HEWLETT hp PACKARD

SIGNAL ANALYZER 5480AB WITH 5485A 5486AB,5487A,5488A PLUG-INS
SERVICE VOL. II III & IV SERIAL PFX ALL SERIALS
PART NO. 05480-90013 (MANUAL) 05480-90016 (FICHE)
APRIL 1971 3 of 8

A3A4 ACCUMULATOR ASSEMBLY (05480-60003)

DESCRIPTION

This assembly performs the following operations for Accumulator Bits 4-7:

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

This board contains 4 of the 24 flip-flops in the 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)

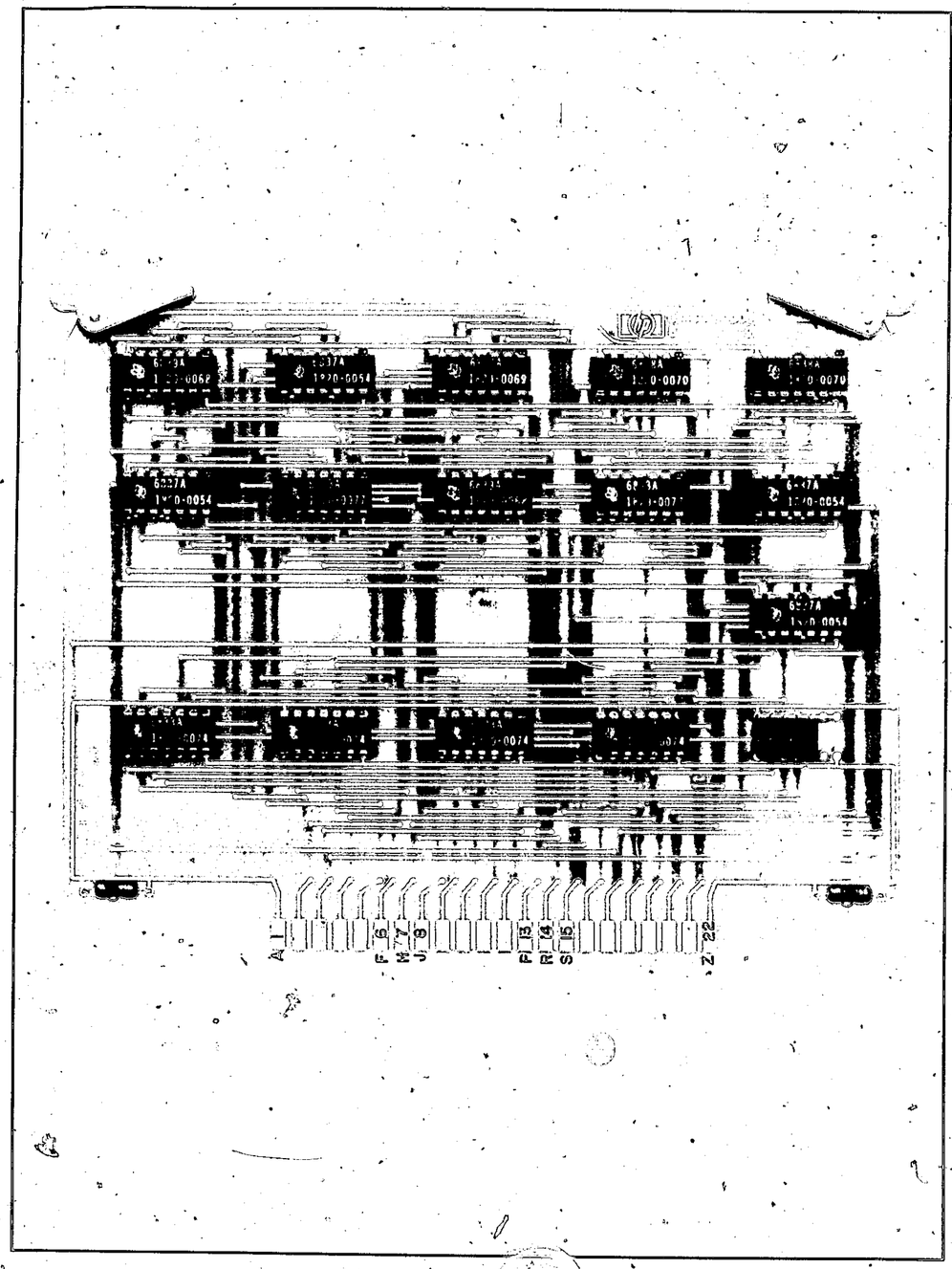
Flip-Flop Outputs are 20, X, 21, Y

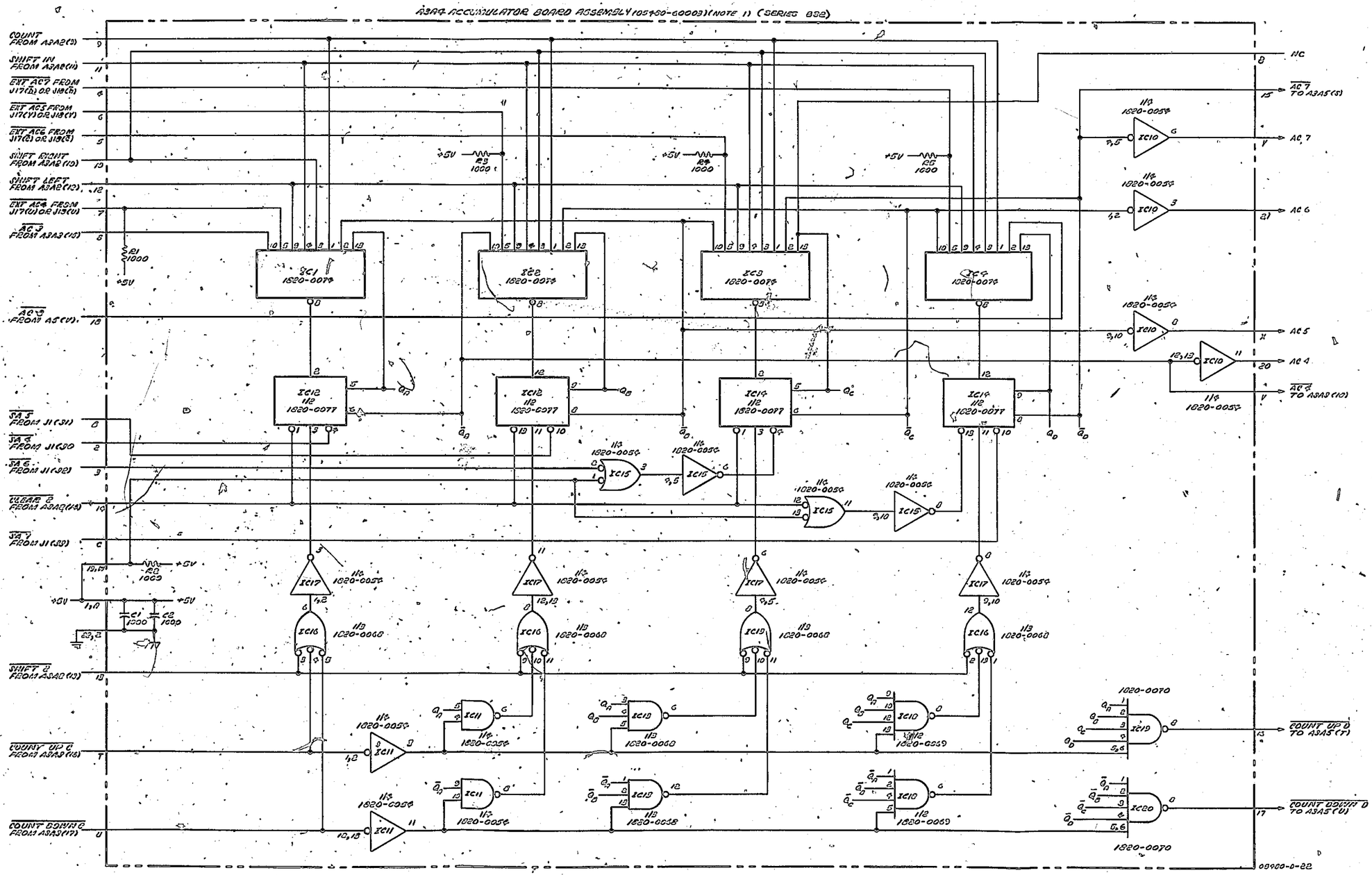
Set Inputs are 2, B, 3, C

CHANGES FOR OLDER BOARDS

Current Series: 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;
   CAPACITANCE IN PICOFARADS;

REFERENCE DESIGNATIONS

A3A4
C1,2
IC1-9, 10-20
R1-5

Figure 2-26
A3A4 Accumulator Series 832

A3A5 ACCUMULATOR ASSEMBLY (05480-60003)

DESCRIPTION

This assembly performs the following operations for Accumulator Bits 8-11:

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

This board contains 4 of the 24 flip-flops in the 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, K, 21, Y

Set Inputs are 2, B, 3, C

CHANGES FOR OLDER BOARDS

Current Series: 832

Older Series: None

COMPONENT LOCATOR

See Figure 2-26 for component locator.

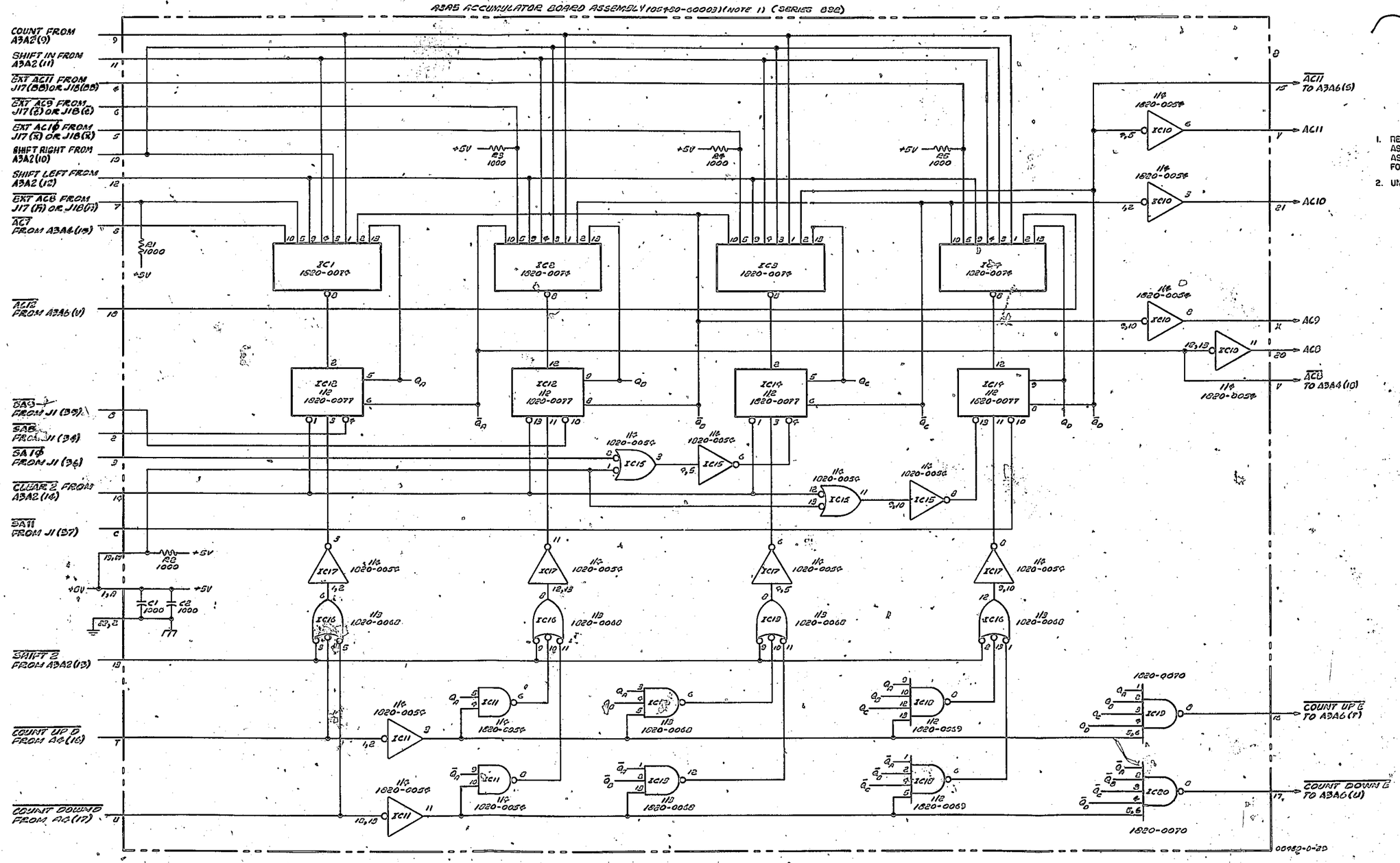


Figure 2-27
A3A5 Accumulator Series 832

ASA7 ACCUMULATOR ASSEMBLY (05480-60003)

DESCRIPTION

This assembly performs the following operations for Accumulator Bits 16-19:

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

This board contains 4 of the 24 flip-flops in the 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: 832

Older Series: None

COMPONENT LOCATOR

See Figure 2-26 for component locator.

A3A6 ACCUMULATOR BOARD ASSEMBLY (10550-60003) (NOTE 1) (SERIES 832)

COUNT FROM A3A2 (9)
SHIFT IN FROM A3A2 (11)
EXT AC 15 FROM J17(5) OR J18(5)
EXT AC 13 FROM J17(11) OR J18(11)
EXT AC 14 FROM J17(14) OR J18(14)
SHIFT RIGHT FROM A3A2 (10)
SHIFT LEFT FROM (A3A2 (12)
EXT AC 12 FROM J17(2) OR J18(2)
AC 11 FROM A3A5 (15)
AC 10 FROM A3A7 (V)
SA 13 FROM J1 (39)
SA 12 FROM J1 (38)
SA 14 FROM J1 (40)
CLEAR 2 FROM A3A2 (14)
SA 15 FROM J1 (41)
SHIFT 2 FROM A3A2 (13)
COUNT UP 2 FROM A3A5 (16)
COUNT DOWN 2 FROM A3A5 (17)

R1 1000 +5V
R2 1000 +5V
R3 1000 +5V
R4 1000 +5V
R5 1000 +5V
R6 1000 +5V
C1 1000
C2 1000

IC1 1820-0077
IC2 1820-0077
IC3 1820-0077
IC4 1820-0077
IC12 1/2 1820-0077
IC14 1/2 1820-0077
IC15 1/6 1820-0055
IC10 1/6 1820-0055
IC11 1/6 1820-0055
IC17 1/6 1820-0055
IC16 1/3 1820-0060
IC13 1/3 1820-0060
IC19 1820-0070
IC20 1820-0070

AC 15 TO A3A7 (E)
AC 14
AC 13
AC 12
AC 12 TO A3A5 (18)
COUNT UP TO A3A7 (T)
COUNT DOWN TO A3A7 (T)

REFERENCE DESIGNATIONS
A3A6
C1-2
IC1-4, 10-20
R1-5

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.

05960-0-24

Figure 2-26
A3A6 Accumulator Series 832

A3A6 ACCUMULATOR ASSEMBLY (05480-60003)

DESCRIPTION

This assembly performs the following operations for Accumulator Bits 12-15:

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

This board contains 4 of the 24 flip-flops in the 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

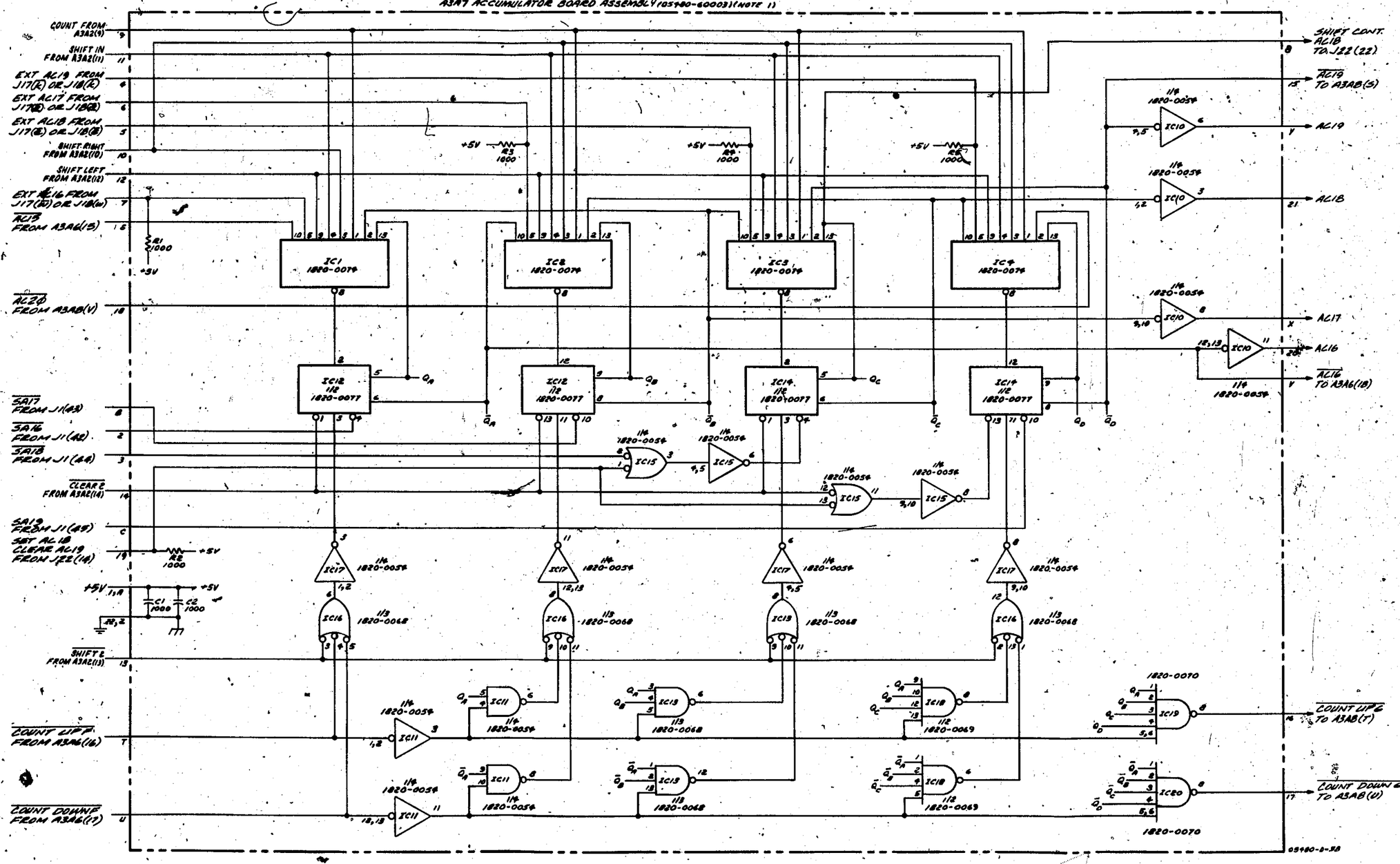
CHANGES FOR OLDER BOARDS

Current Series: 832

Older Series: None

COMPONENT LOCATOR

See Figure 2-26 for component locator.



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
A3A7
C1,2 IC1-9, 10-20 R1-5

Figure 2-29
A3A7 Accumulator Series 832

A3A8 ACCUMULATOR ASSEMBLY (05480-60005)

DESCRIPTION

This assembly performs the following operations for Accumulator Bits 20-23:

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

This board contains 4 of the 24 flip-flops in the 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)

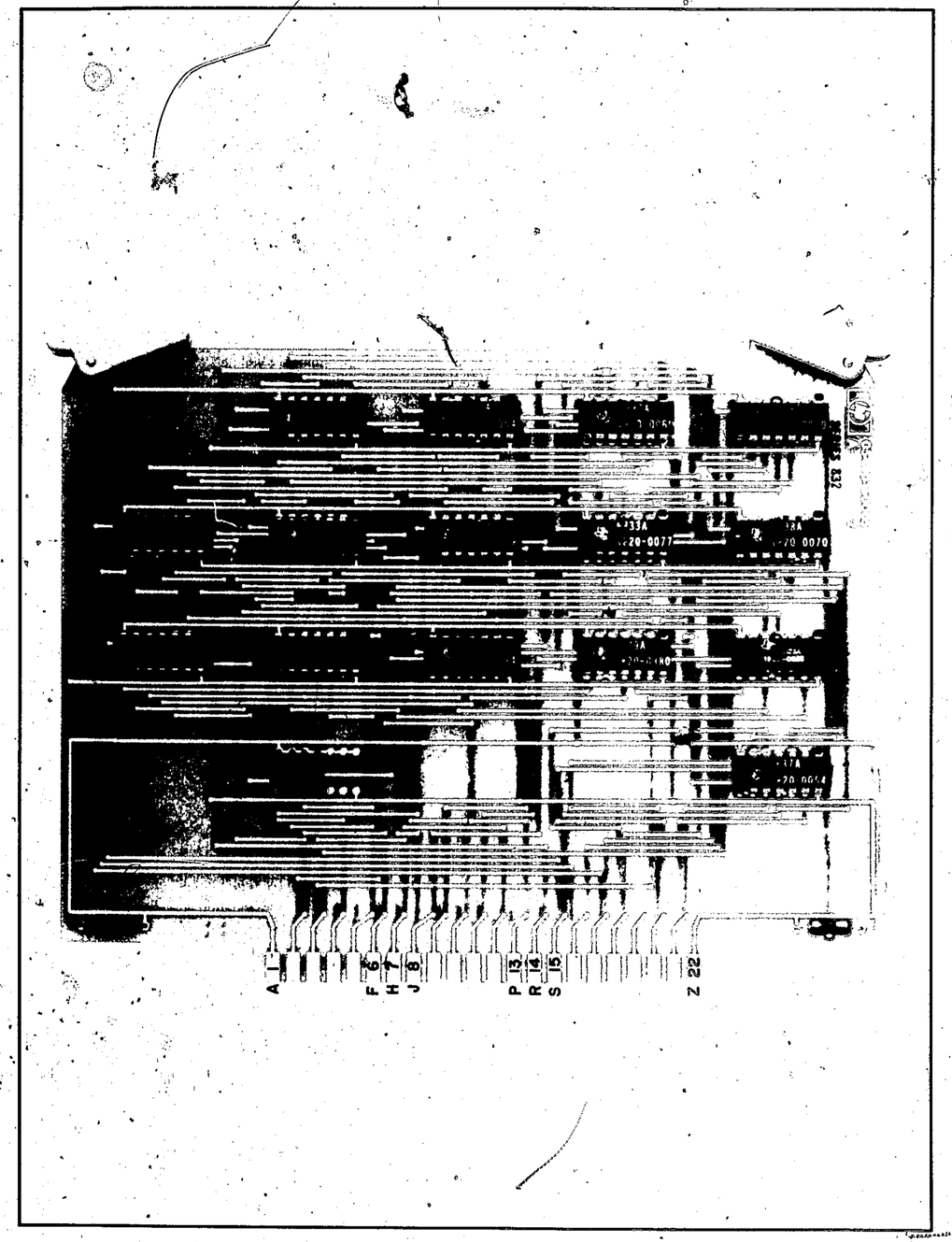
Flip-Flop Outputs are 20, X, 21, Y

Set Inputs are 2, B, 3, C

CHANGES FOR OLDER BOARDS

Current Series: 832

Older Series: None



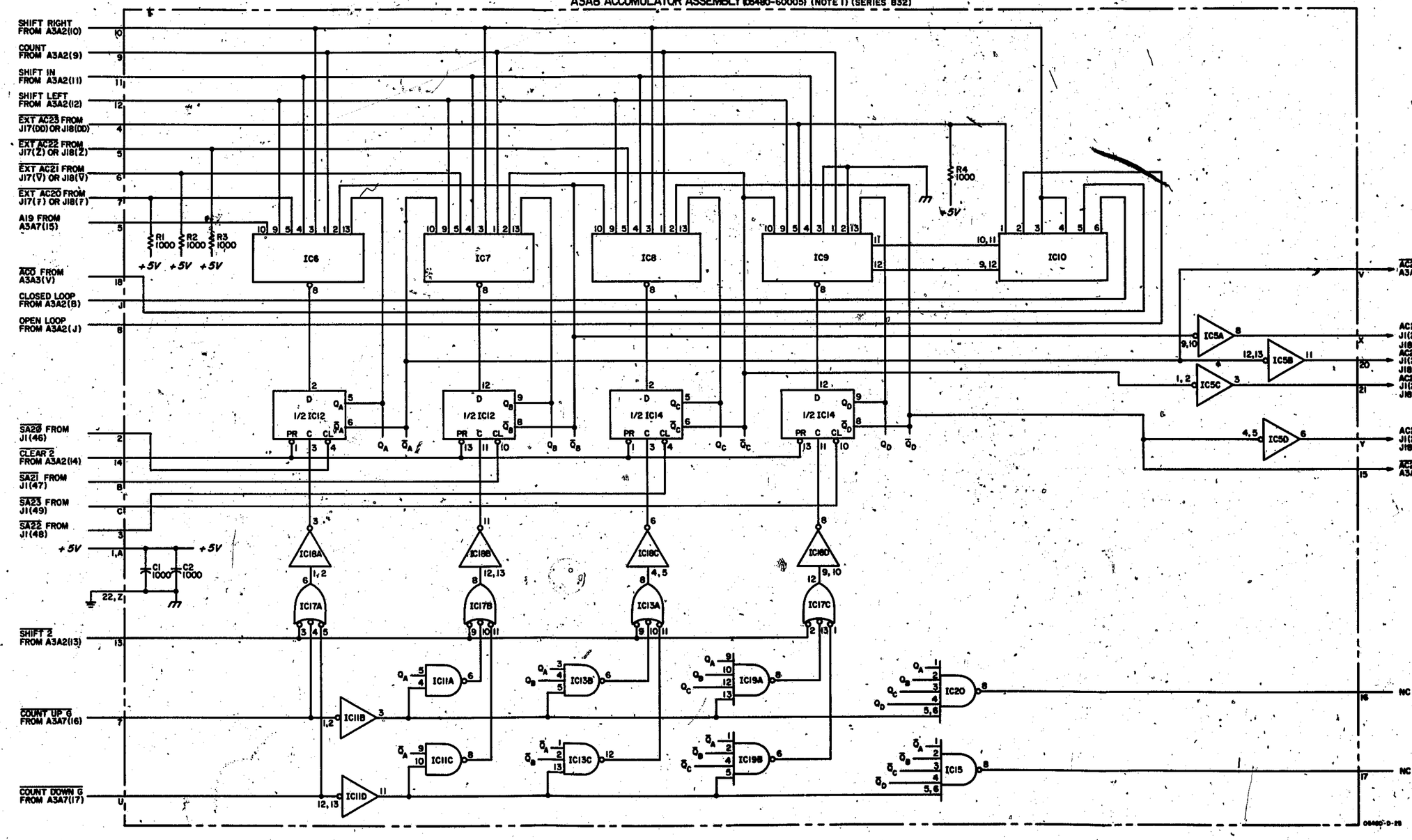


Figure 2-30
A3A8 Accumulator Series 832

A3A9 ADDRESS REGISTER (05480-60077, 05480-60007)

DESCRIPTION

Address Register bits 0 and 1 provide the proper address for storing or retrieving information from the magnetic core memory. This board assembly contains two flip-flops of the Display Address Register and two flip-flops of the Process Address Register.

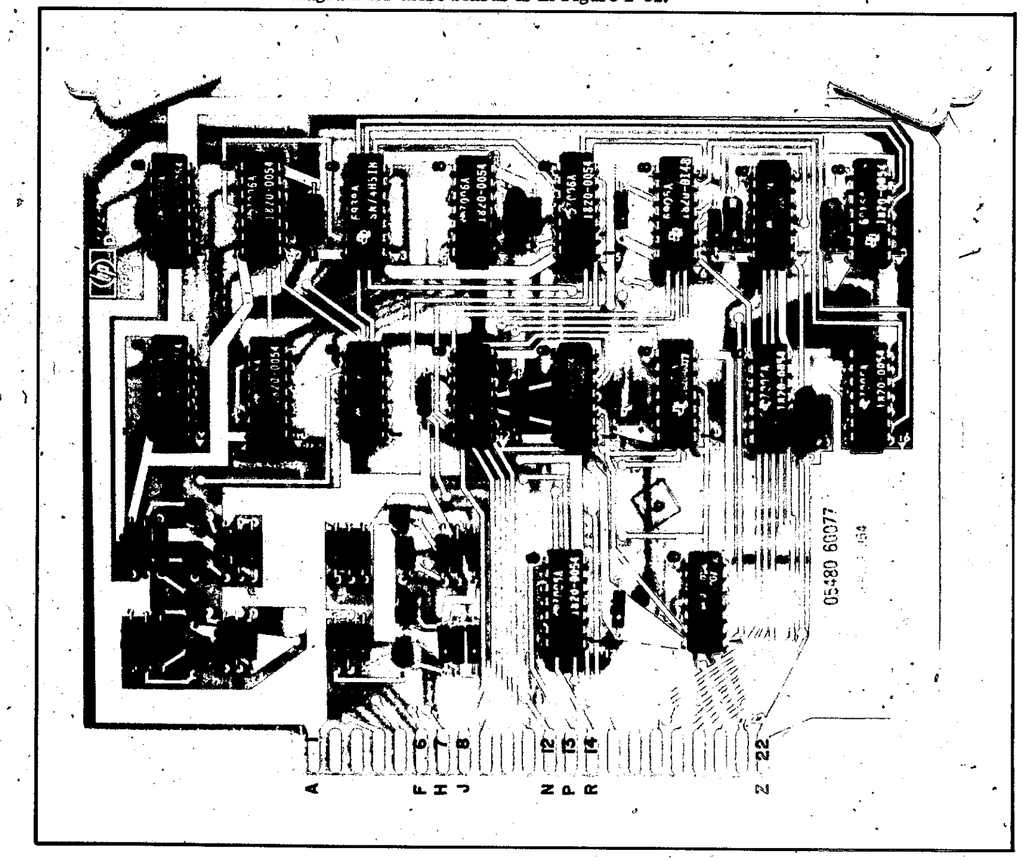
The board also contains circuitry for gating the 20 MHz clock into the Count-Up or Count-Down lines.

CHANGES FOR OLDER BOARDS

Current Board: 05480-60077, Series 964

Older Boards: 05480-60007, Series 852 and 832

The Series 852 and 832 board circuits and components are identical, the same schematic drawing may be used for both. The schematic diagram for these boards is in Figure 2-32.



A3A9 ADDRESS REGISTER ASSEMBLY (05480-60007) (NOTE 1) SERIES 964

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

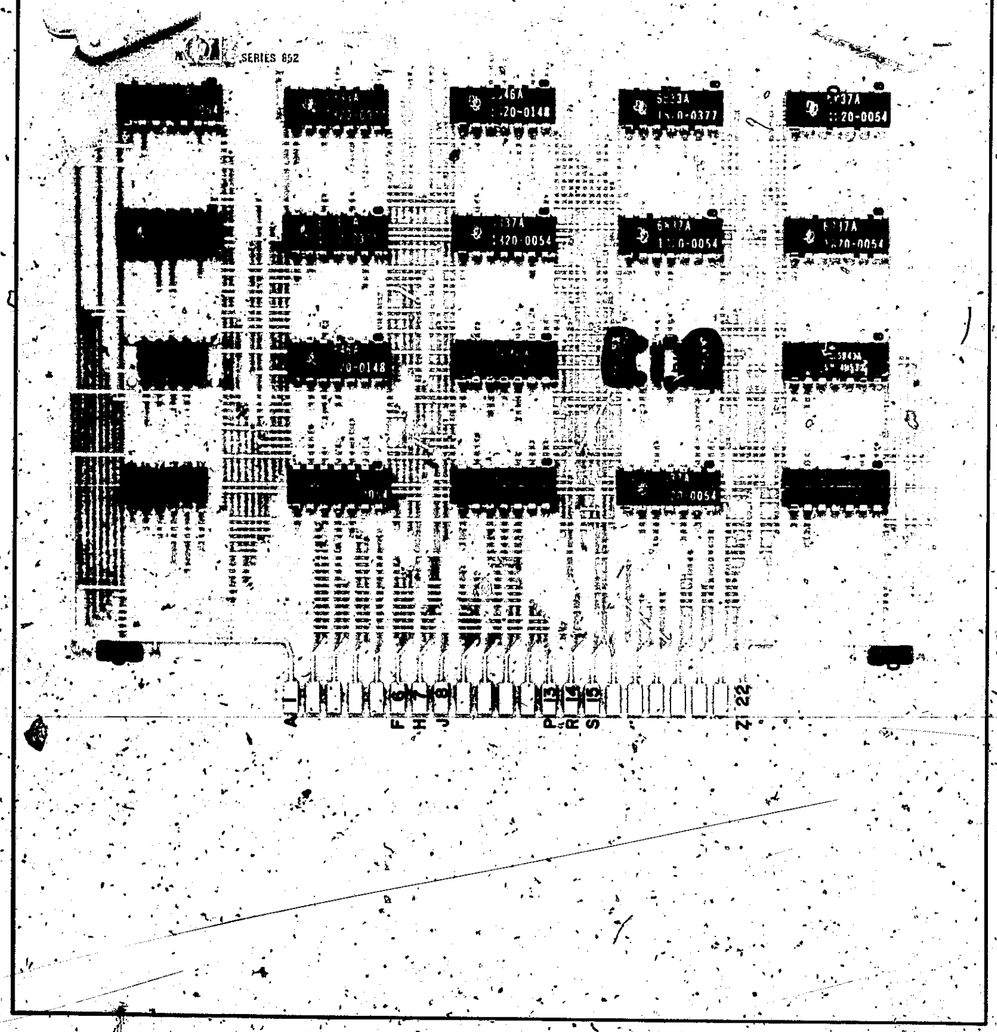
A3A9
C1-6
IC -
Q1-8
R1-34

NOT USED: R24, 26, 28

05480-B-39

Figure 2-31
A3A9 Address Register Series 964

See Figure 2-31 for Board Description.



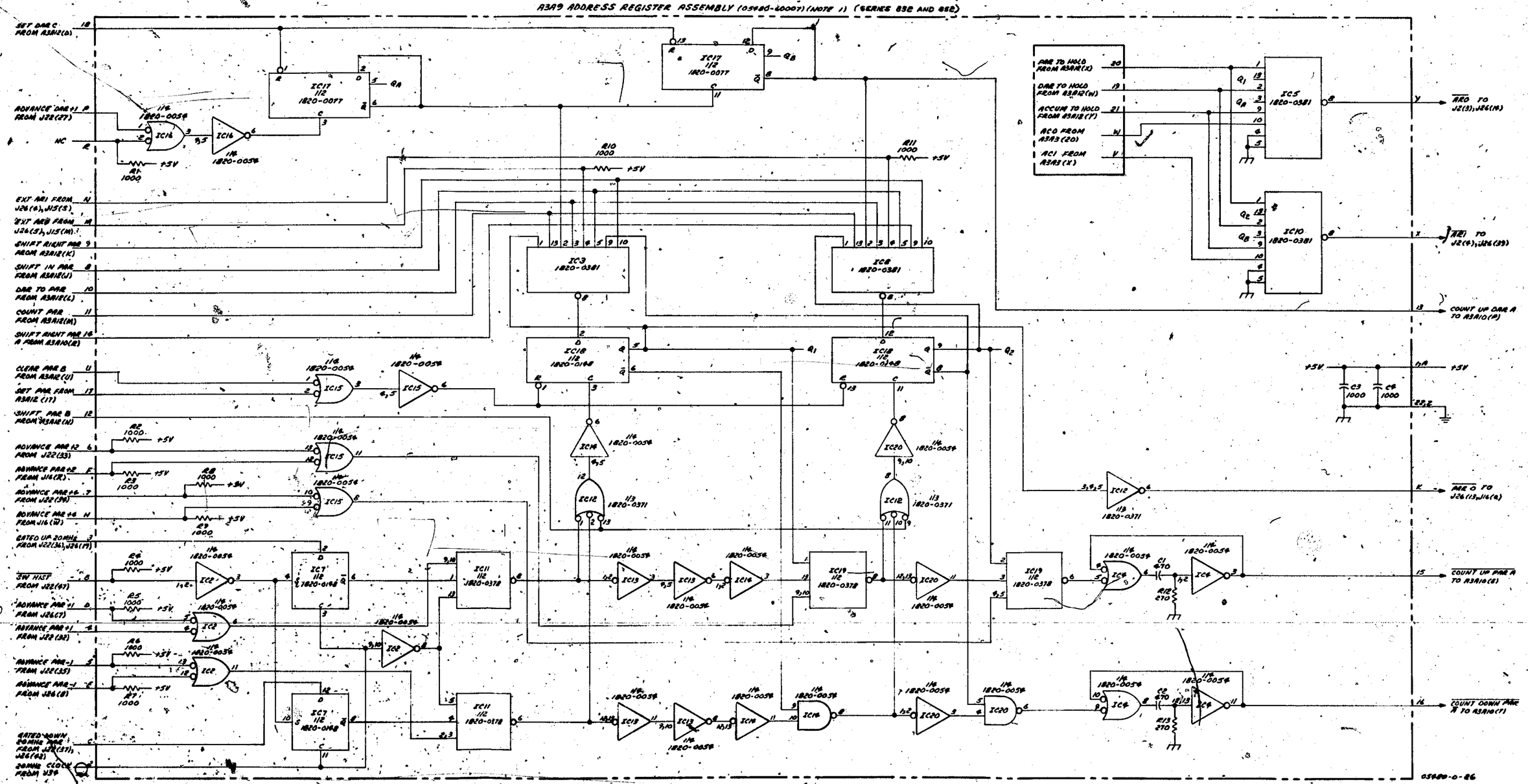


Figure 2-32
A3A9 Address Register Series 832, 852

A3A10, A3A11 ADDRESS REGISTER ASSEMBLY (05480-60006)

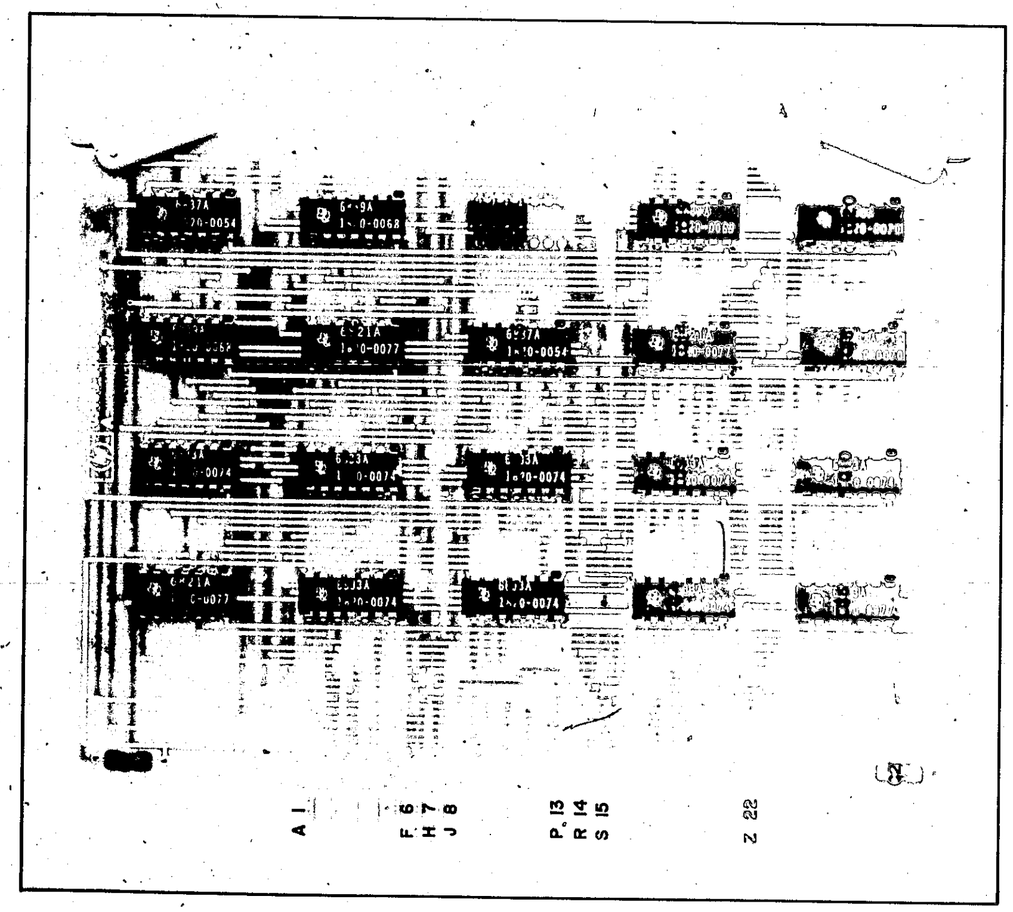
DESCRIPTION

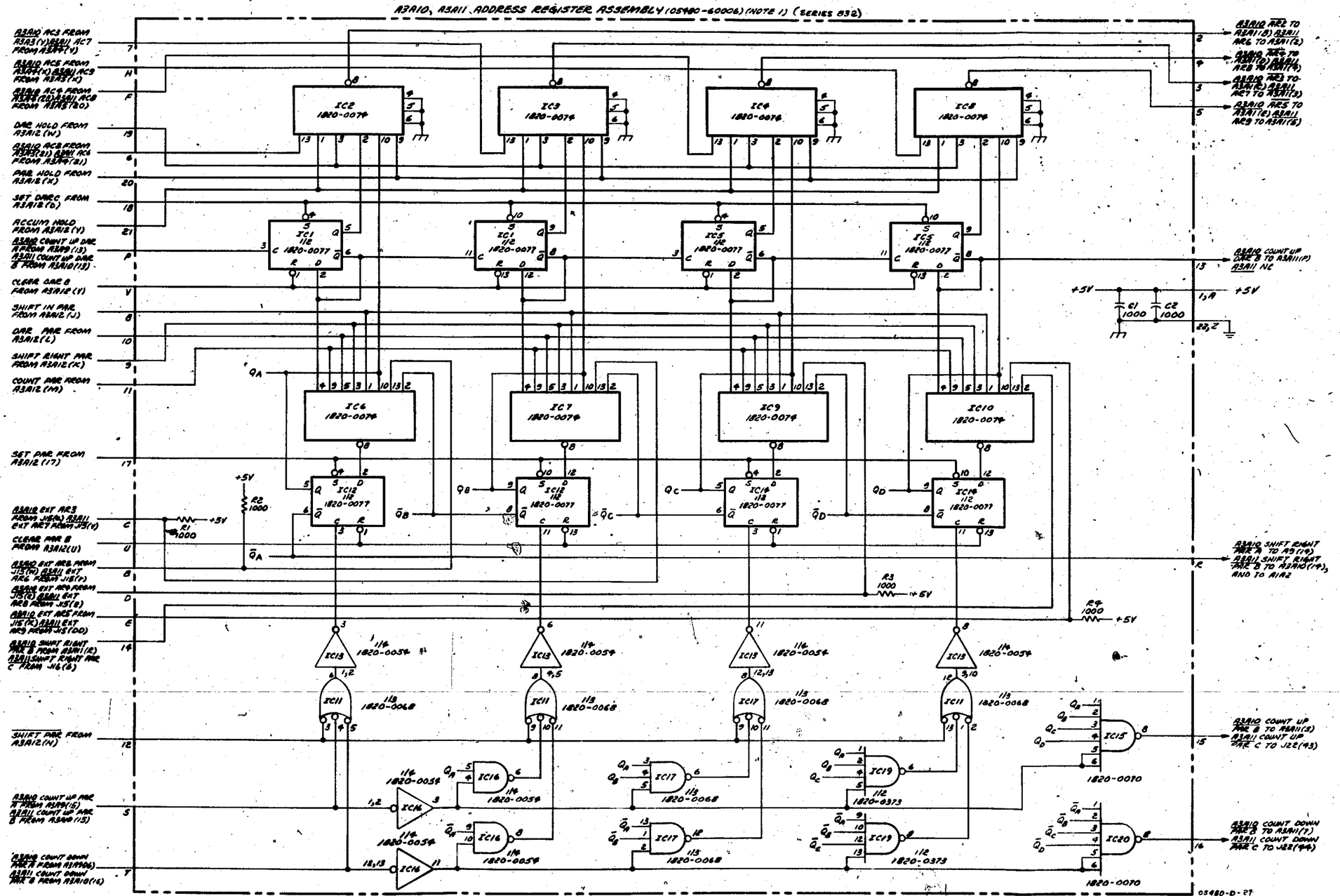
The 05480-60006 Address Register provides the proper address for storing or retrieving information from the magnetic core memory. The board contains four flip-flops of the Display Address Register, which is used for all display, interlaced display, and output operations; and four flip-flops of the process address register, which is used for all data input and processing operations.

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, CAPACITANCE IN PICOFARADS;

REFERENCE DESIGNATIONS

A3A10, A3A11
C1, 2 IC1-17, 19, 20 R1-4

Figure 2-33
A3A10, A3A11 Address Register Series 832

A3A12 ADDRESS REGISTER CONTROL ASSEMBLY (05480-60075, 05480-60008)

DESCRIPTION

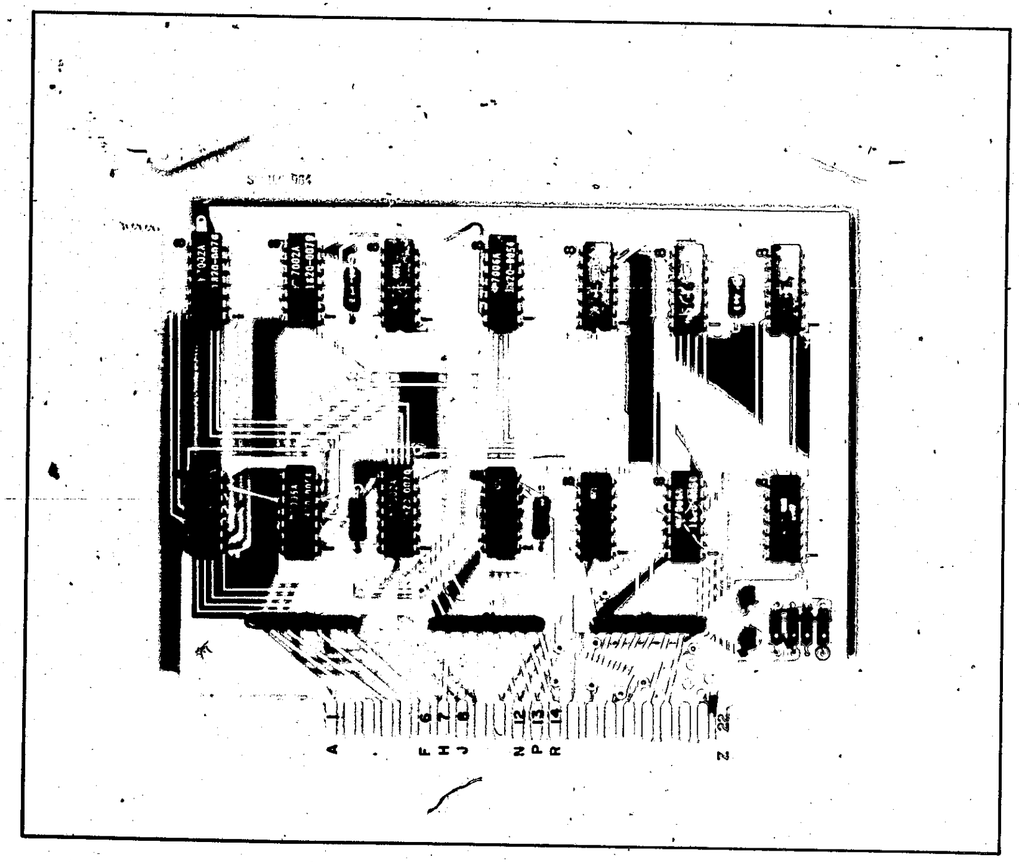
The Address Register Control provides proper levels for operation of the Address Register (A3A9, A3A10). The board contains a flip-flop which holds the Process Address Register in one of four operating modes: Count, Shift-Right, Shift-In, and Transfer DAR to PAR; a flip-flop for determining which information is sent to the Horizontal DAC (Process Address Register, Display Address Register, or Accumulator); and four buffer amplifiers for the following pulses: Clear Process Address Register, Clear Display Address Register, Shift Clock, and Set Process Address Register.

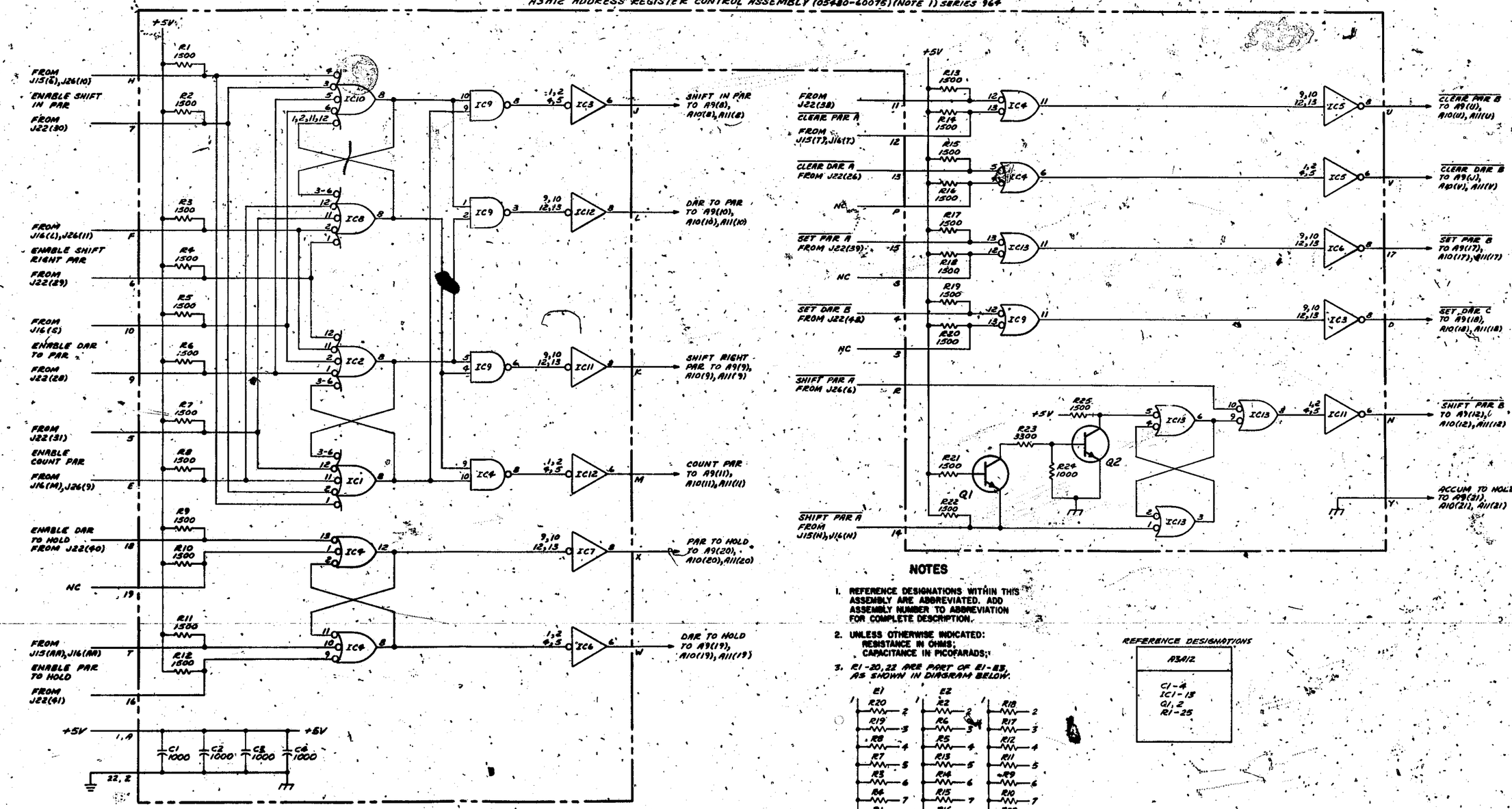
CHANGES FOR OLDER BOARDS

Current Board: 05480-60075, Series 964

Older Boards: 05480-60008, Series 832

The schematic diagram for the older board is in Figure 2-35.





NOTES

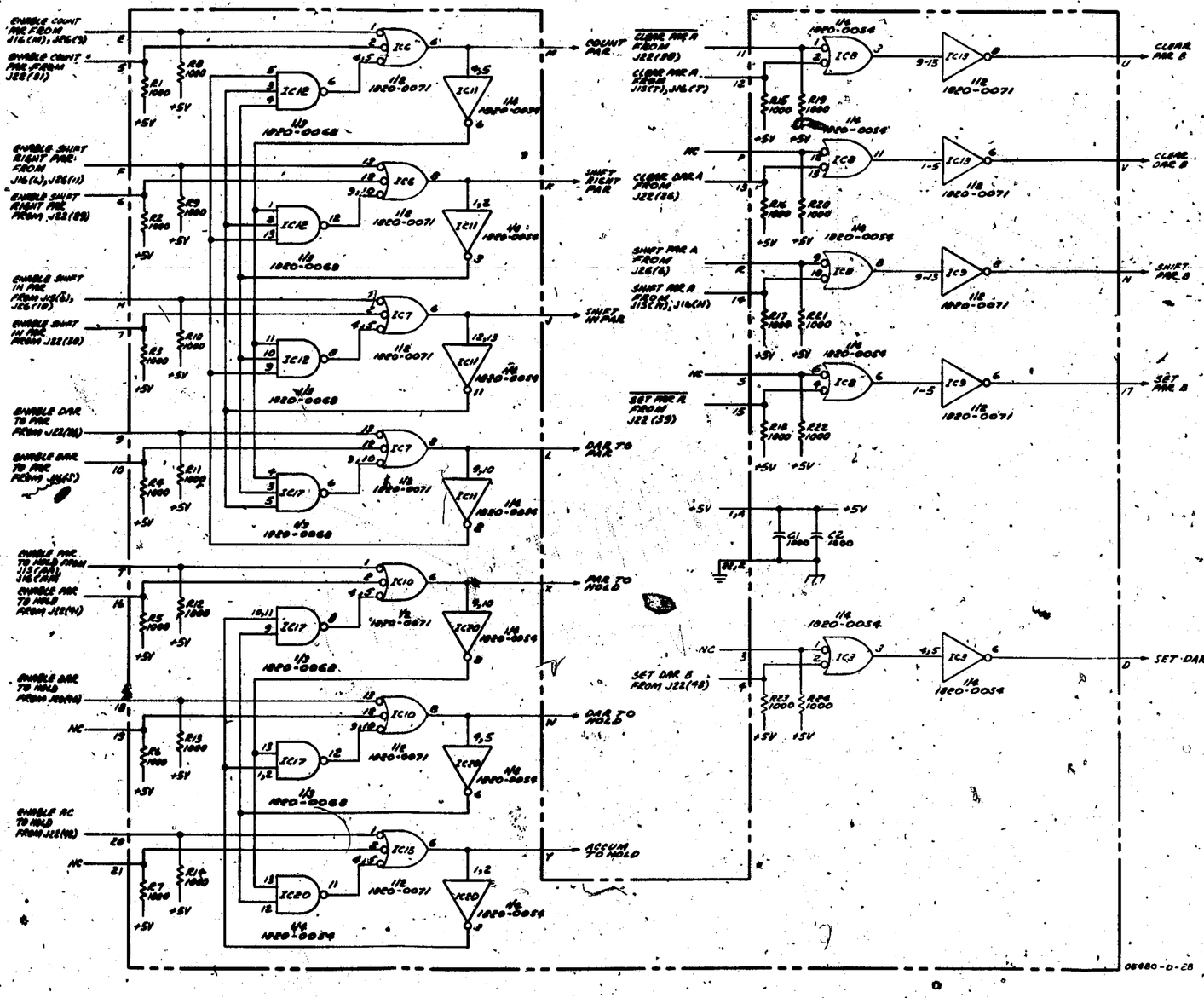
1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED:
   RESISTANCE IN OHMS;
   CAPACITANCE IN PICOFARADS;
3. R1-20, 22 ARE PART OF E1-E3, AS SHOWN IN DIAGRAM BELOW.

REFERENCE DESIGNATIONS

A3A12
C1-4 IC1-13 Q1, 2 R1-25

Figure 2-34
A3A12 Address Register Control Series 964

See Figure 2-34 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

A3A12
C1,2 IC3, 6-13, 15, 17, 20 R1-24

Figure 2-35
A3A12 Address Register Control Series 832

A4A1 LIGHT DRIVER AND FLIP/FLOP ASSEMBLY (05480-60012)

DESCRIPTION

The 05480-60012 consists of two 4-state flip-flops. One 4-state flip-flop indicates which pushbutton was last pushed. The other 4-state flip-flop drives one of four transistors, which in turn drives one of four front-panel indicator lights.

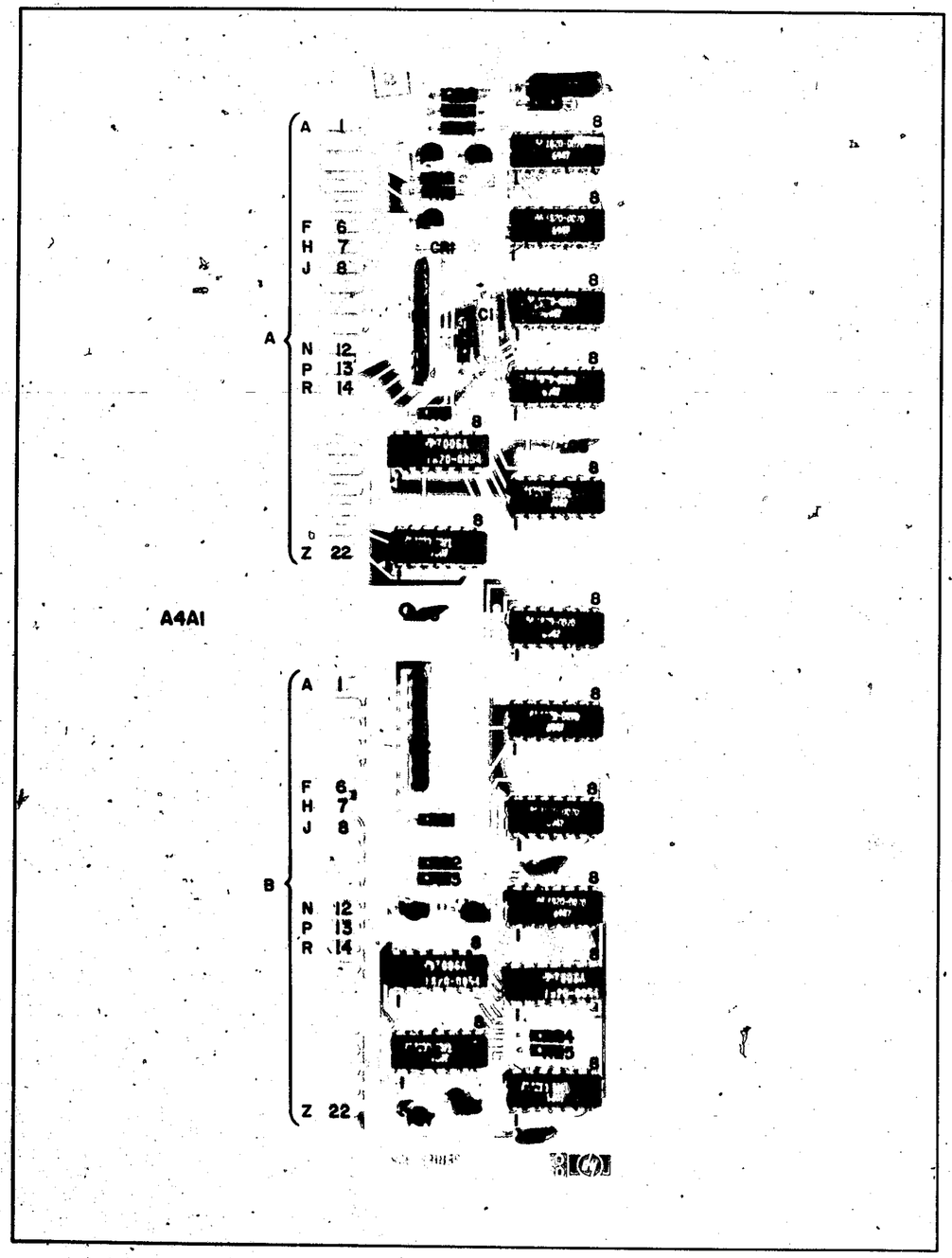
The board also has a voltage monitor which indicates when the voltage difference between the +19.5 V and -19.5 V supplies is less than 30 V, and causes the RESET lamp to light

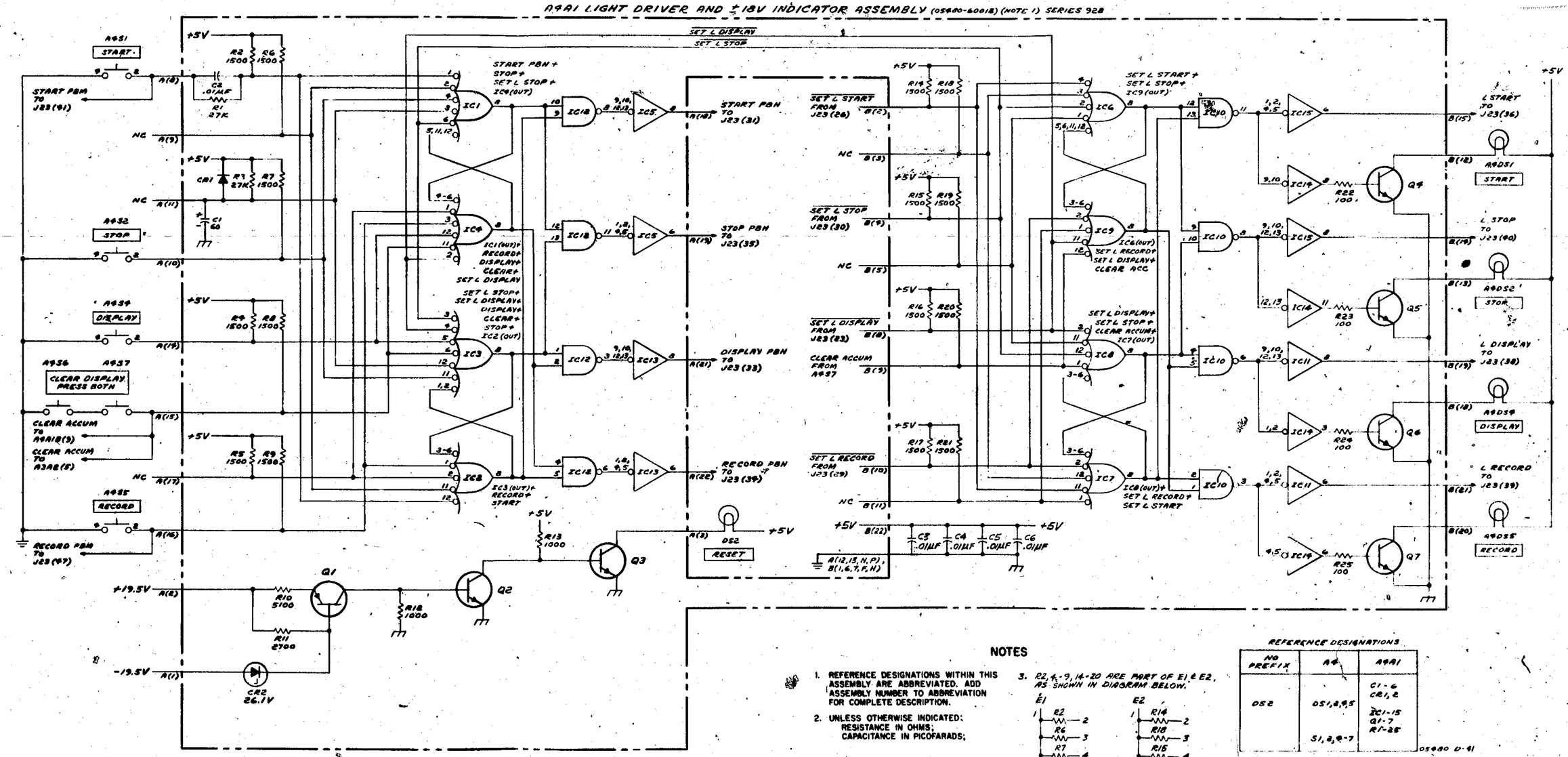
CHANGES FOR OLDER BOARDS

Current Series: 928

Older Series: 832 (see Figure 2-37)

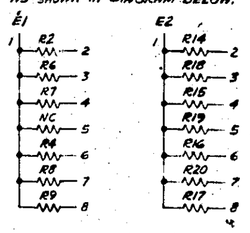
The current board is a direct replacement for the older board.





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. R2, 4-9, 14-20 ARE PART OF E1 & E2, AS SHOWN IN DIAGRAM BELOW.



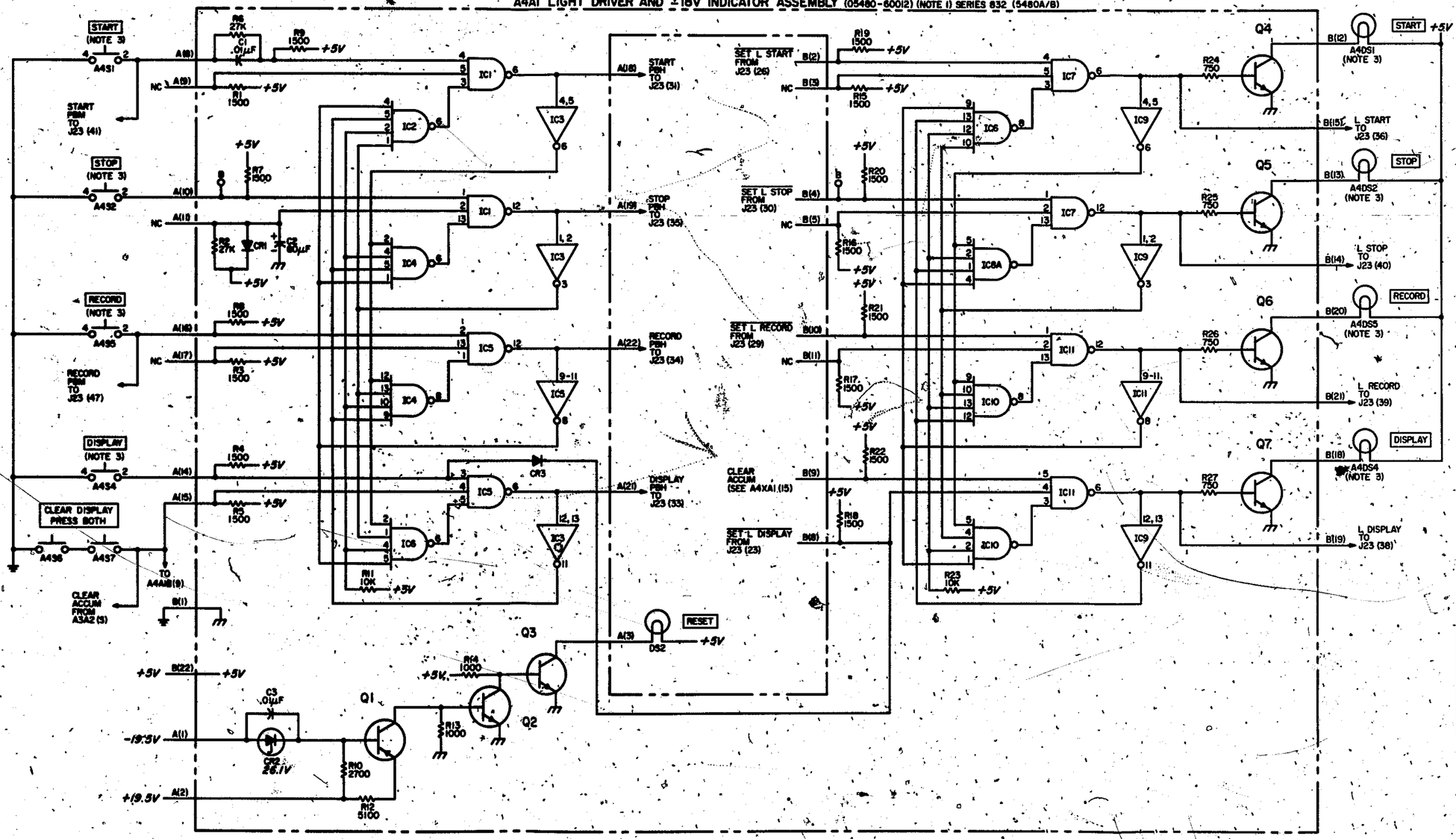
REFERENCE DESIGNATIONS

NO PREFIX	A4	A4A1
DS2	DS1,3,4,5	C1-6, CR1,2, IC1-15, Q1-7, R1-25
	S1,2,3-7	

05480-41

Figure 2-36
A4A1 Light Driver and ±18 Volt Indicator
Series 928

See Figure 2-36 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.
3. START STOP DISPLAY RECORD
   SWITCH CONNECTIONS
   2,4: NORMALLY OPEN
   1,3: NORMALLY CLOSED
   CENTER CONNECTIONS: LAMP

REFERENCE DESIGNATIONS

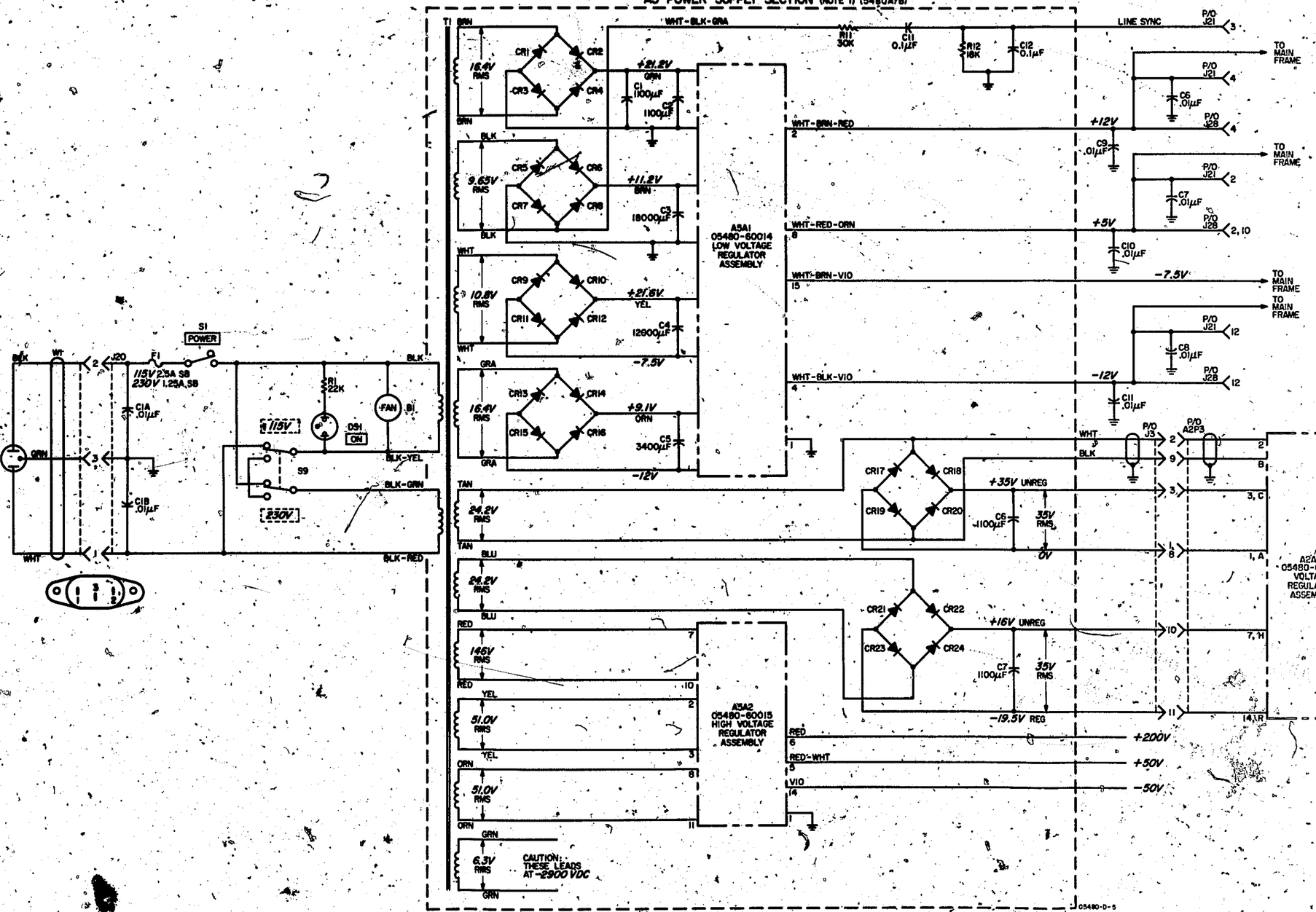
NO PREFIX	A4	A4A1
DS2	DS1,2,4,5	C1-3 CR1-3 IC1-11 Q1-7 R1-27
	S1,2,4-7	

TABLE

REFERENCE DESIGNATIONS	HP PART NUMBER
CR 1,2	1901-0040
3	1902-3268
IC 1,5,7,11	1820-0068
2,4,6,8,10	-0069
3,9	-0054
Q1	1853-0020
2-7	1854-0246
	2N3643

05480-D-4

Figure 2-37
A4A1 Light Driver and ± 18 Volt Indicator
Series 832



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

NO PREFIX	A2	A5
B1		
C1, 6-13		C1-7 11,12 CR1-24
DS1		
F1		
J3,20,21 28	P3	
R1		R11,12
S1,9		
T1		
W1		

TABLE

REFERENCE DESIGNATIONS	HP PART NUMBERS
CR1-24	1901-0409

Figure 2-38
A5 Power Supply

A5A1 LOW VOLTAGE REGULATOR (05480-60014)

DESCRIPTION

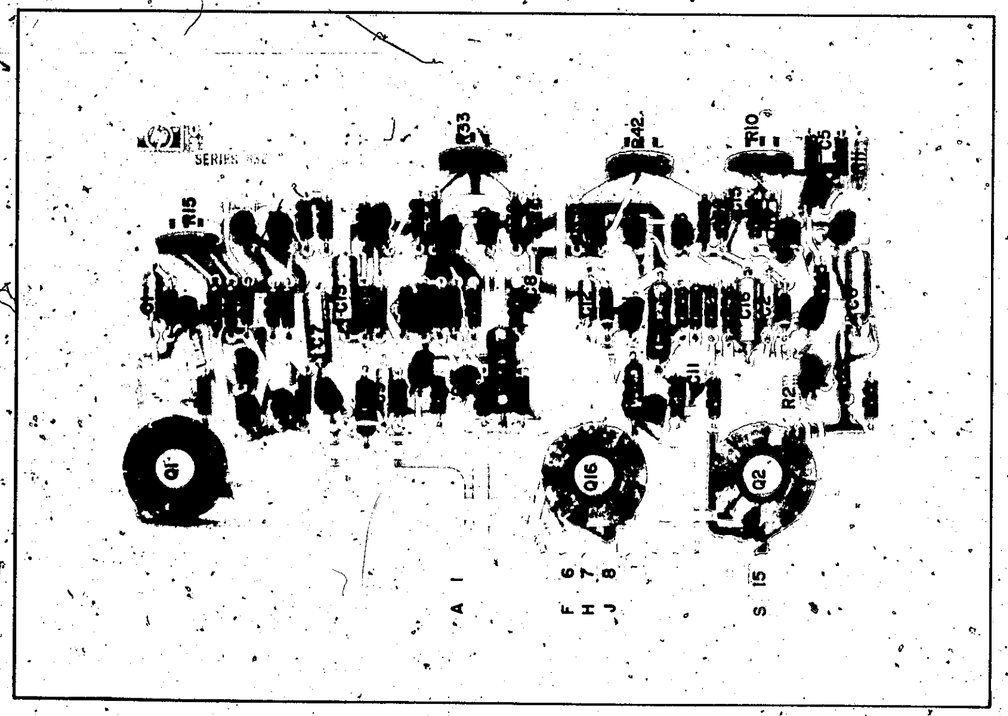
The Low Voltage Regulator includes four power supplies to drive digital, analog, and memory circuitry. The nominal voltages are +12 V, +5 V, -7.5 V, and -12 V. All supplies are current-limited so they will withstand output short circuits. In addition, the +5 V supply includes SCR crowbar circuitry to prevent output over-voltages from damaging the load.

CHANGES FOR OLDER BOARDS

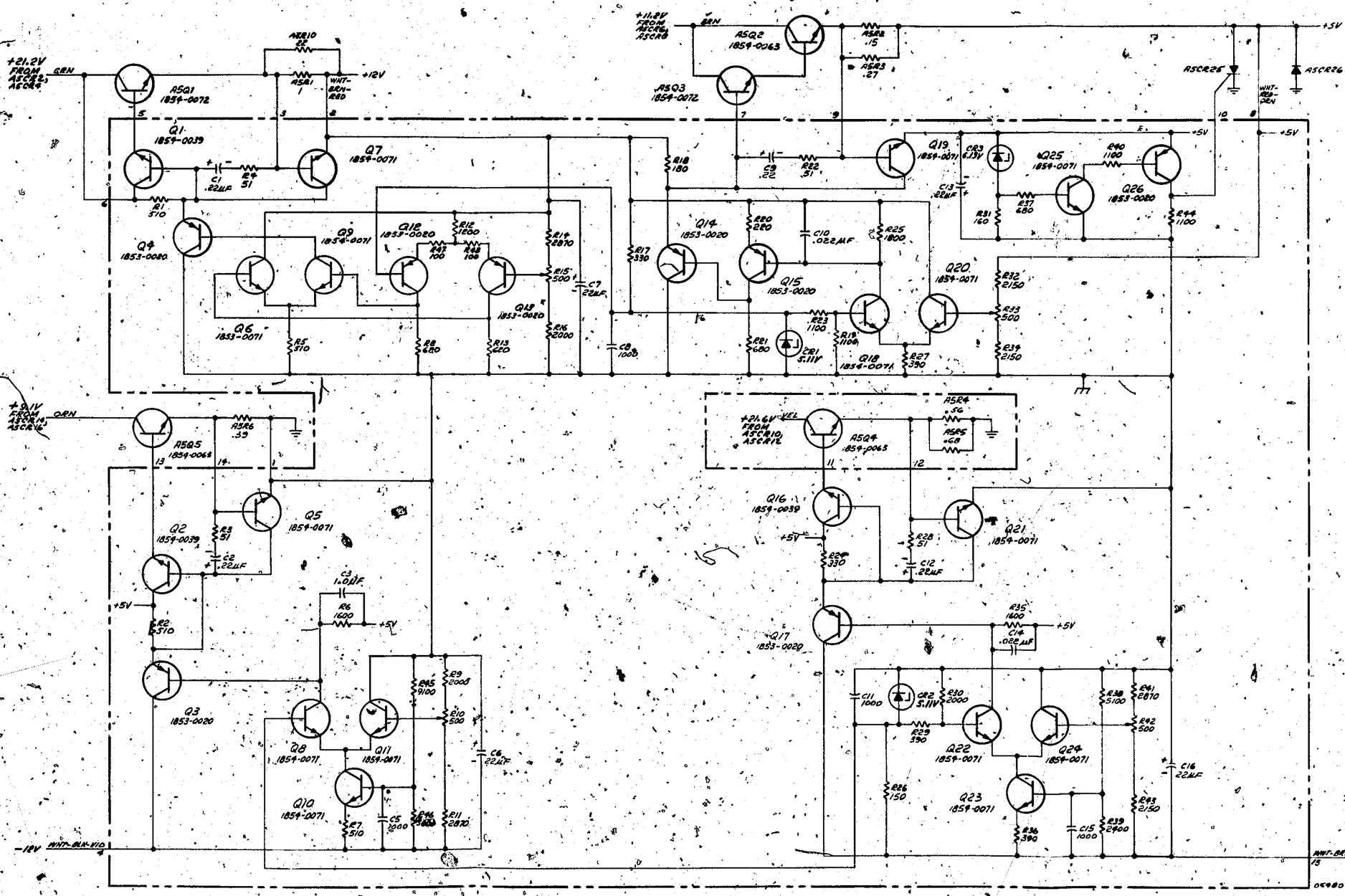
Current Series: 832

Some boards with this series number have a .01 UF capacitor at C14. The current capacitor (0.22 UF) provides better suppression of a parasitic oscillation which was found in some of these supplies.

Older Series: None.



A5A1 LOW VOLTAGE REGULATOR ASSEMBLY (05480-60014) (NOTE 1) (SERIES 832)



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

A5	A5A1
	C1-6
CR1,25,26	CR1-3
Q1-5	Q1-26
R1-6,10	R1-48

DELETED: C4

Figure 2-39
A5A1 Low Voltage Regulator Series 832

A5A2 HIGH VOLTAGE REGULATOR (05480-60015)

DESCRIPTION

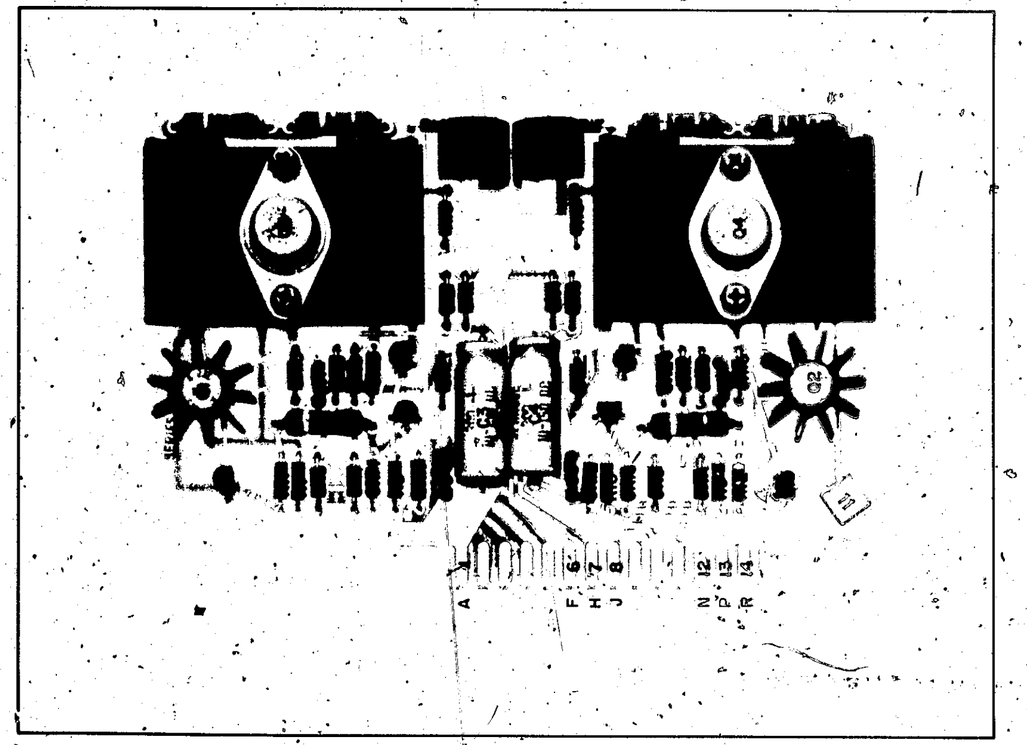
This board provides power to the CRT, CRT High Voltage Supply, and Deflection Amplifiers. The plus- and minus-50 V supplies are regulated and current-limited; they are used for the CRT HV supply and electrodes in the CRT. The nominal +200 V is unregulated, has current limiting, and with the -50 V supply is used in the Vertical and Horizontal Deflection Amplifiers.

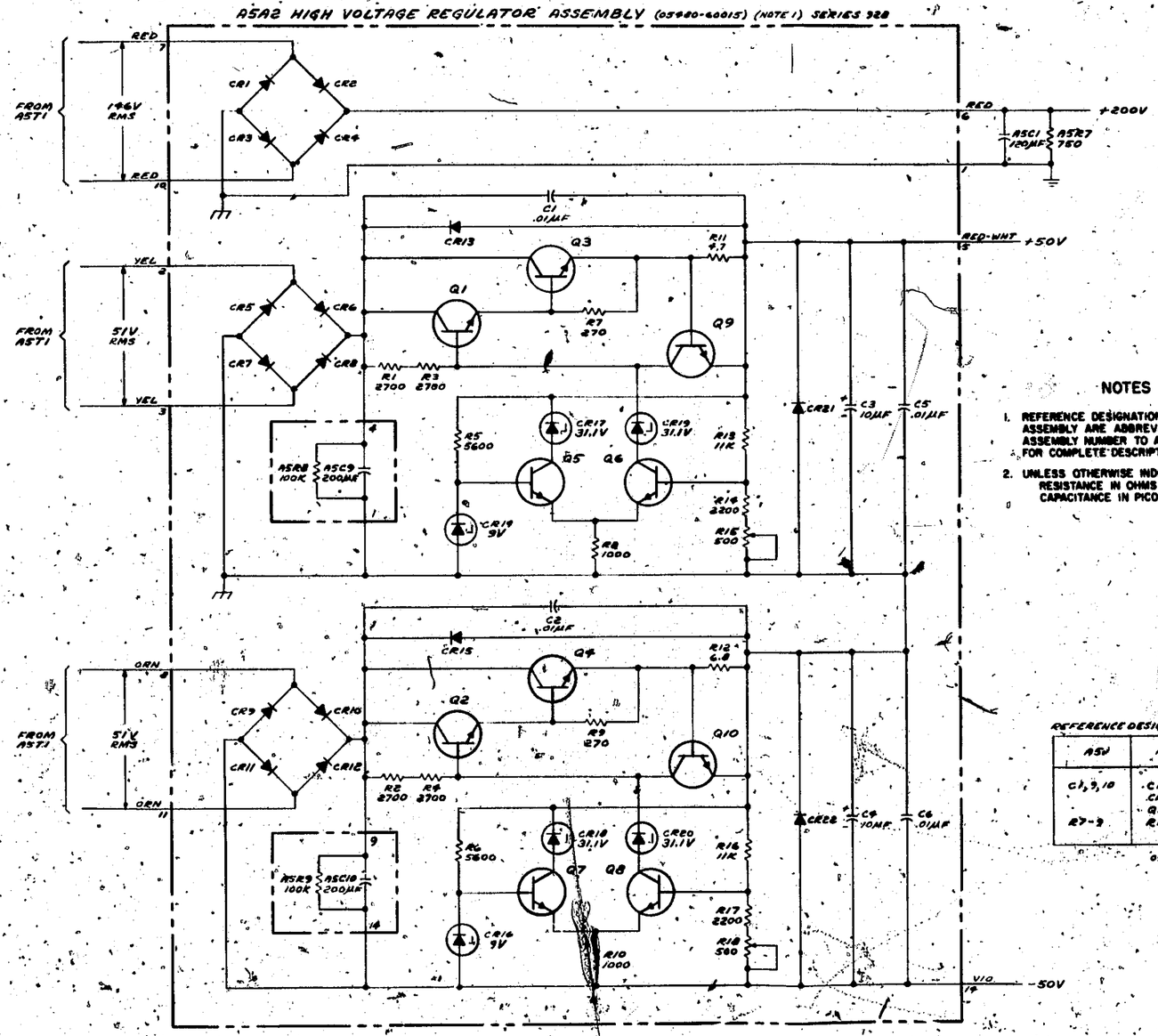
CHANGES FOR OLDER INSTRUMENTS

Current Series: 928

Older Series: 832 (see Figure 2-41)

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;

REFERENCE DESIGNATIONS

A5U	A5A2
C1, 9, 10	C1-6
	CR1-22
	Q1-10
R7-9	R1-18

05980-0-42

Figure 2-40
A5A2 High Voltage Regulator Series 928