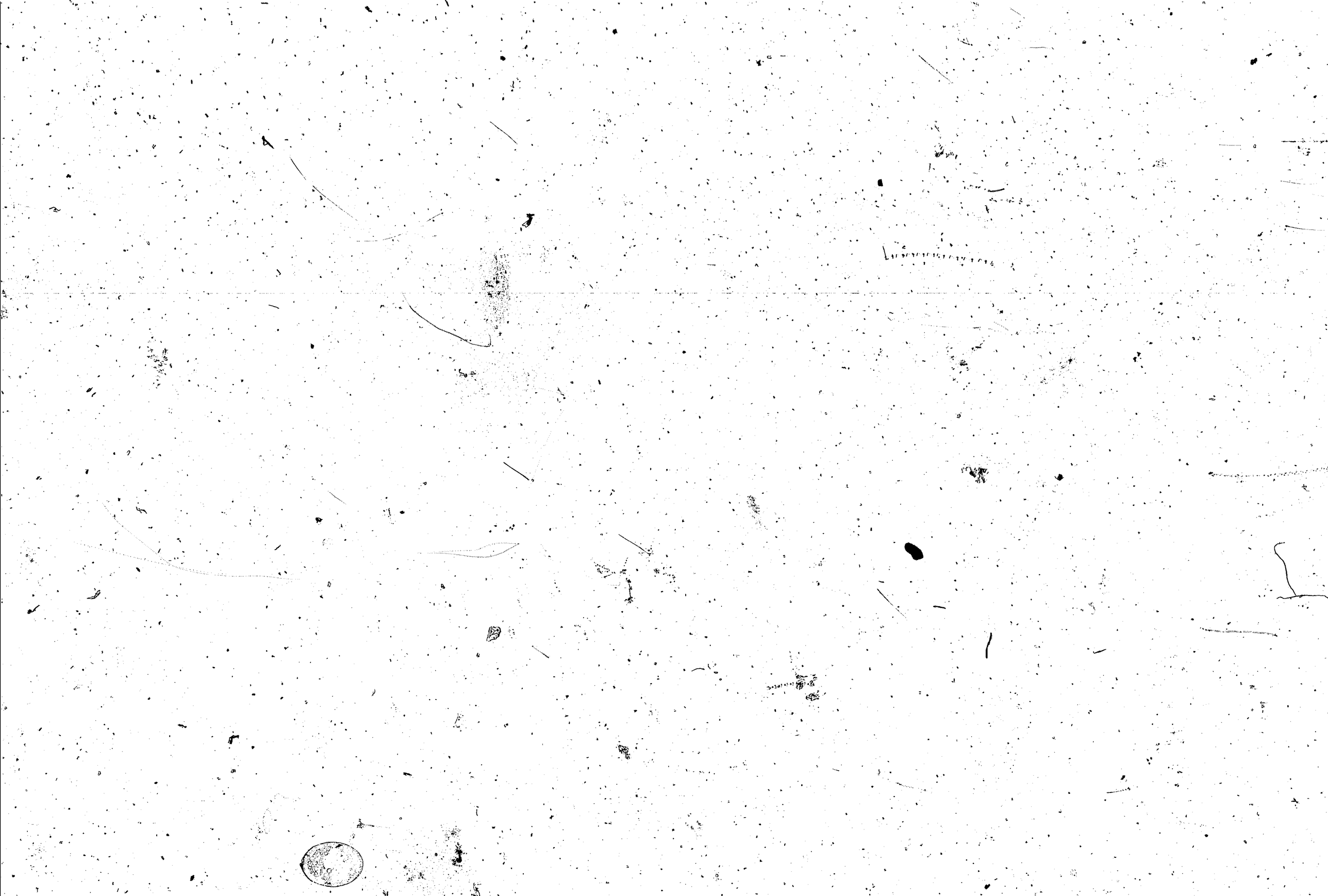
REFERENCE DESIGNATIONS

A3A1
C1 - 4 IC1-13 R1

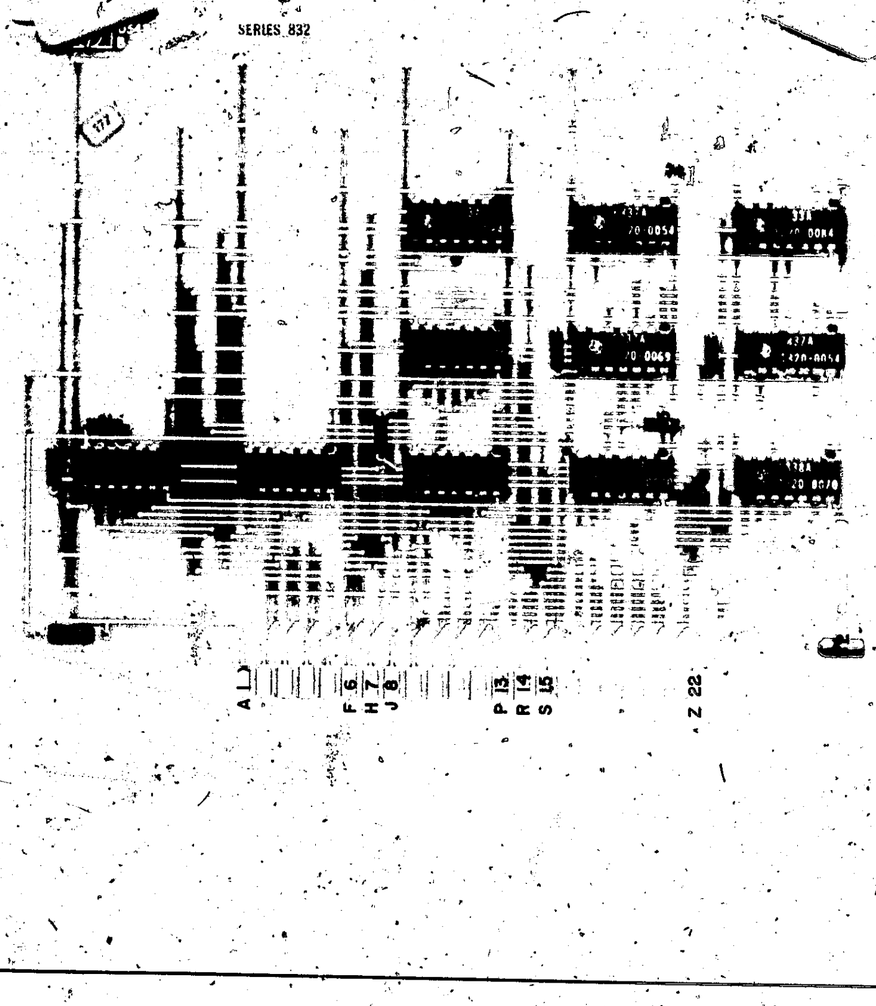
TABLE

REFERENCE DESIGNATIONS	HP PART NUMBERS
IC1, 8, 9, 15	1820-0054
IC2	1820-0068
IC12	1820-0069
IC5-7, 10, 11	1820-0070

Figure 2-19
A3A1 Preset Detector Series 928



See Figure 2-19 for board description.



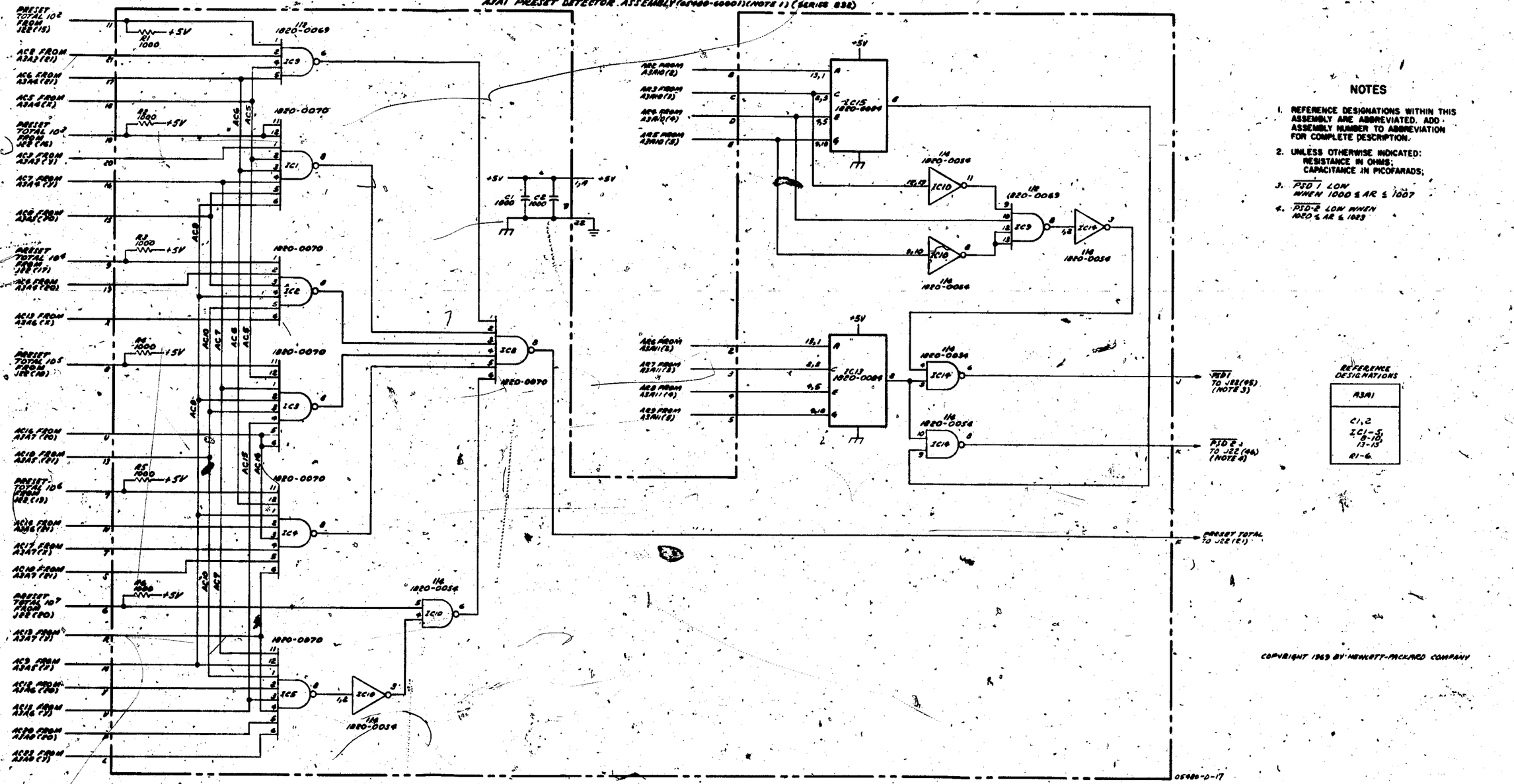


Figure 2-20
A3A1 Preset Detector Series 832

A3A2 ACCUMULATOR CONTROL ASSEMBLY (05480-60004)

DESCRIPTION

The Accumulator Control Assembly provides the proper levels for operation of the Accumulator Register. The board contains a flip-flop which holds the Accumulator in one of its four operating modes: Count, Shift Left, Shift Right, or Shift In; a flip-flop for open-loop or closed-loop shifting; a buffer amplifier for CLEAR pulses; and a buffer amplifier for SHIFT pulses.

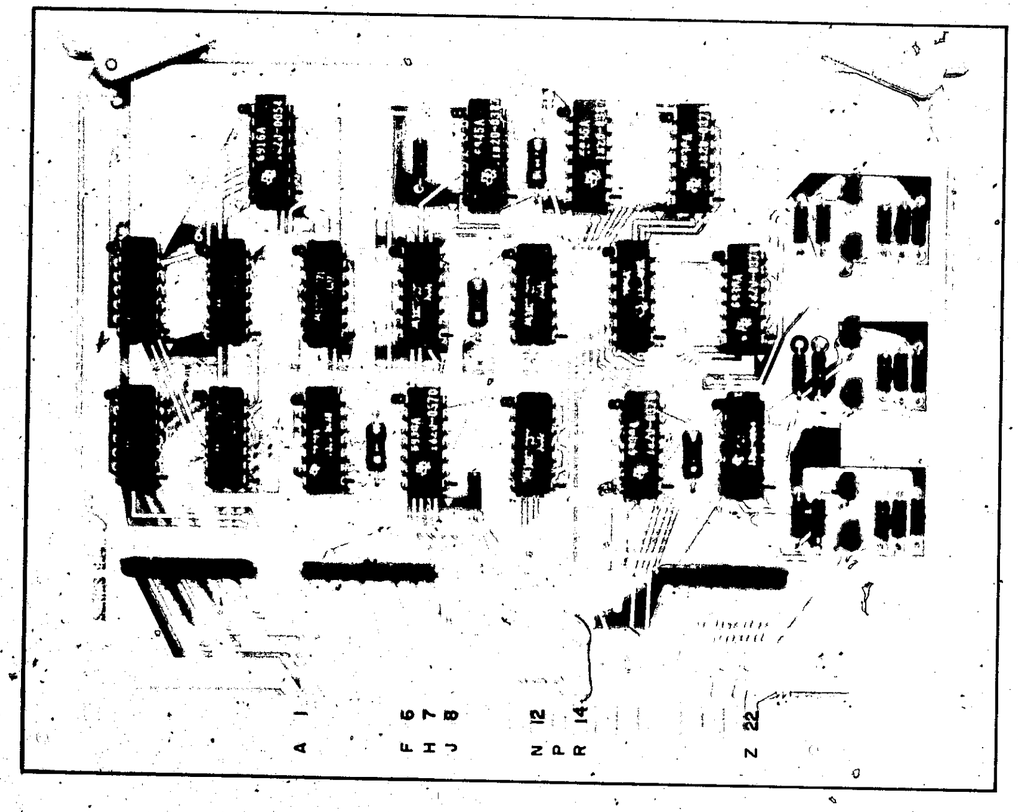
The board also contains circuitry for gating the 20 MHz clock onto the Count Up and Count Down lines.

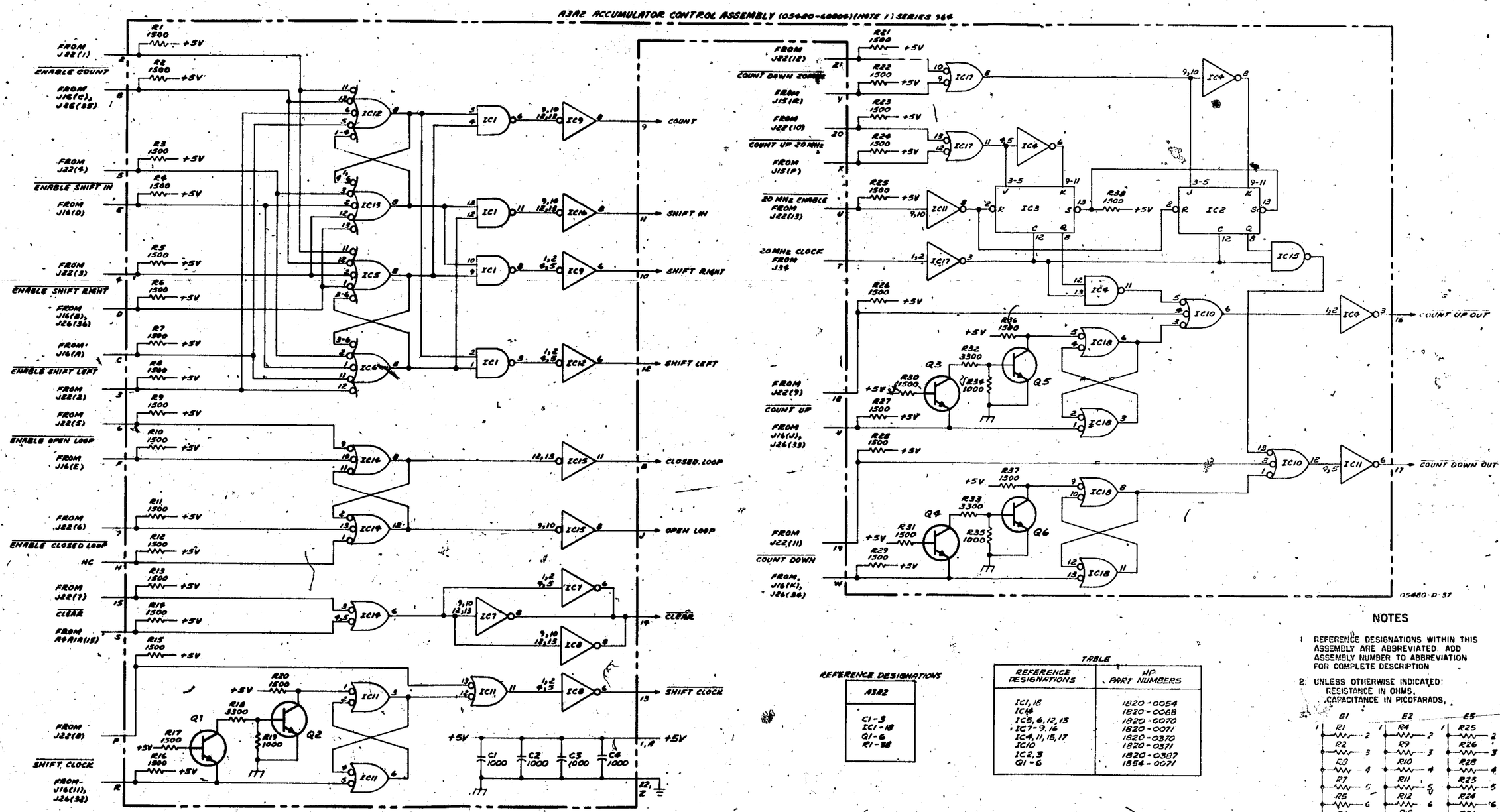
CHANGES FOR OLDER BOARDS

Current Series: 964

Older Series 852, 832

1. *The current board is a direct replacement for the older boards.
2. The schematic diagrams for the older boards are provided as Figures 2-22 and 2-23.
3. Reference designations for the current board do not necessarily apply to the older boards. Parts usage differences between the current board and the older boards are shown in schematics.





REFERENCE DESIGNATIONS

A3A2
C1-3 IC1-18 Q1-6 R1-38

TABLE

REFERENCE DESIGNATIONS	HP PART NUMBERS
IC1, 18	1820-0054
IC4	1820-0068
IC5, 6, 12, 13	1820-0070
IC7-9, 16	1820-0071
IC14, 11, 15, 17	1820-0370
IC10	1820-0371
IC2, 3	1820-0387
Q1-6	1854-0071

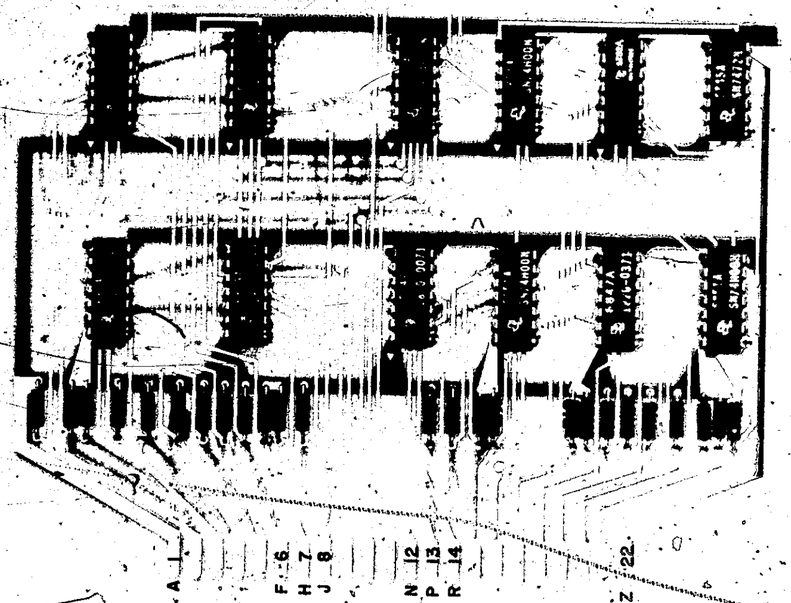
NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN PICOFARADS.

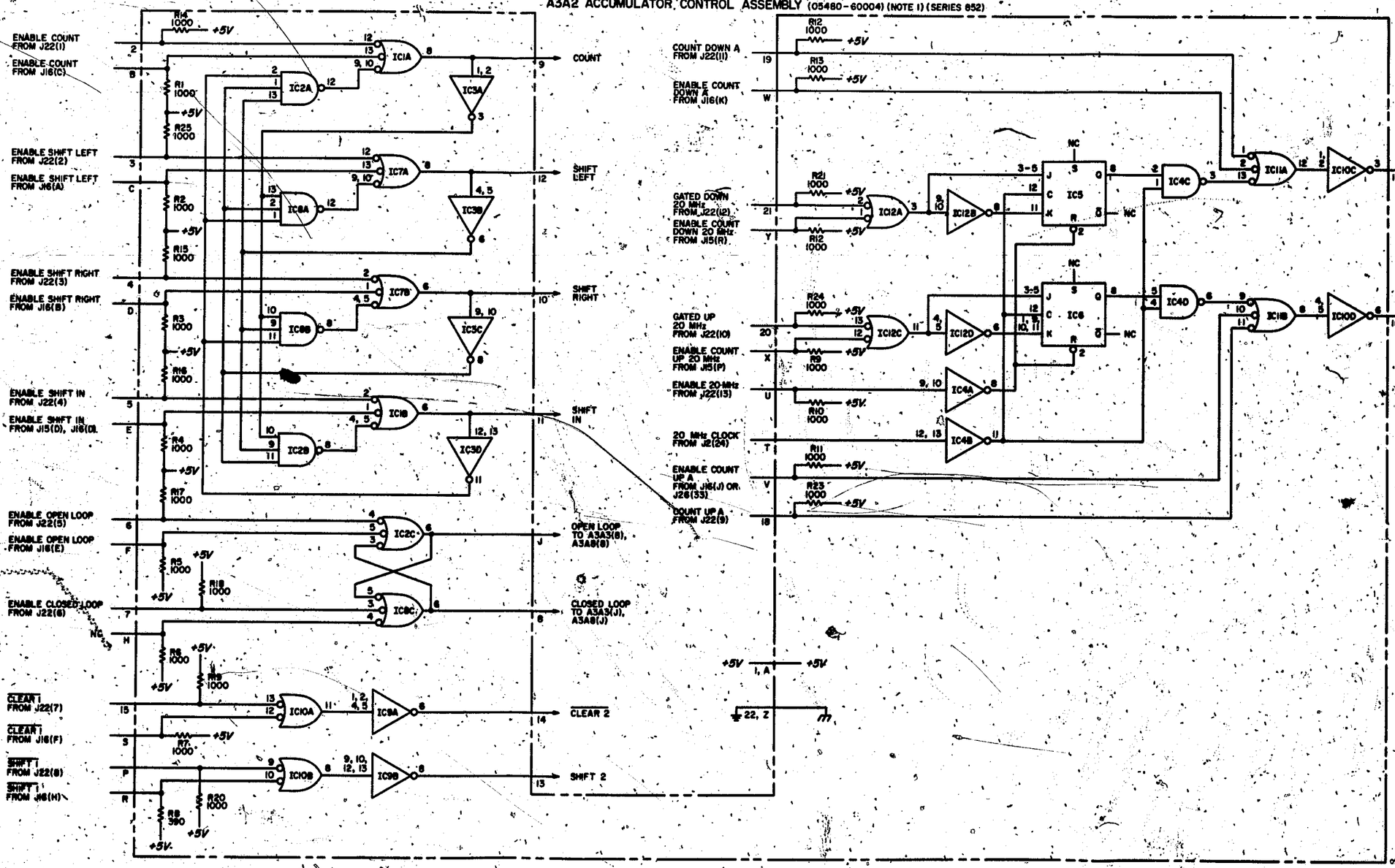
Figure 2-21
A3A2 Accumulator Control Series 964

See Figure 2-21 for board description.

SERIES 852



A3A2 ACCUMULATOR CONTROL ASSEMBLY (05480-60004) (NOTE 1) (SERIES 852)



05480-D-18

NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED:
   RESISTANCE IN OHMS;
   CAPACITANCE IN PICOFARADS;

REFERENCE DESIGNATIONS

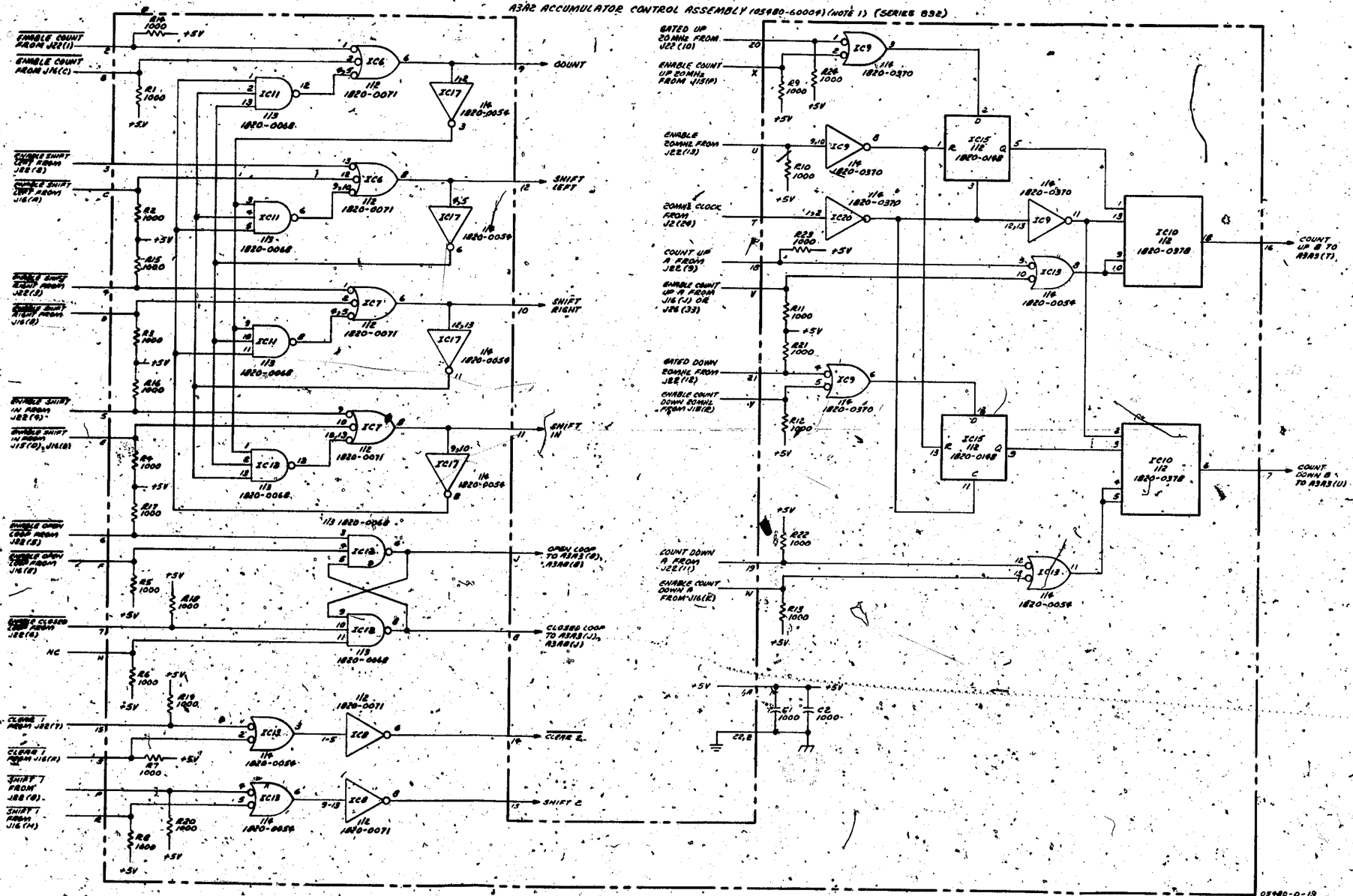
A3A2
IC1-12 R1-25

TABLE

REFERENCE DESIGNATIONS	HP PART NUMBERS
IC1, 7, 9, 11	1820-0071
IC2, 8	1820-0068
IC3	1820-0094
IC4, 10	1820-0370
IC5, 6	1820-0387

Figure 2-22
A3A2 Accumulator Control Series 852

See Figure 2-21 for board description.



NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED:
   RESISTANCE IN OHMS;
   CAPACITANCE IN PICOFARADS;

REFERENCE DESIGNATIONS
A3A2
C1, 2
IC2-19
R1-29

Figure 2-23
A3A2 Accumulator Control Series 832

A3A3 HIGH-SPEED ACCUMULATOR (05480-60002)

DESCRIPTION

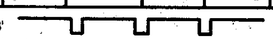
The High-Speed Accumulator performs the following operations:

Count-Up, Count-Down, Shift-Left, Shift-Right, and Shift-In.

The board contains 4 of the 24 flip-flops in the whole Accumulator Register.

The input levels necessary for proper operation are as follows:

MODE	PIN							
	9	10	11	12	13	T	U	14
Count-Up	1	0	0	0	1	P	1	1
Count-Down	1	0	0	0	1	1	P	1
Shift-Left	0	0	0	1	P	1	1	1
Shift-Right	0	1	0	0	P	1	1	1
Shift-In	0	0	1	0	P	1	1	1
Clear	?	?	?	?	1	1	1	0

P = Inverted Pulses 

? = Don't Care (i.e., 1 or 0)

Flip-Flop Outputs are 20, X, 21, Y

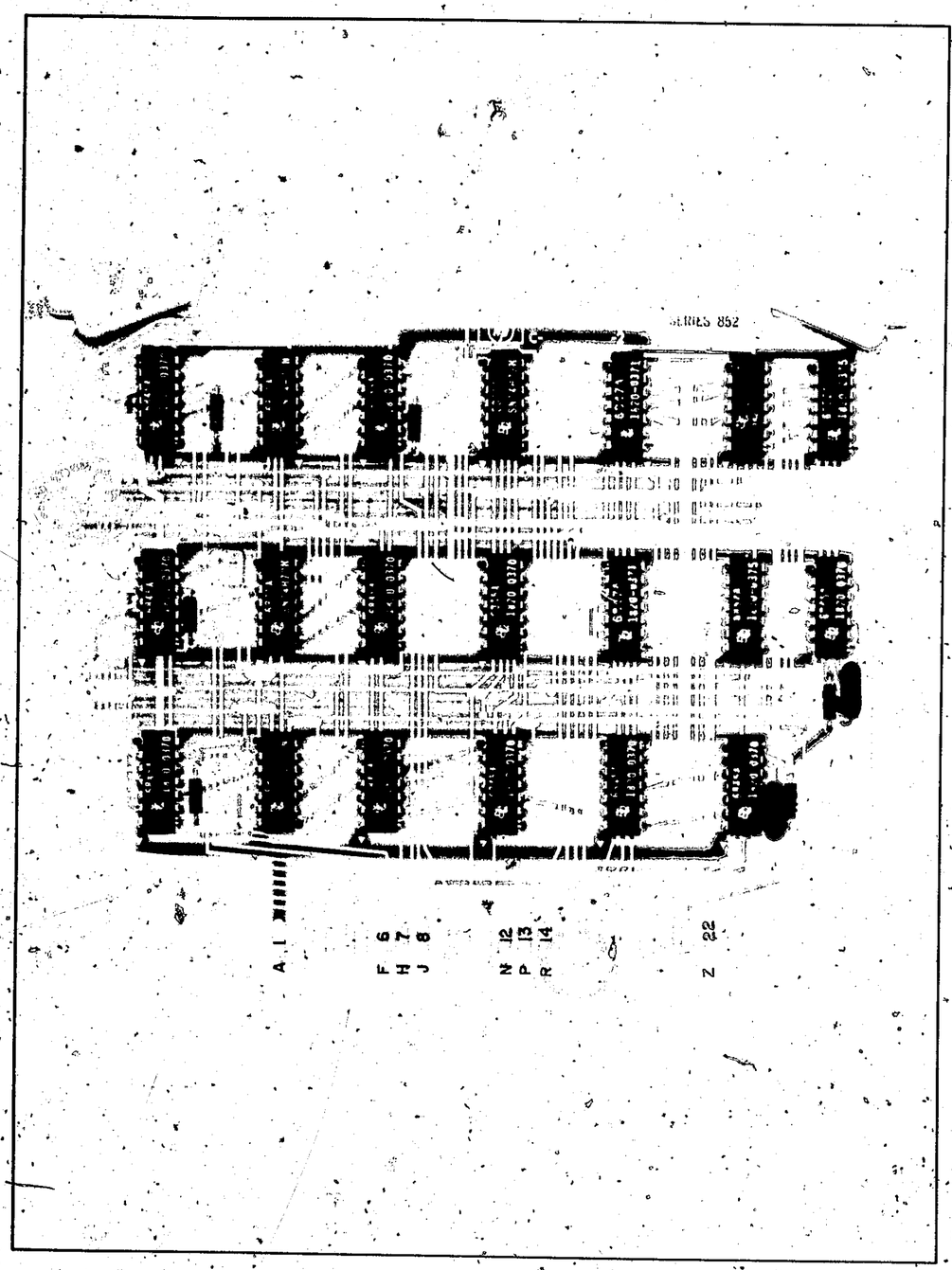
Set Inputs are 2, B, 3, C

CHANGES FOR OLDER BOARDS

Current Series: 852

Older Series: 832

1. The current board is a direct replacement for the older board.
2. The schematic diagram for the older board is provided as Figure 2-25.
3. Reference designations for the current board do not necessarily apply to the older board. Parts usage differences between the current board and the older board shown in schematics.



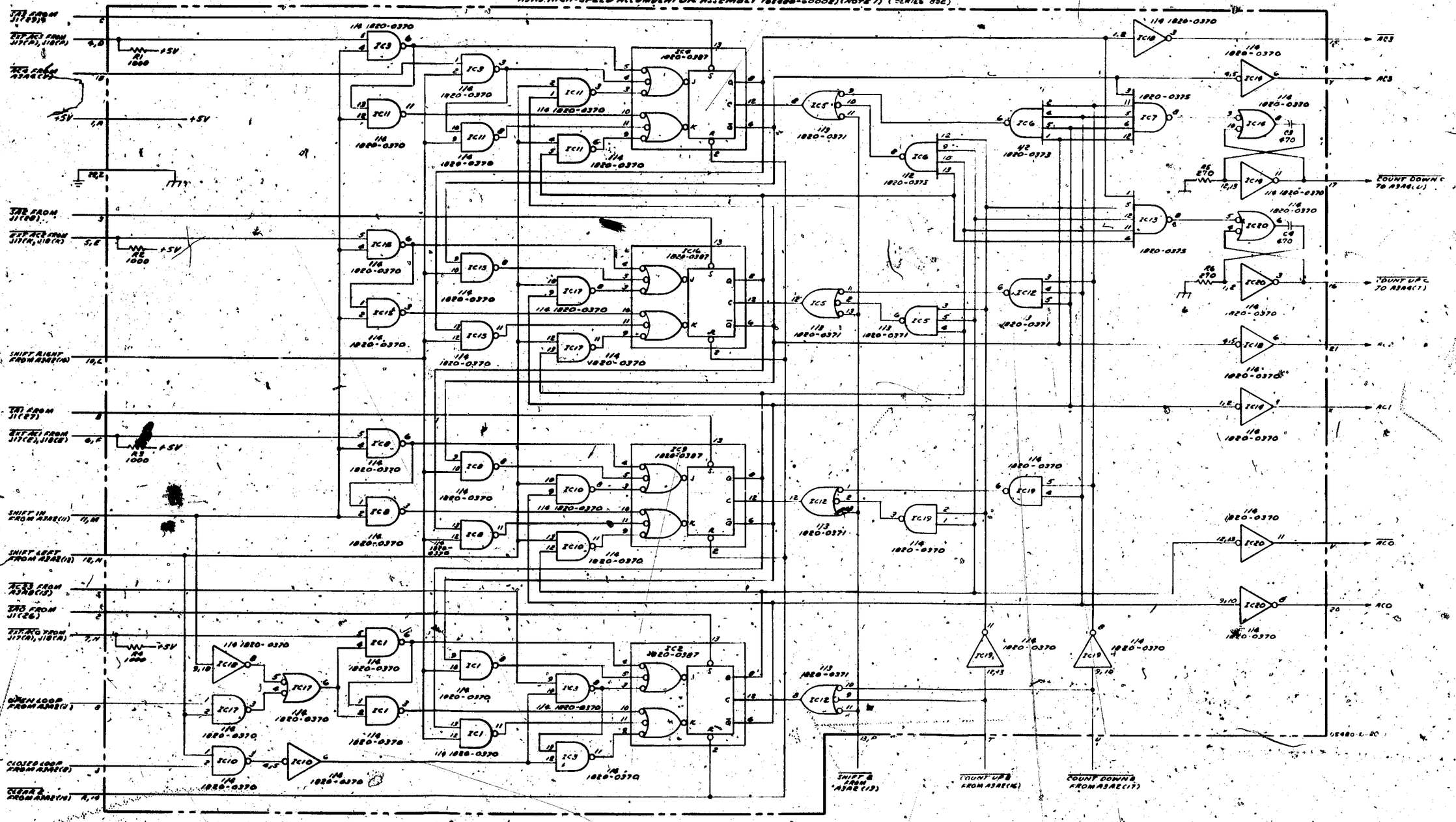
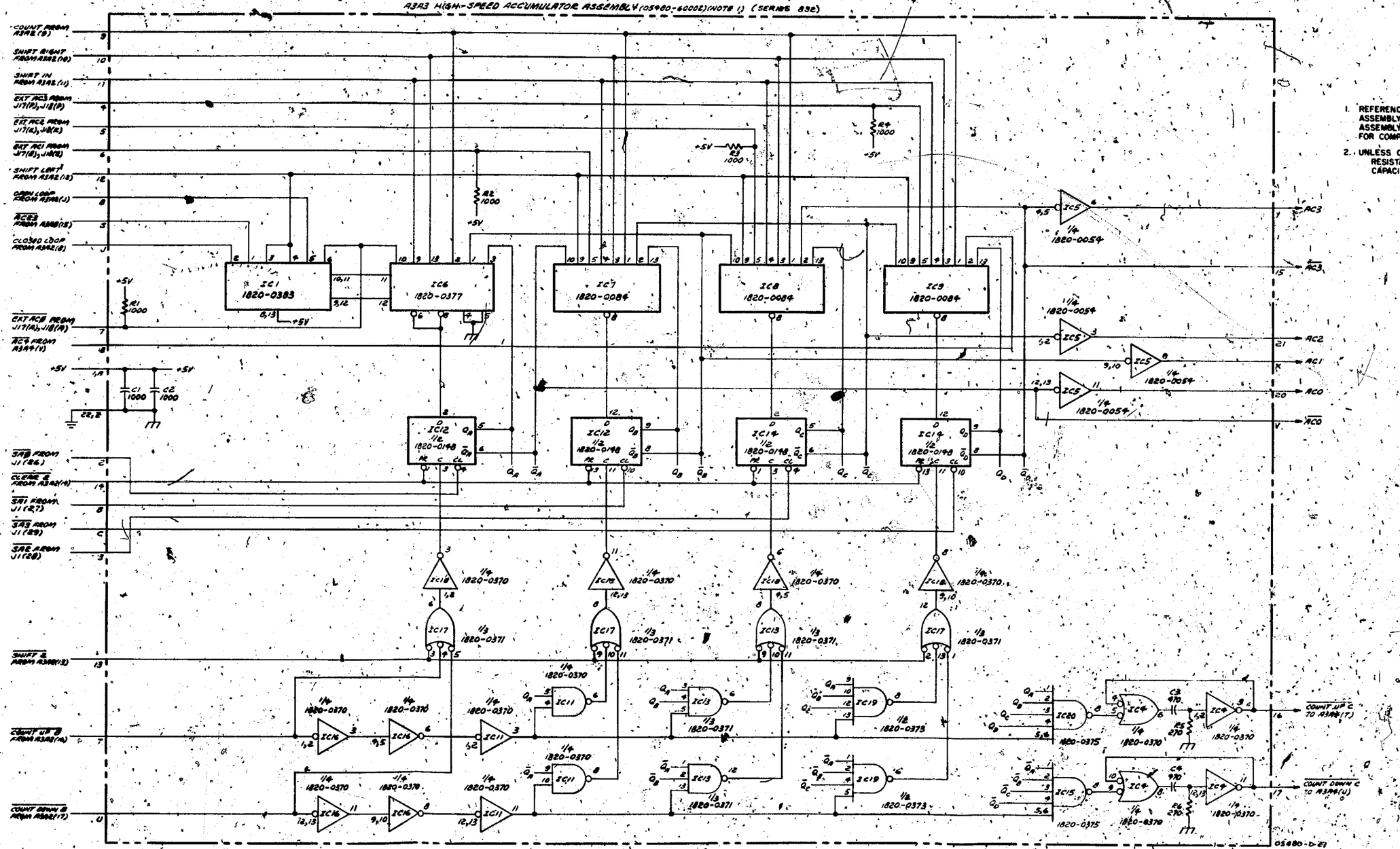


Figure 2-24
A3A3 High Speed Accumulator Series 852

See Figure 2-24 for board description.



NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS, CAPACITANCE IN PICOFARADS.

REFERENCE DESIGNATIONS

A3A3

-9
IC's 9-9; 11-20
R1-6

Figure 2-25
A3A3 High Speed Accumulator Series 832