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   1 of 8

START

SIGNAL ANALYZER
5480A/B with 5485A, 5486A/B, 5487A, 5488A PLUG-INS

ALL SERIALS

This manual applies to all standard Hewlett-Packard Model 5480A/B Signal Analyzer Systems, as described in 5480A/B Signal Analyzer System Service Manual, Volume I, Paragraph 1-5.

SPECIAL INSTRUMENTS

The information required to relate this manual to special modifications is supplied on special insert sheets. If this information is missing, contact any HP Sales and Service Office, giving full specification number, instrument name, and serial number.

HEWLETT **hp** PACKARD

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

SECTION I

GENERAL INFORMATION

1-1. SCOPE

This manual contains schematic diagrams, component locators, and function descriptions for boards in Standard 5480A/B Signal Analyzer systems, including plug-in units. Unit wiring diagrams from Volume I of the Service Manual are repeated as appropriate.

1-2. MANUAL ORGANIZATION

The three sections of schematic and wiring diagrams in this manual are organized as follows:

Section II: 5480A/B

    Wiring diagram for Section I (Display Section)
    Schematic diagrams for 5480A/B A1A1-A1A4
    Wiring diagram for Section II (Memory Section)
    Schematic diagrams for 5480A/B A2A1-A2A14
    Wiring diagram for Section III (Main Frame Logic Section)
    Schematic diagrams for 5480A/B A3A1-A3A12
    Wiring and Schematic diagrams for 5480A/B A4A1 (Light Driver
        and Flip/Flop)
    Wiring diagram of Section V (Power Supply Section)
    Schematic Diagrams for 5480A/B A5A1 and A5A2

Section III: Analog Plug-In Units

    Wiring diagram for 5485A
    Schematic diagrams for 5485A A1-A7, plus switches
    Wiring diagram for 5487A
    Schematic diagrams for 5487A A1-A7, plus switches
    Wiring diagram for 5488A
    Schematic diagrams for 5488A A1-A9, plus switches

Section IV: Logic Plug-In Units

    Wiring diagram for 5486B
    Wiring diagram for 5486A
    Schematic diagrams for 5486A/B A1-A13, plus switches

Schematic figures normally include component locators for board assemblies and test describing board operation. There is no separate backdating section in this manual. All information for current and past boards having the same reference designation is presented on a single page or on consecutive pages.

The basic reference unit for a block of information presented in this manual is derived from the number of the fold-out figure that contains the information. For example, Table 3-2A would be part of fold-out Figure 3-2.

SECTION II

MEMORY-DISPLAY UNITS
(5480A/B)

The units described include the Display, Memory, Main Frame Logic, and Power
Supply sections for the 5480A/B Signal Analyzer systems. The Memory-Display
units contain two plug-in compartments; the right-hand compartment accepts one
of the Analog Plug-In Units described in Section III of this manual, the left-hand
compartment accepts one of the Logic Control Plug-In units described in Section
IV of this manual.

A1 DISPLAY SECTION (5400A/B)

OUTPUT HORIZ DAC
VERTICAL SCOPE OUTPUT

J0 (NOTE 1)
J20 (NOTE 1)

ANALOG PLUG-IN

HORIZONTAL POSITION
R4
7

MAGNIFIER X1/X5
S1
2,3

FOCUS
R1

P26
VERT DEFL 49
HORIZ DAC 45
INTENSIFY 31
INTENSITY MOD (NOTE 2) Y J18
SET VERT 19 J2
GET NUMBER 41

J26

A2 MEMORY SECTION

A1A1 DEFLECTION AMPLIFIER (05400-60013)
6
4
14
13
10
11

VERT 2
HORIZ 2

V DEFL PLATES 10,11
H DEFL PLATES 6,7

A1V1 CRT

INTENSITY R3
FOCUS R1

TRACE ALIGN R2

A5 POWER SUPPLY SECTION

+200V 1
+12V 5
+5V 12
-12V 20
-50V 8
GND 17,19

R33
R47
R40

+200V
+50V
-50V
GND

A1A4 HV REG (01200-66515) (NOTE 3)
R14 INTENSITY LIM
17A ASTIG
17D HIGH VOLTAGE

FOCUS 4
ACCEL 8
ASTIG 9
GRID 1 3
CATH 2
FIL 14

-3000V
-2950V

R6

6.3VAC

A5A2 (6) +200V -50V
A5A2 (5) +50V GND
A5A1 (2) +12V
A5A1 (0) +5V
A5A1 (4) -12V
A5A2 (14) -50V
A5T1 (GRN) 6.3VAC
2

CAUTION: THESE LEADS AT -2900VDC

15

A1A3 HV RECT (01200-66505)
2

A5 MAIN FRAME LOGIC
CRT PAN D A11 (R)

GND

DETERMINES CALIBRATOR FREQUENCY

+12V
TRACE ALIGN COIL L1
GND

A1A2 CALIBRATOR (05400-60025)
A2 CALIBRATOR
R4 CALIBRATOR

A1J1

CALIBRATOR 1 VOLT

J11

OUTPUT Z-AXIS

NOTES
1. J0 AND J20 CAN BE USED AS INPUTS TO DISPLAY SECTION WHEN PLUG-INS ARE REMOVED.
2. CAN BE USED AS INTENSITY MODULATION INPUT AT ANY TIME.
3. A1A4 WAS (01200-66505) IN OLDER INSTRUMENTS, THE CURRENT BOARD IS A DIRECT REPLACEMENT FOR THE OLDER ONE.

Figure 2-1
A1 Display Section

2-1

A1A1 DEFLECTION AMPLIFIER ASSEMBLY (05480-60013)

DESCRIPTION

General

This board assembly drives the Horizontal and Vertical Deflection plates of the CRT. The gating circuitry for Z-Axis unblanking also on this board. Approximately 5 usec after an unblank pulse, the CRT is turned on for about 5 usec, as described below.

Unblanking

In the Memory Section, The SET V NUM signal places the accumulator value to be displayed into the Vertical DAC (A2A10). At the same time, on the Deflection Amplifier Assembly, Q4, Q8, and Q10 act to provide a delayed pulse to IC2(2) and IC1(10); the delay is about 5 usec, determined by the time constant of R7 and C3, and a reference voltage given by R27 and R24.

The delayed pulse sets IC1(8) high, causing unblanking to occur, and the Z-Axis output to go low. After a delay (about 5 usec) determined by A3, Q7, Q9, R6, C2, R26, and R22, a low pulse to IC2(4) causes IC1(8) to go low, blanking to CRT, and setting the Z-Axis output back to high.

CHANGES FOR OLDER BOARDS

Current Series: 852

Older Series: 832

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

2. The circuit for the current board is the same as the older board. Reference designations for the current board may be used for the older board. Only difference is parts values.

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

3. ASTERISK (*) INDICATES SELECTED COMPONENT, AVERAGE VALUES SHOWN

4. TERMINAL 17 IS GROUND ONLY FOR IC_1-3.
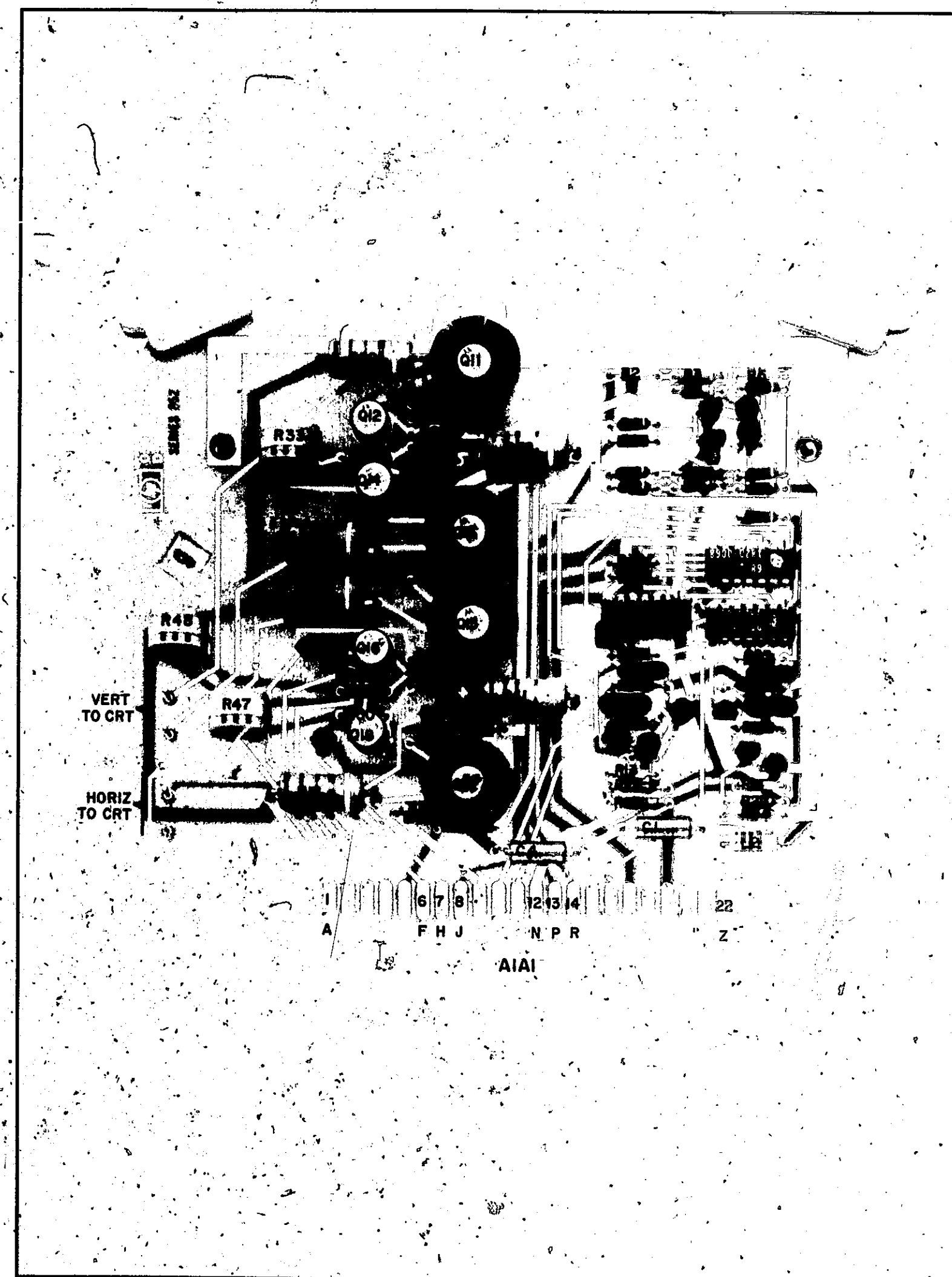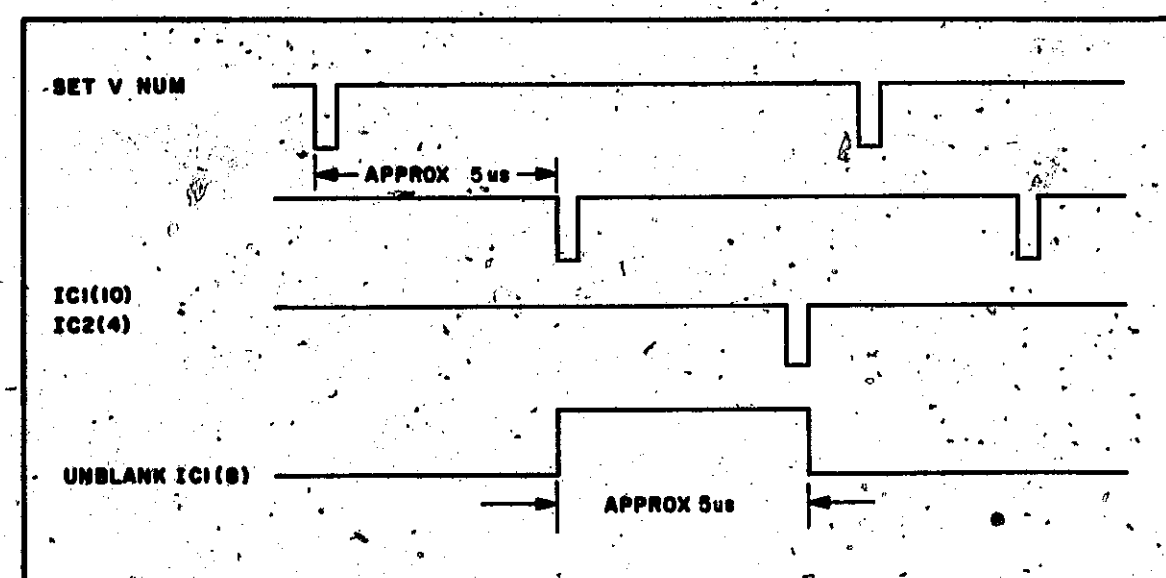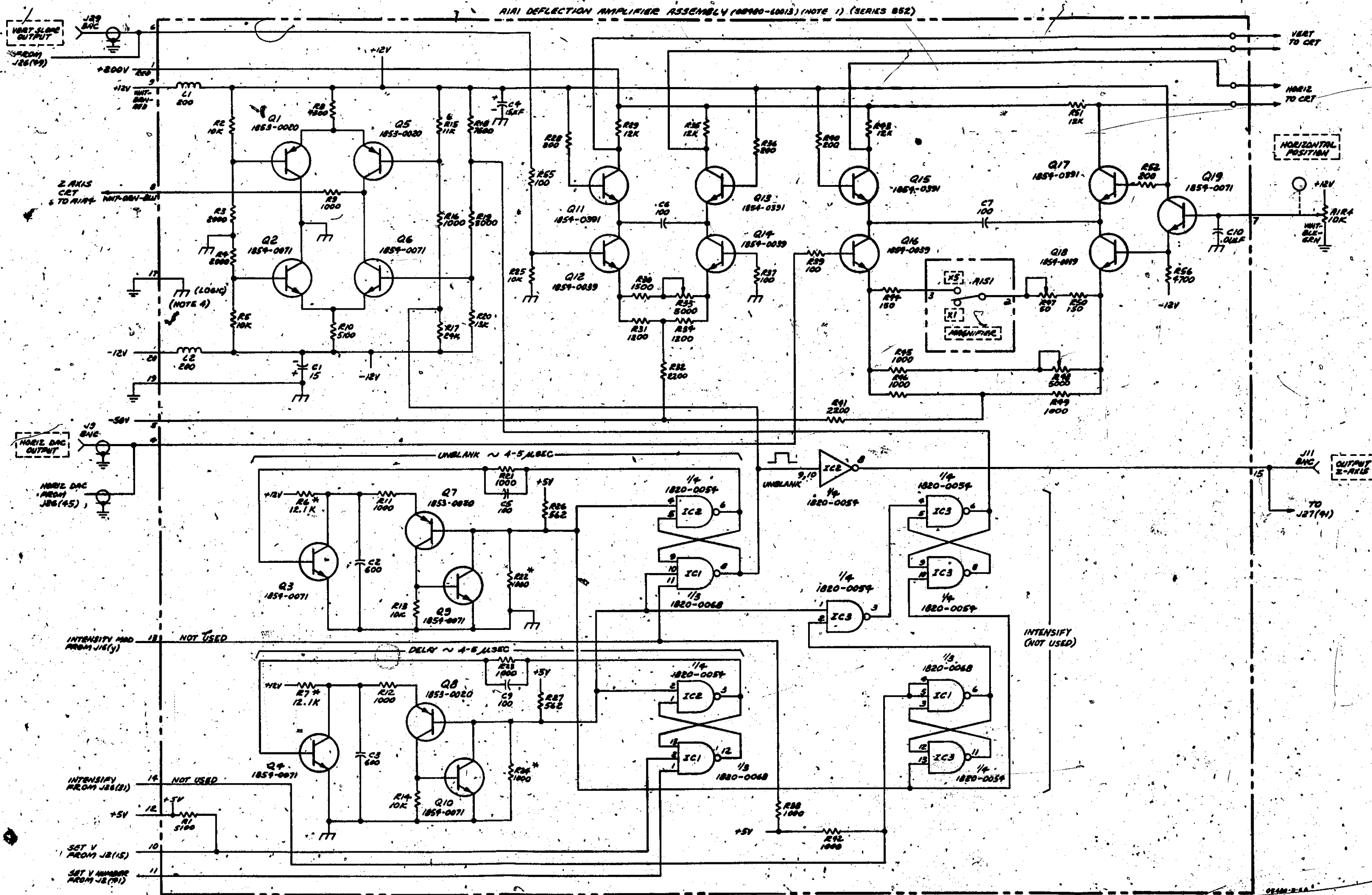
Figure 2-2
A1A1 Deflection-Amplifier Series 852
2-3

See Figure 2-2 for board description

A1A1 DEFLECTION AMPLIFIER ASSEMBLY (05480-60013) (NOTE 1) (SERIES 832)
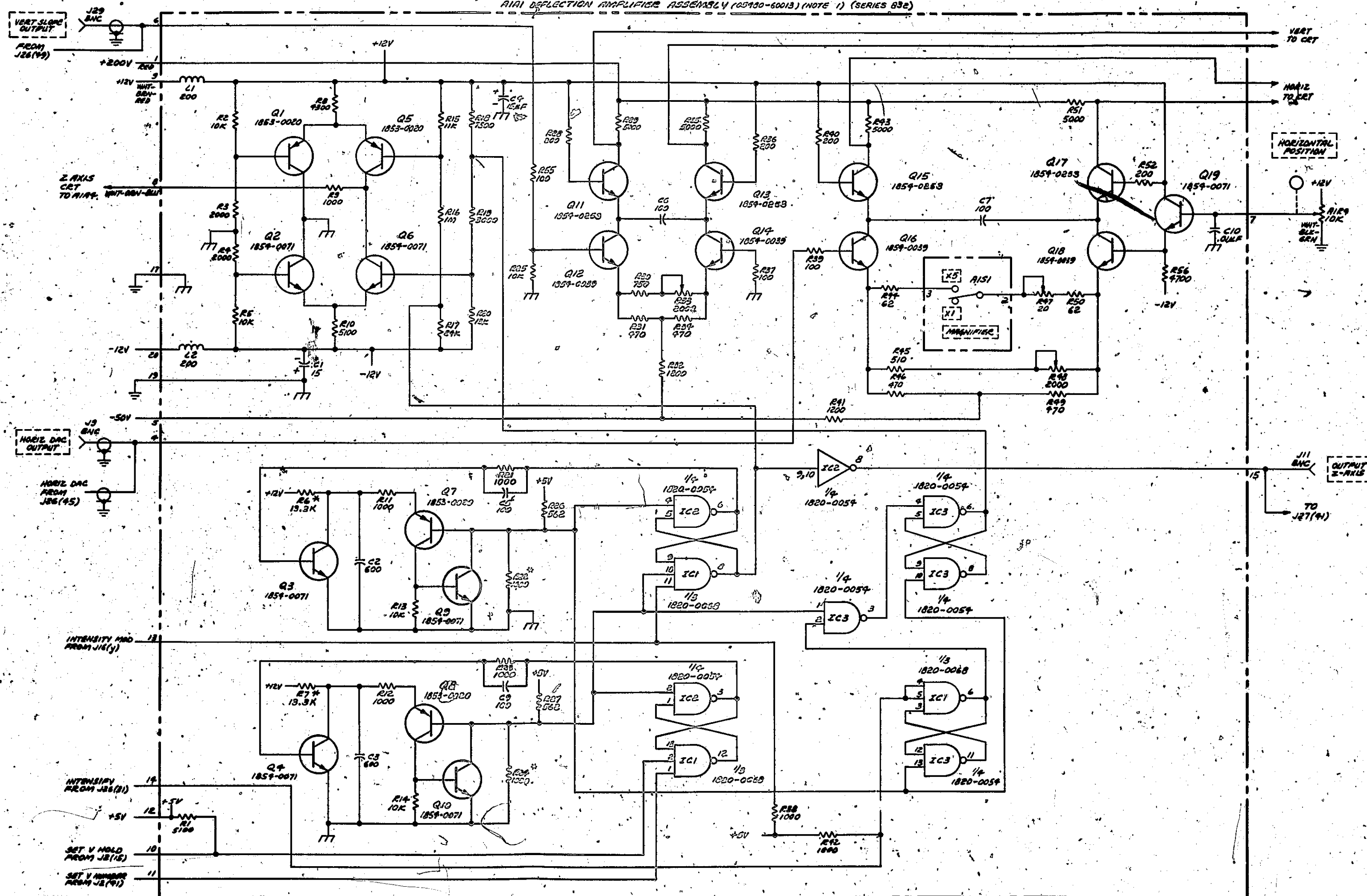
VERT SLOPE OUTPUT

FROM J26(74)

VERT TO CRT

HORIZ TO CRT

Z AXIS CRT TO A1A4

HORIZONTAL POSITION

HORIZ DAC OUTPUT

HORIZ DAC FROM J26(45)

INTENSITY MOD FROM J16(y)

INTENSIFY FROM J26(31)

SET V HOLD FROM J8(15)

SET V NUMBER FROM J8(71)

OUTPUT Z-AXIS

TO J27(41)

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

3. ASTERISK (*) INDICATES SELECTED COMPONENT, AVERAGE VALUES SHOWN

REFERENCE DESIGNATIONS

NO PREFIX	R1	A1A1
J9,11,29		C1-10
		1C1-3
		L1,2
		Q1-19
	R4	R1-56
	51	

DELETED:
C8
R53,54

Figure 2-3
A1A1 Deflection Amplifier Series 832

2-5

A1A2 CALIBRATOR (05480-60025)

DESCRIPTION

The Calibrator board provides a 1 V p-p square wave signal whose frequency is synchronous with the processing sweep, giving a signal at the calibration output jack which will give a constant 6.4-cycle display on the CRT. Calibrator frequency control is done by driving the calibrator from Process Address Register bit 6.

CHANGES FOR OLDER BOARDS

Current Series: 832

Older Series: None

A1A3 H.V. XFMR AND RECTIFIER (01200-66505)

DESCRIPTION

This board works with the 01200-66506 regulator board, and contains the HV oscillator coil, HV transformer primary, and HV rectifiers. Outputs from this board are regulated and applied to the CRT by the HV Regulator Assembly.

A1A4 HV REGULATOR ASSEMBLY (01200-66515, 01200-66506)

DESCRIPTION

This board provides all HV outputs necessary to drive the CRT, as well as Z-Axis unblanking gate amplifier.

CHANGES FOR OLDER BOARDS

Current Boards: 01200-66515

Older Boards: 01200-66506

The current board is a direct replacement for the older board, as described below.

The CRT bias protection circuit (CR8, R37, VR2, VR3) was not part of the 01200-66506 board assembly. In the 5480A, the circuit shown in Figure 2-4a was used. This circuit was mounted on a small board next to the HV regulator; the small board should be discarded when the older HV regulator is replaced with the 01200-66515 regulator.

R35 and L2 (in the Regulator circuit) were not part of all 01200-66506 boards. On these boards, Q6 collector was connected directly to Q5 base, and Q5 emitter was connected directly to the pin to which the ORN wire is connected. R35 was added to the circuit to provide current limiting protection for oscillator transistor Q4 in the event high voltage is shorted to ground. L2 was added to dampen any harmonic oscillations of Q4 and the transformer primary; these harmonic oscillations appear on the CRT face as intensity modulation.

R36 was not part of all 01200-66506 boards. This resistor was added to ensure diode leakage characteristics, which in turn correct "double moding" oscillations in the HV supply.

Figure 2-4a. CRT Bias Protection Circuit

A1A3

A1A4

(01200-66515)

WHT-BLK-RED
WHT-RED
WHT-BLK
WHT-GRN

WHT-GRN-GRA
WHT-YEL-GRA

BLK

WHT-BLK-ORN

BLU
GRN
RED
WHT-RED
BLK

VIO
WHT-VIO
ORN
WHT-BRN-YEL
WHT-BRN-YEL
WHT-ORN-GRN
WHT-ORN-VIO
WHT-ORN-BLU

C15

WHT-BLK-ORN

GRN
WHT-GRN-GRA
WHT-YEL-GRA
YEL
ORN
BLU

BLK
WHT-GRN
WHT-BLK-RED
WHT-BLK-GRA
WHT-RED
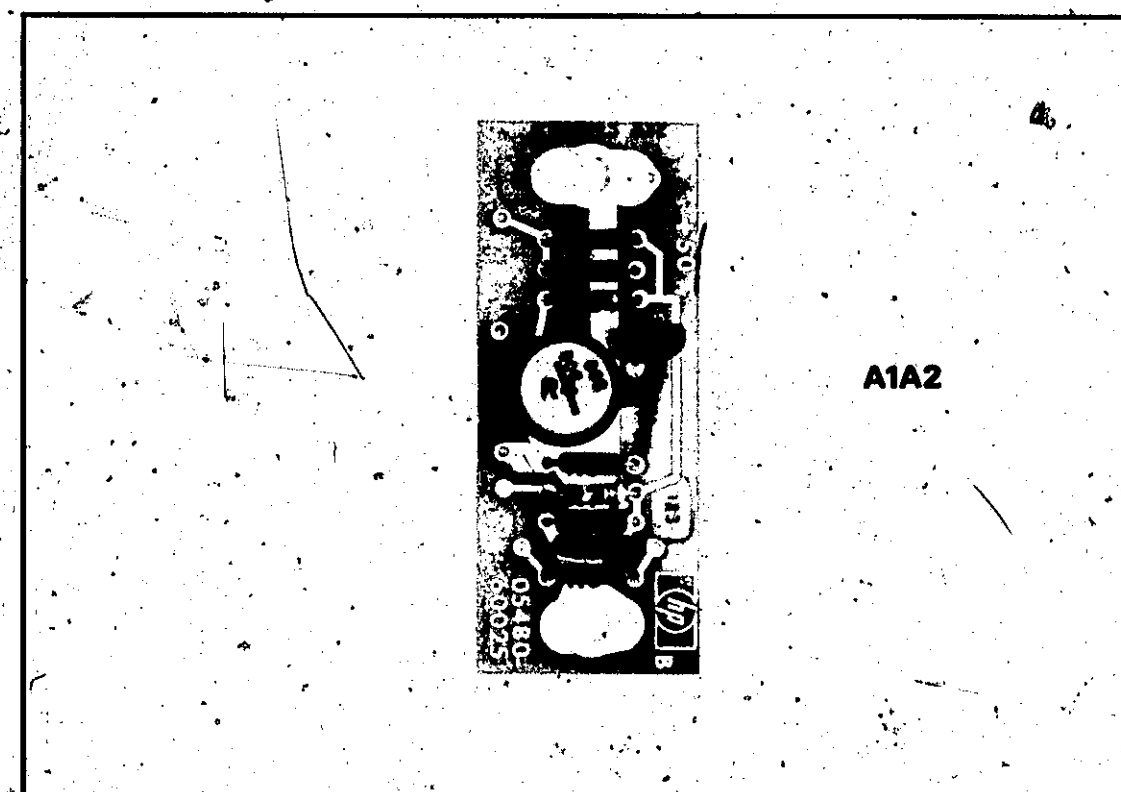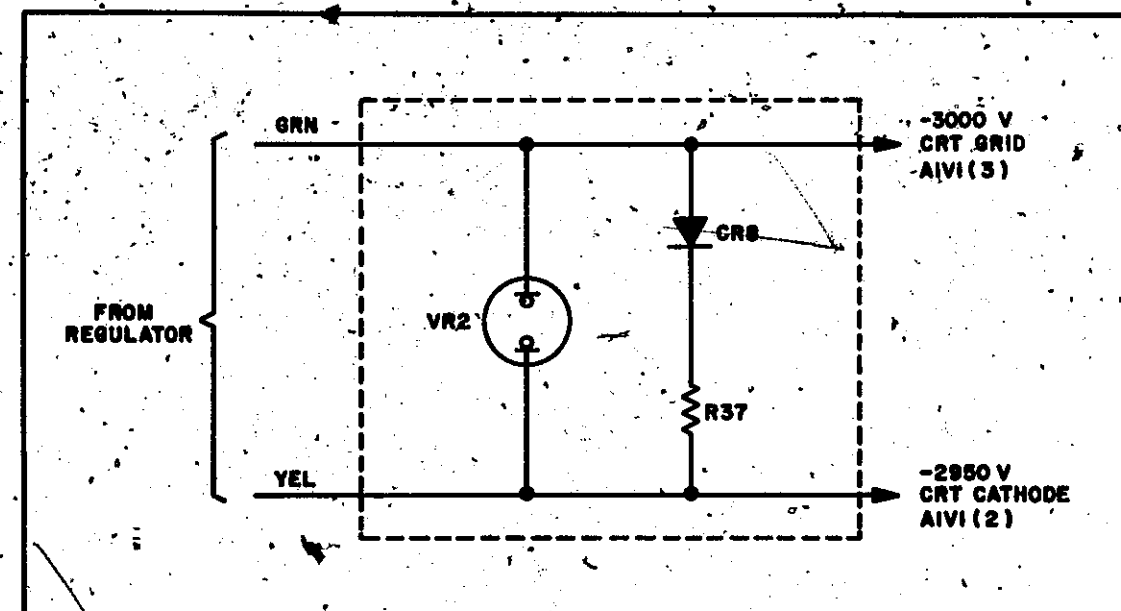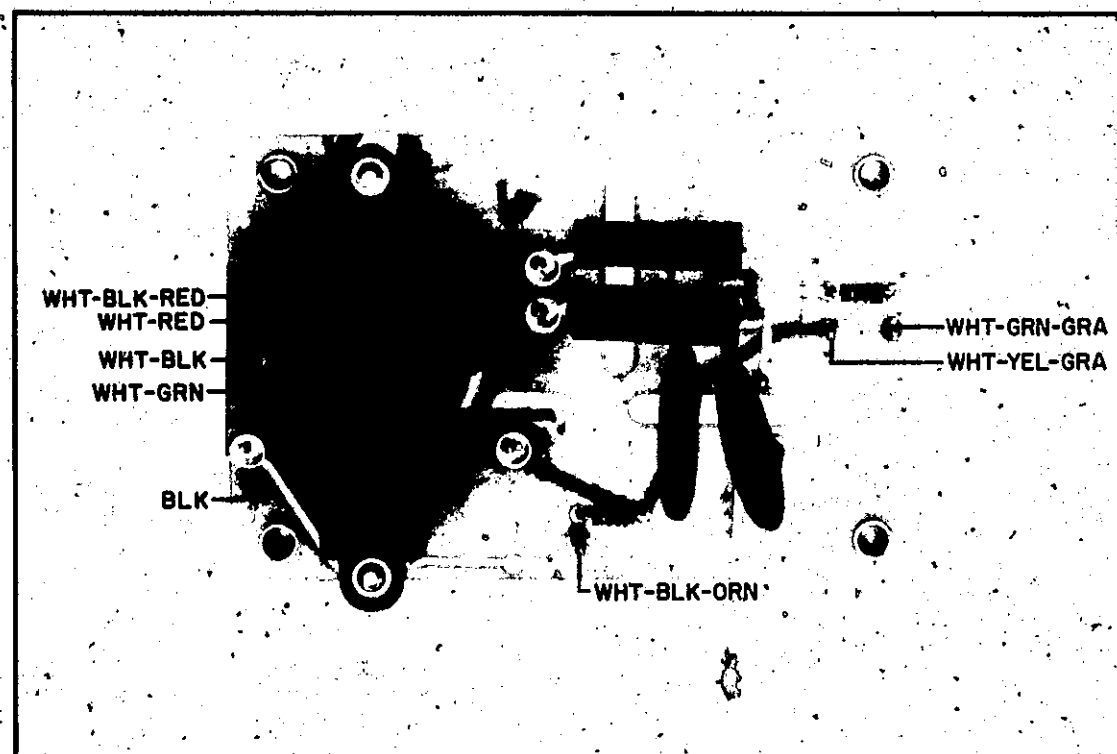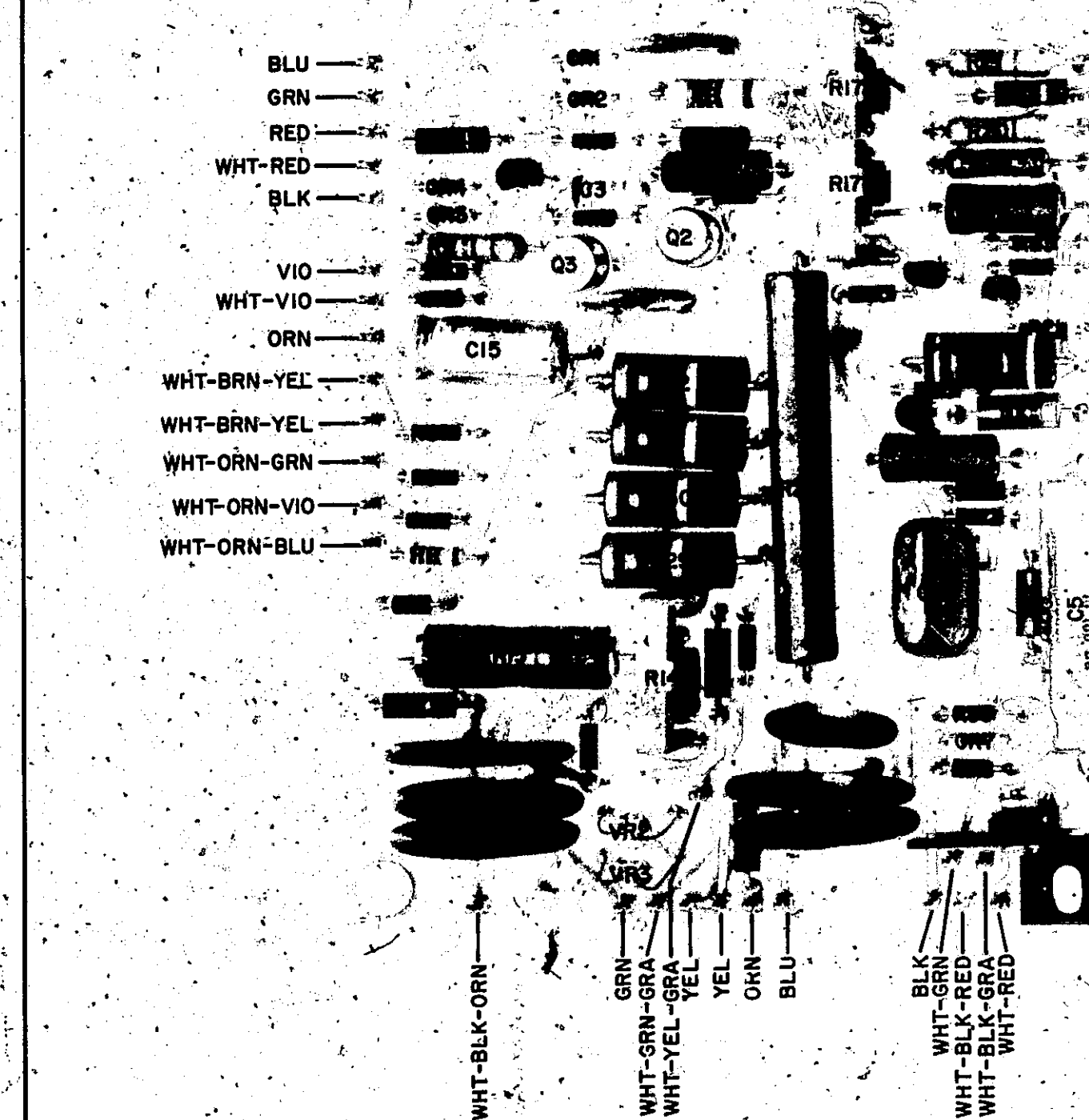
OPEN THIS FOLD FOR ADDITIONAL INFORMATION

A1A4

(01200-66506)

BLU
GRN
RED
WHT-RED
BLK

VIO
WHT-VIO
ORN

WHT-BRN-YEL

WHT-ORN-GRN
WHT-ORN-VIO
WHT-ORN-BLU

WHT-BLK-ORN

GRN
WHT-GRA-GRN
WHT-YEL-GRA
YEL
ORN
BLU

BLK
WHT-GRN
WHT-BLK-RED
WHT-BLK-GRN
WHT-BLK-RED
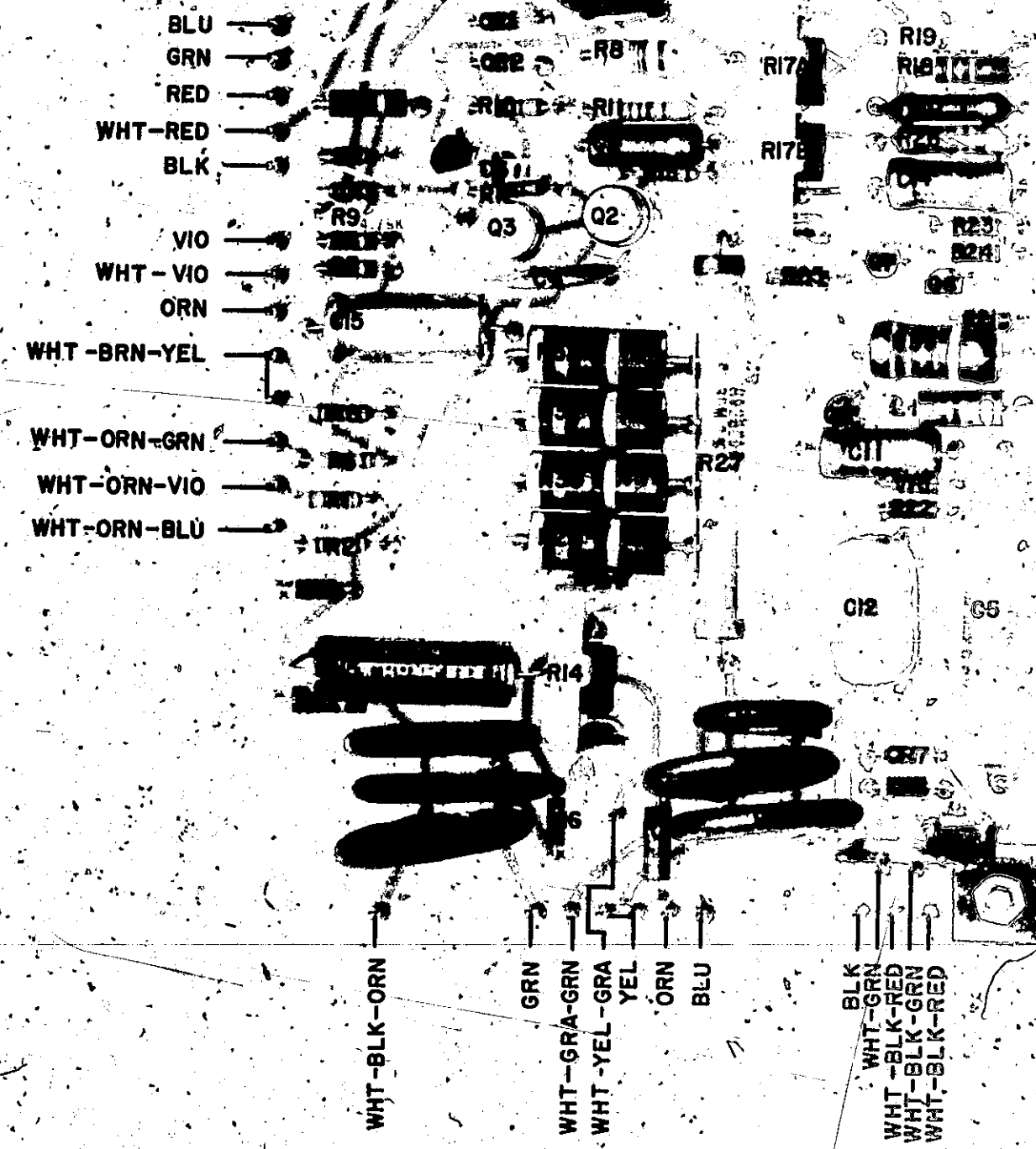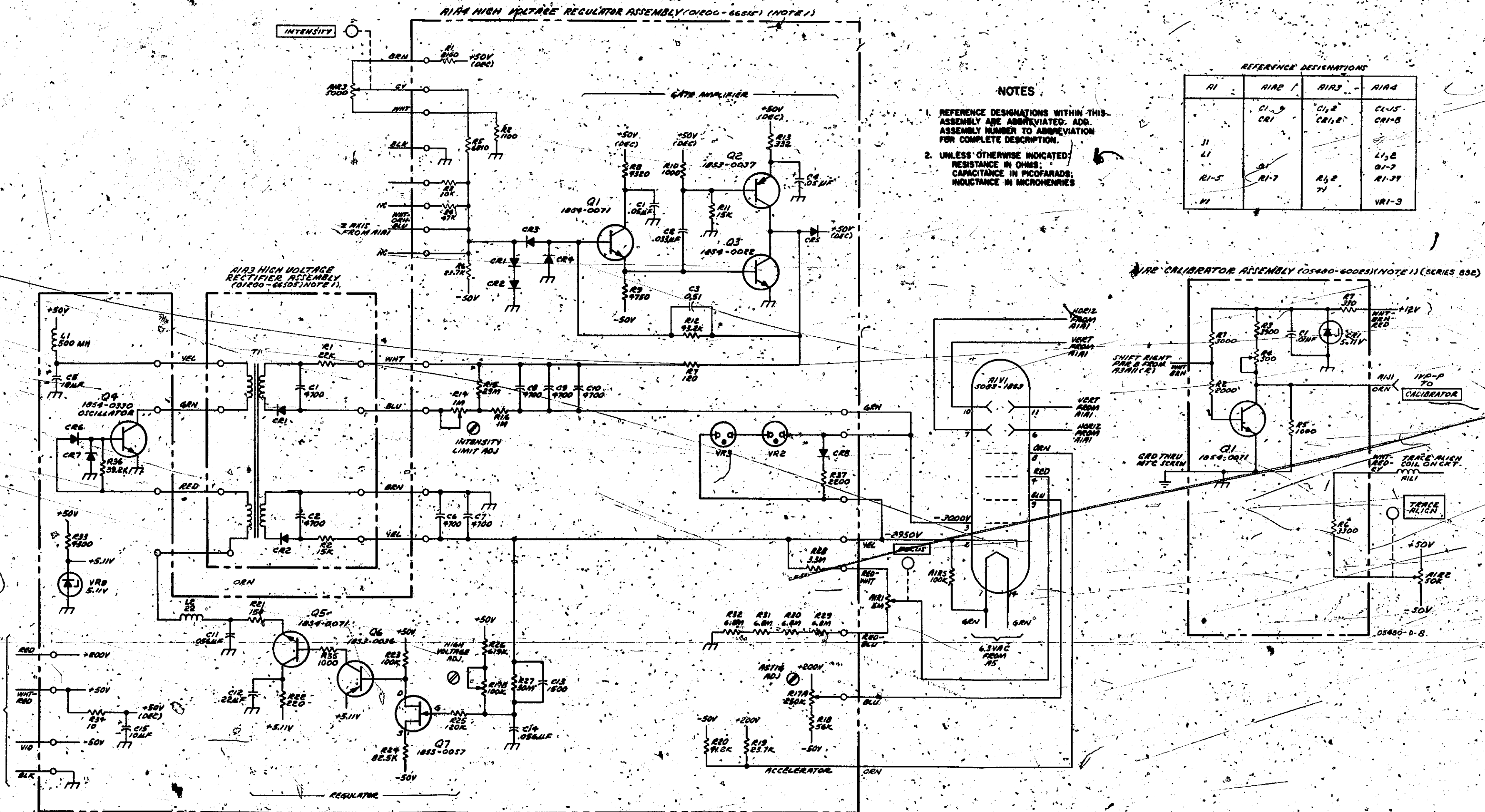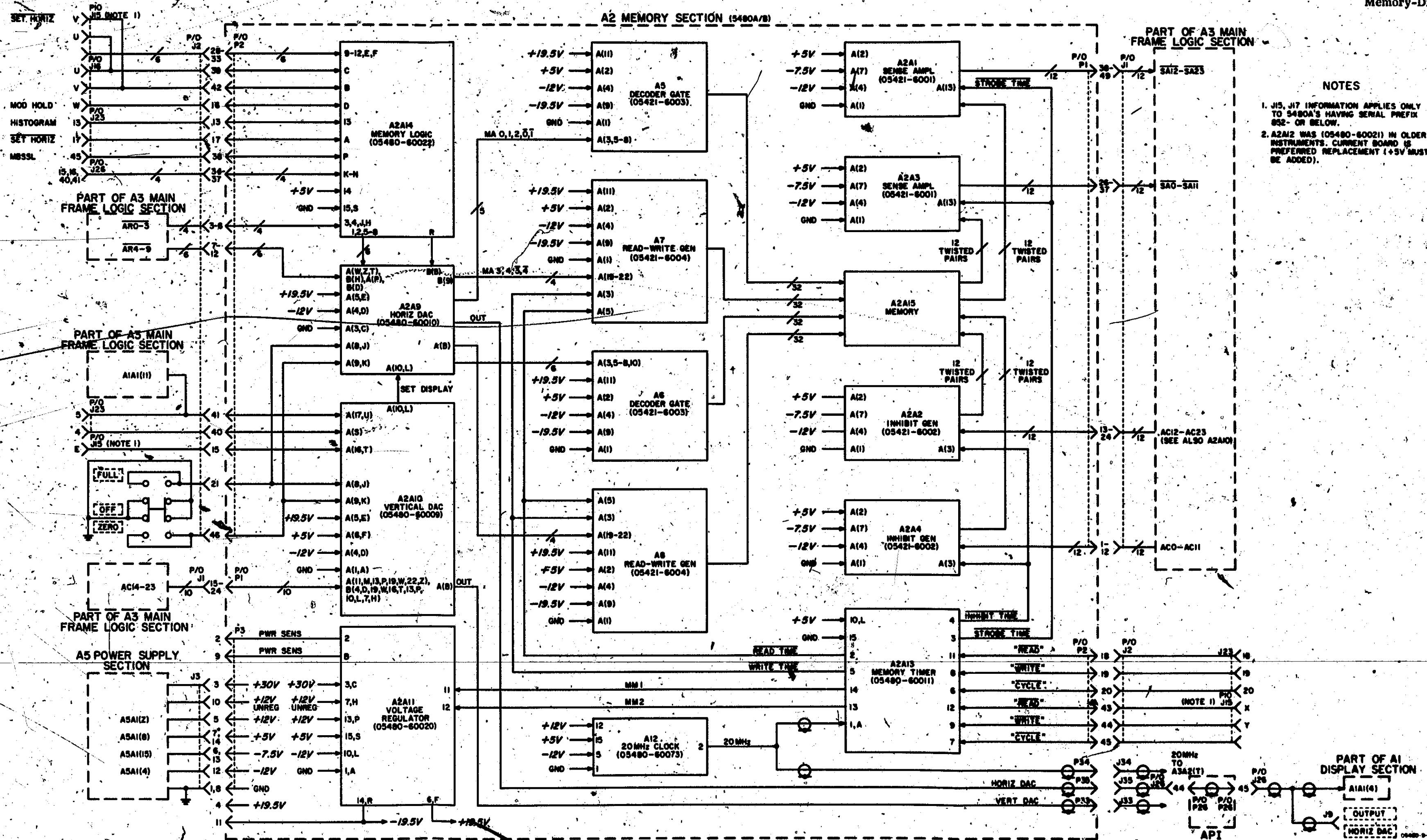
Figure 2-5
A2 Memory Section Wiring Diagram

2-9

A2A1, A2A3 SENSE AMPLIFIER (05421-6001)

Each of these board assemblies contain 12 individual sense amplifier circuits. Each sense amplifier circuit amplifies the low-level signal from the magnet core memory stack to a TTL level compatible with other 5480A/B logic.

A2A1 AND A2A3 SENSE AMPLIFIER ASSEMBLY (05421-6001)(NOTE 1)

+5V FROM A2P3(7,14)   A(2)
C13 2.2μF   +5V
(NOTE 3)   B(22)
C14 10μF   R85 150   CR1 7.5V
-12V
STROBE TIME FROM A2A3(W)   A(13)
(NOTE 3)   B(Z)
(NOTE 3)   B(21)
-7.5V FROM A2P3(6,13)   A(7)   -7.5V
-12V FROM A2P3(12)   A(4)
C15 2.2μF   -12V
(NOTE 3)   B(Y)
CHASSIS GROUND   A(1)

R1 110   Q1   R9 240   Q5
R5 825   -12V   C1 22μF
R6 825   -12V   Q6
Q2   R13 10K   R13 10K   +5V
R2 110   R10 240
R3 110   Q3   R11 240   Q7
R7 825   -12V   C2 22μF
R8 825   -12V   Q8
Q4   R14 10K   +5V
R4 110   R12 240

C16 10μF   R86 34.8   R87 34.8   +5V

ICIB 4 6   ICIA 9 10 8
IC1D 1 3   ICIC 13 12 11

A1
A(5)
A(6)

A2A1 SAI2 TO A2P1(38)
A2A3 SA0 TO A2P1(26)
A2A1 SAI3 TO A2P1(39)
A2A3 SAI TO A2P1(27)

B(20)   B(X)   B(19)   B(W)   C3,4   IC2   Q9-16   R15-28   B   A(11)
A2A1 SAI4 TO A2P1(40)
A2A3 SA2 TO A2P1(28)
A(12)
A2A1 SAI5 TO A2P1(41)
A2A3 SA3 TO A2P1(29)

B(18)   B(V)   B(17)   B(U)   C5,6   IC3   Q17-24   R29-42   C   A(15)
A2A1 SAI6 TO A2P1(42)
A2A3 SA4 TO A2P1(30)
A(16)
A2A1 SAI7 TO A2P1(43)
A2A3 SA5 TO A2P1(31)

B(16)   B(T)   B(15)   B(S)   C7,8   IC4   Q25-32   R43-56   D   A(17)
A2A1 SAI8 TO A2P1(44)
A2A3 SA6 TO A2P1(32)
A(18)
A2A1 SAI9 TO A2P1(45)
A2A3 SA7 TO A2P1(33)

B(14)   B(R)   B(13)   B(P)   C9,10   IC5   Q33-40   R57-70   E   A(19)
A2A1 SA20 TO A2P1(46)
A2A3 SA8 TO A2P1(34)
A(20)
A2A1 SA21 TO A2P1(47)
A2A3 SA9 TO A2P1(35)

B(12)   B(N)   B(11)   B(M)   C11,12   IC6   Q41-48   R71-84   F   A(21)
A2A1 SA22 TO A2P1(48)
A2A3 SA10 TO A2P1(36)
A(22)
A2A1 SA23 TO A2P1(49)
A2A3 SA11 TO A2P1(37)

(NOTE 3)

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. CONNECTOR WIRED TO MEMORY STACK A2A15

REFERENCE DESIGNATIONS

A2A1, A2A3
C1-16
CR1
IC1-6
Q1-48
R1-87

TABLE

REFERENCE DESIGNATIONS	HP PART NUMBERS
CR1	1902-0064
IC1-6	1820-0054
Q1-48	1854-0005
	2N708

Figure 2-6
A2A1, A2A3 Sense Amplifier Series 744
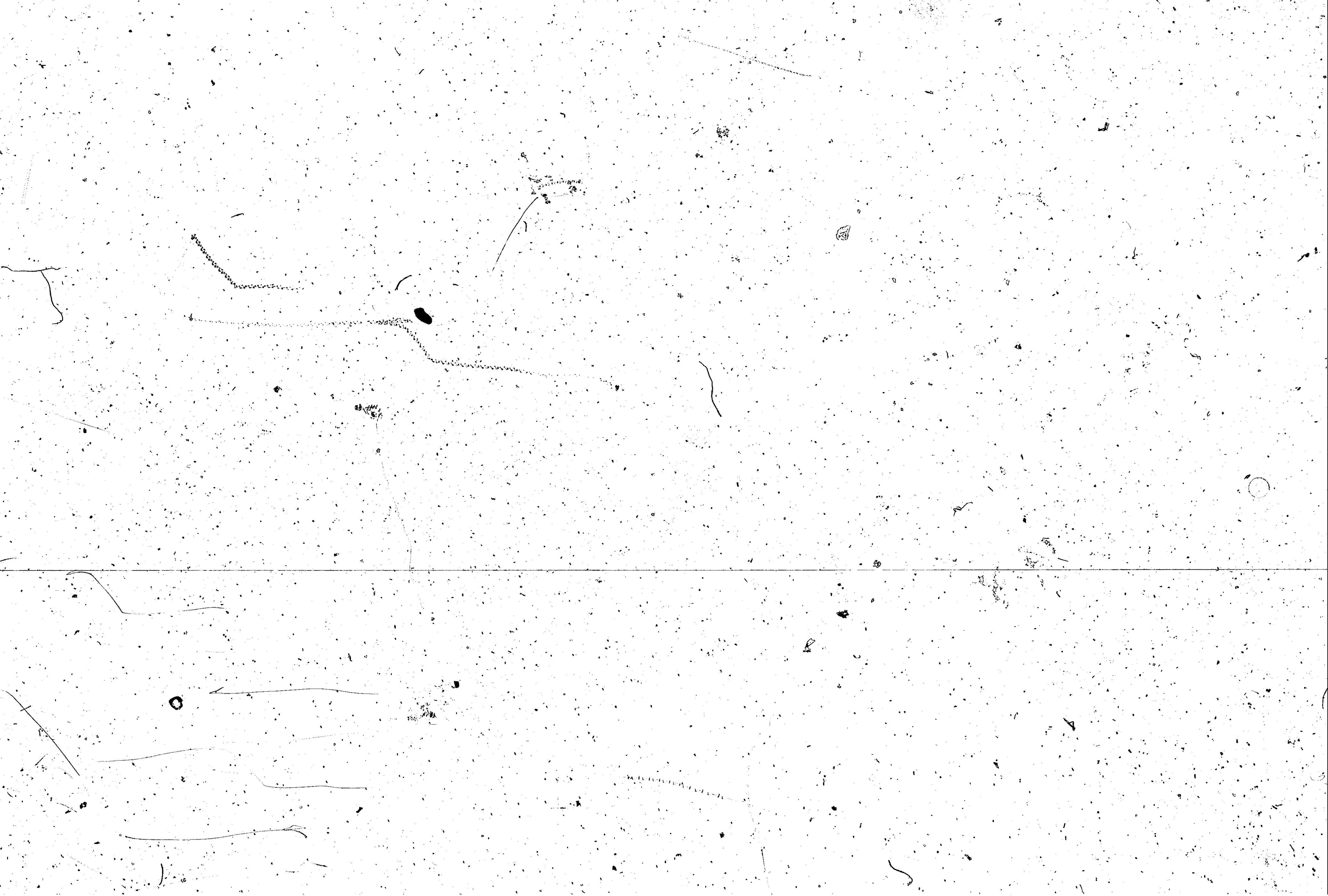
A2A2, A2A4, INHIBIT GENERATOR (05421-6002)

Each of these assemblies drives up to 12 individual inhibit windings through the magnet core memory stack. The inhibit generator supplies current to each inhibit winding running through a core where a "0" is to be written during a WRITE TIME.

A2A2 AND A2A4 INHIBIT GENERATOR ASSEMBLY (05421-6002)(NOTE 1) SERIES 744

+5V FROM A2P3 (7,14)

INHIBIT TIME FROM A2A13 (4)

A2A2 AC12 FROM A2P1(13)
A2A4 AC0 FROM A2P1(1)

−12V FROM A2P3(2)

A2A2 AC13 FROM A2P1(14)
A2A4 AC1 FROM A2P1(2)

−7.5V FROM A2P3(6,13)

A2A2 AC14 FROM A2P1(15)
A2A4 AC2 FROM A2P1(3)

A2A2 AC15 FROM A2P1(16)
A2A4 AC3 FROM A2P1(4)

A2A2 AC16 FROM A2P1(17)
A2A4 AC4 FROM A2P1(5)

A2A2 AC17 FROM A2P1(18)
A2A4 AC5 FROM A2P1(6)

A2A2 AC18 FROM A2P1(19)
A2A4 AC6 FROM A2P1(7)

A2A2 AC19 FROM A2P1(20)
A2A4 AC7 FROM A2P1(8)

A2A2 AC20 FROM A2P1(21)
A2A4 AC8 FROM A2P1(9)

A2A2 AC21 FROM A2P1(22)
A2A4 AC9 FROM A2P1(10)

A2A2 AC22 FROM A2P1(23)
A2A4 AC10 FROM A2P1(11)

A2A2 AC23 FROM A2P1(24)
A2A4 AC11 FROM A2P1(12)

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. CONNECTOR WIRED TO MEMORY STACK A2A15

REFERENCE DESIGNATIONS

A2A2, A2A4
C1−27
CR1−40
Q1−27
R1−79

TABLE

REFERENCE DESIGNATIONS	HP PART NUMBERS
CR1−40	1901-0040
Q1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27	1853-0016 2N3638
Q2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24	1854-0246 2N3643
Q26	1854-0005 2N708

05480-C-51

Figure 2-7
A2A2, A2A4 Inhibit Generator Series 744

A2A5, A2A6 DECODER GATES (05421-6003)

Each of these assemblies performs the following functions:

1. Selects the desired channel to be read from or written into by decoding three bits of memory address information from the address register.

2. Provides a current sink for the Read or Write current.

A2A5 AND A2A6 DECODER GATE ASSEMBLY (05421-6003)(NOTE 1) SERIES 744

FROM A2P3(7,14) +5V A(2) C1 10µF +5V

FROM A2A11(14,R) -19V A(9) C2 6.8µF -19V

A2A5 MA0 FROM A2A9B(9)
A2A6 MA5 FROM A2A9B(4) A(5)

IC1A 11 9 10 8 R49 470

-19V R2 1000 R3 100 R5 200 Q2

CR1 CR4 CR5 CR8 CR10 B(21) B(22) B(Y) B(Z)

CR2 Q1 CR3 R4 82 Q3 CR6 CR7 CR9 CR11

R1 1000 +5V

A

A2A5 MA0 FROM A2A9B(18)
A2A6 MA5 FROM A2A9B(3) A(8)

IC1B 3 5 4 6 R50 470

CR12-22 Q4-6 R7-12

B B(17) B(18) B(U) B(V)

A2A5 MA2 FROM A2A9B(13)
A2A6 MA7 FROM A2A9A(19) A(6)

IC2A 10 9 11 8 R51 470

CR23-33 Q7-9 R13-18

C B(14) B(15) B(R) B(S)

IC2B 5 4 3 6 R52 470

CR34-44 Q10-12 R19-24

D B(11) B(12) B(M) B(N)

A2A5 MA3 FROM A2A9B(12)
A2A6 MA7 FROM A2A9A(18) A(10)

IC2C 2 13 1 12 R53 470

CR45-55 Q13-15 R25-30

E B(8) B(9) B(J) B(K)

A2A5 MA1 FROM A2A9B(16)
A2A6 MA6 A(7)

IC3A 10 9 11 8 R54 470

CR56-66 Q16-18 R31-36

F B(6) B(7) B(F) B(H)

IC3B 5 3 4 6 R55 470

CR67-77 Q19-21 R37-42

G B(4) B(5) B(D) B(E)

A2A5 MA7 FROM A2A9B(15)
A2A6 MA6 FROM A2A9A(21) A(3)

GND A(1)

FROM A2P3(12) -12V A(4) -12V

IC3C 2 1 13 12 R56 470

CR78-88 Q22-24 R43-48

H B(2) B(3) B(B) B(C)

FROM A2A11(6,F) +19V A(11) +19V

(NOTE 3)

05480-D-33

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. CONNECTOR WIRED TO MEMORY STACK

REFERENCE DESIGNATIONS

A2A5, A2A6

C1, 2
CR1-88
IC1-3
Q1-24
R1-56

TABLE
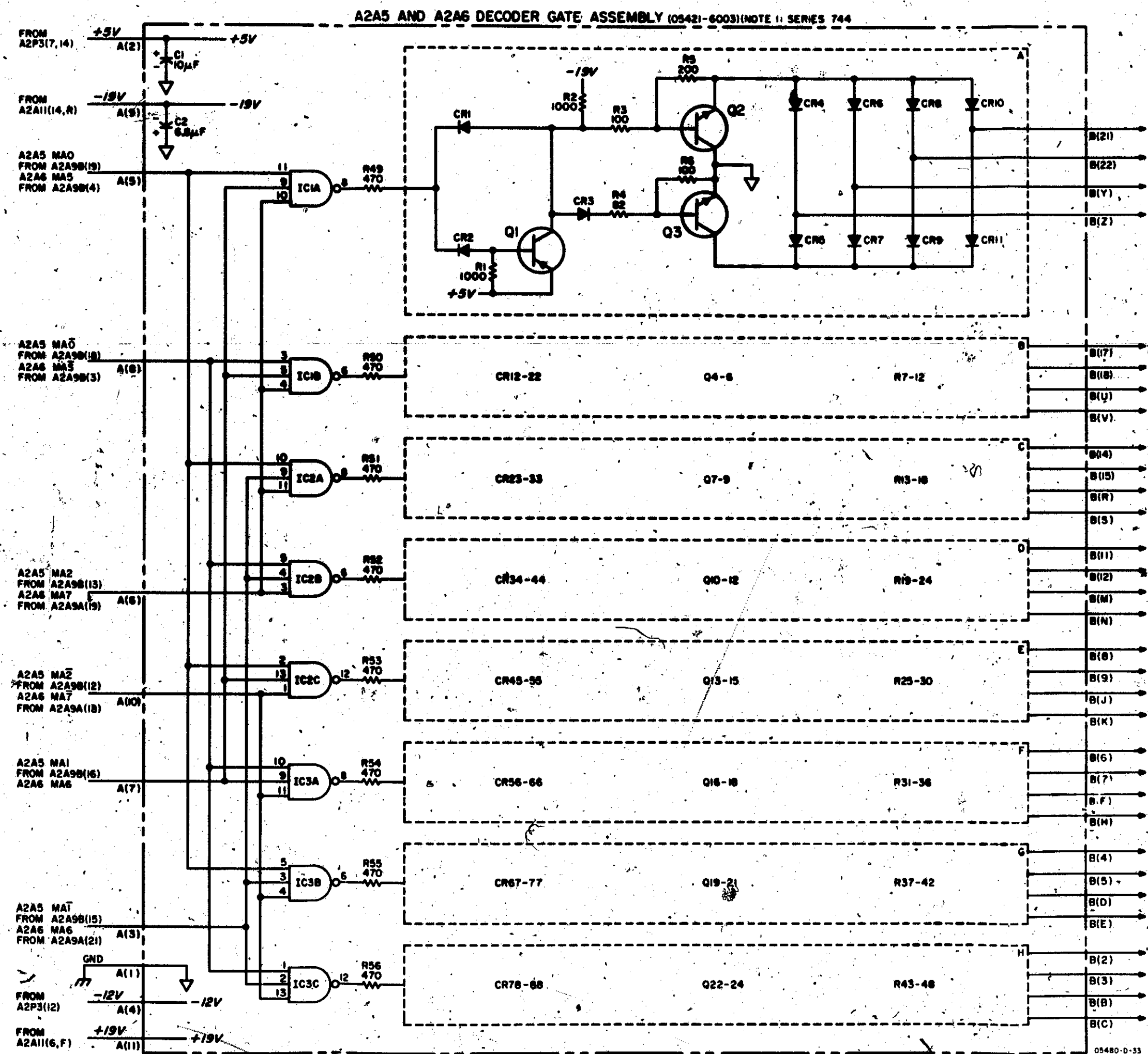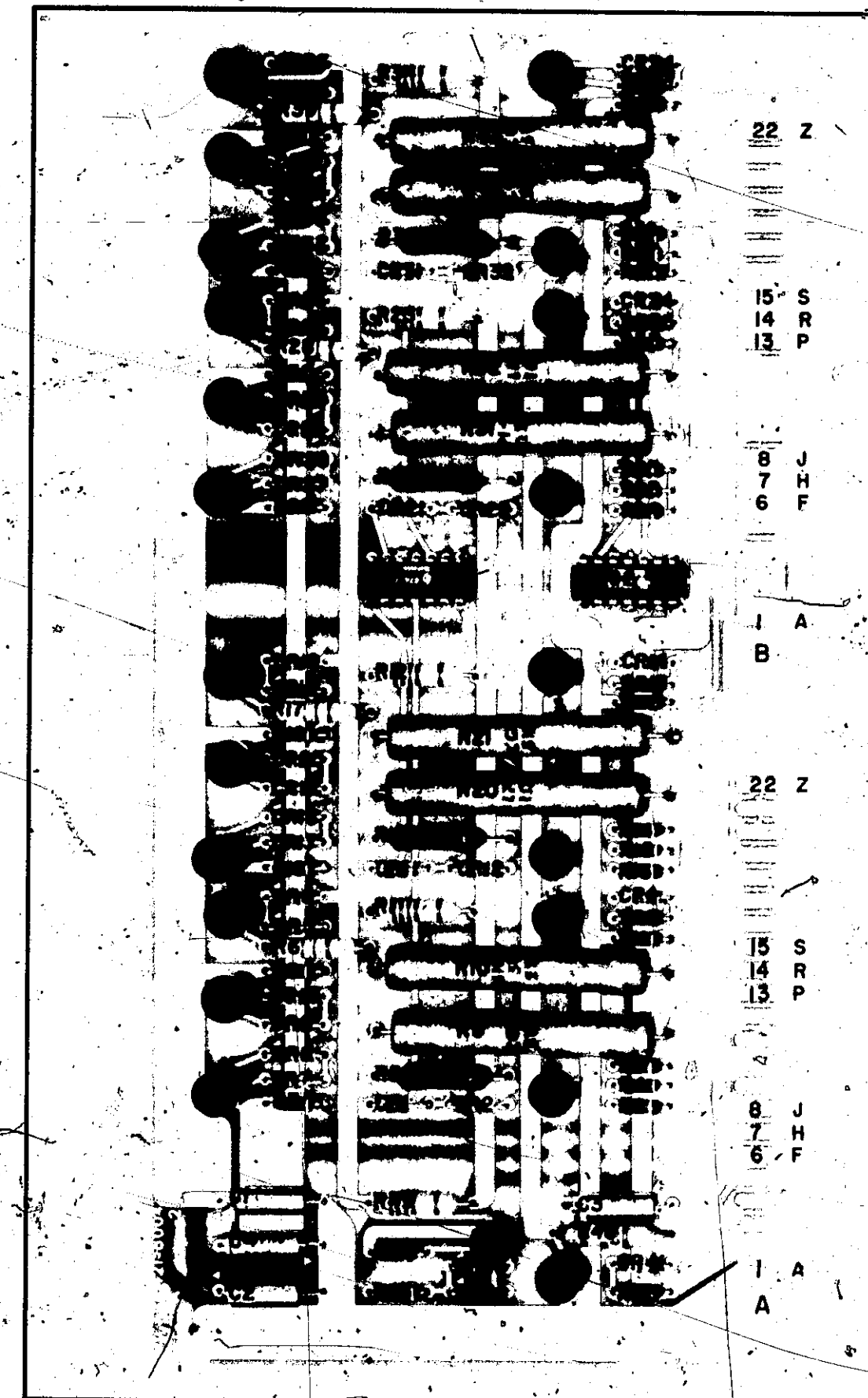
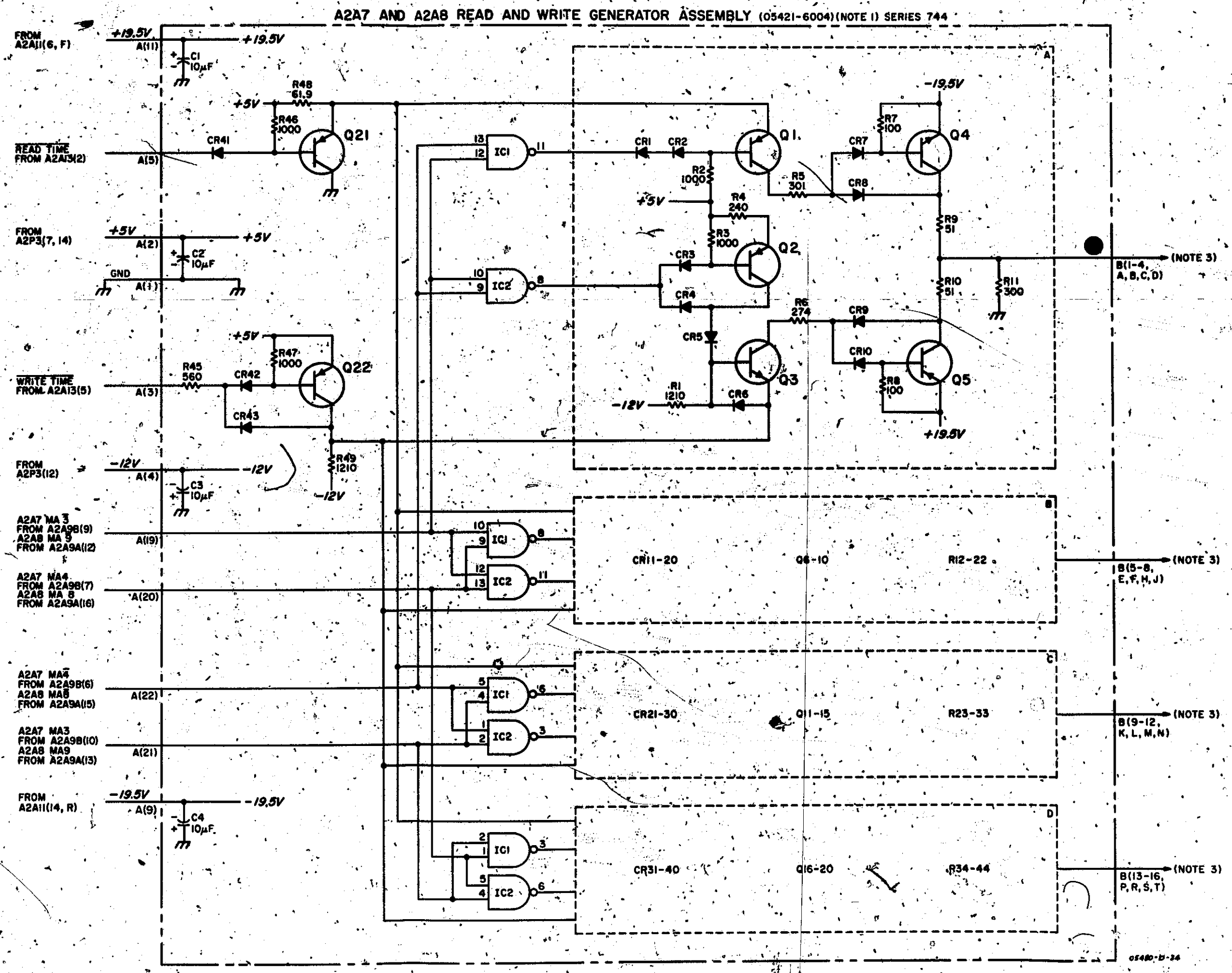| REFERENCE DESIGNATIONS	HP PART NUMBERS
CR1-3,12-14,23-25, 34-36,45-47,56-58, 67-69,78-80	1901-0040
CR4-11,15-22,26-33, 37-44,48-55,59-66, 70-77	1901-0039
IC1-3	1820-0068
Q1,4,7,10,13,16,19,22	1853-0016 2N3638
Q2,5,8,11,14,17,20,23	1854-0094 2N3646
Q3,6,9,12,15,18,21,24	1854-0246 2N3643

Figure 2-8
A2A5, A2A6 Decoder Gate Series 744

2-15

A2A7, A2A8 READ/WRITE GENERATOR (05421-6004)

Each of these assemblies:

1. Generates the read or write current required to operate the memory stack.

2. Selects the desired channel for reading or writing by decoding two memory address bits

A2A7 AND A2A8 READ AND WRITE GENERATOR ASSEMBLY (05421-6004)(NOTE I) SERIES 744

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. CONNECTOR WIRED TO MEMORY STACK A2A15.

REFERENCE DESIGNATIONS

A2A7, A2A8
CI-4
CRI-43
ICI,2
QI-22
RI-49

TABLE

REFERENCE DESIGNATIONS	HP PART NUMBERS
CRI-12,14-22,24-31, 32-40,41-43	1901-0040
CR3,13,23,33	1901-0025
ICI-2	1820-0054
QI, 2,5-7,10-12, 15-17, 20,	1853-0016 2N3638
Q3,4,8,9,13,14, 18, 19	1854-0246 2N3643

05480-B-24

Figure 2-9
A2A7, A2A8 Read Write Generator
Series 744

2-17

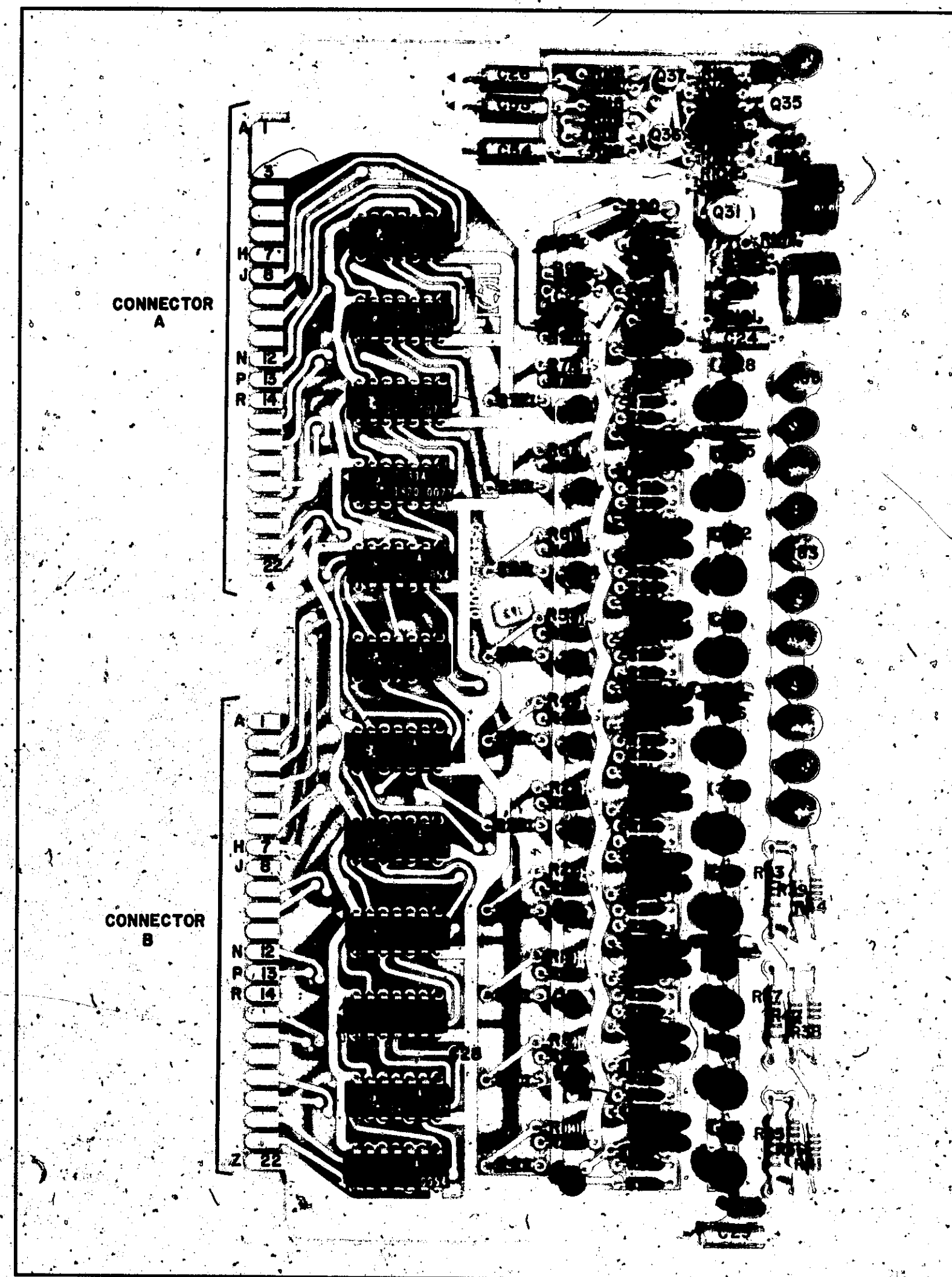### A2A9 HORIZONTAL DIGITAL-TO-ANALOG CONVERTER (05480-60010)

DESCRIPTION

The horizontal DAC converts 10-bit binary numbers into analog voltages which are used for the horizontal CRT deflection. The analog voltage range is 0 V to 10 V. The board includes the memory address buffer register and a 10-bit buffer hold register for the DAC. The 10-volt reference is obtained on the board from a precision 10 V power supply. Low output impedance is assured through use of an operational amplifier. Analog voltages of 0 V and +10 V, for adjusting amplifier level, and precisions voltage supply are obtained by grounding the ZERO and FULL SCALE inputs, respectively.

CHANGES FOR OLDER BOARDS

Current Series: 832

Older Series: None

PART OF A2A9 HORIZONTAL D.A. CONVERTER ASSEMBLY (05480-60010) (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;
   INDUCTANCE IN MICROHENRIES

3. ALL UNUSED "S" AND "R" INPUTS OF IC1-9, 12 ARE CONNECTED TO +5V.

Figure 2-10
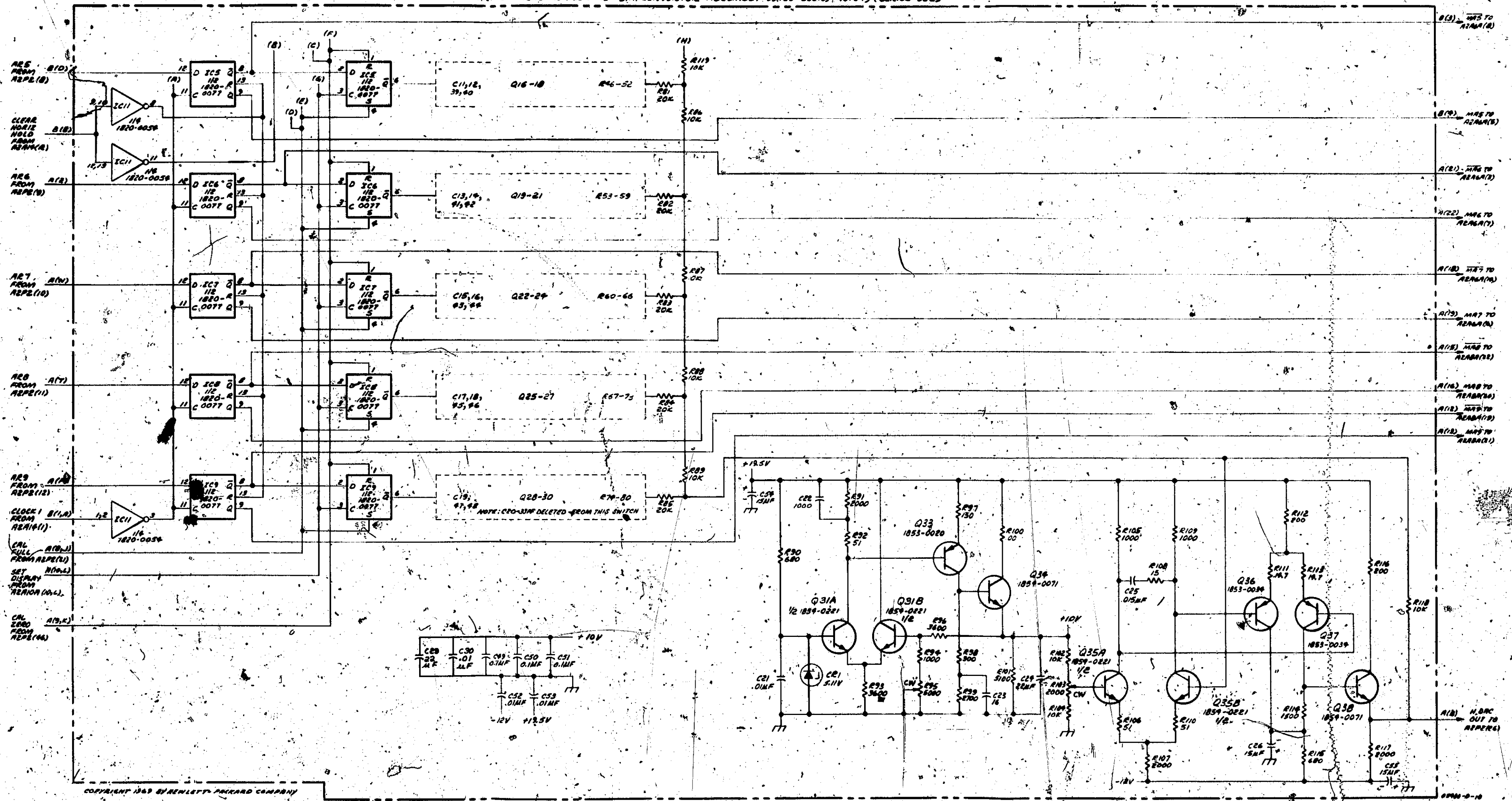A2A9 Horizontal DAC Series 832
(Sheet 1 of 2)

2-19

Figure 2-10
A2A9 Horizontal DAC Series 832
(Sheet 2 of 2)

A2A10 VERTICAL DIGITAL-TO-ANALOG CONVERTER (05480-60009)
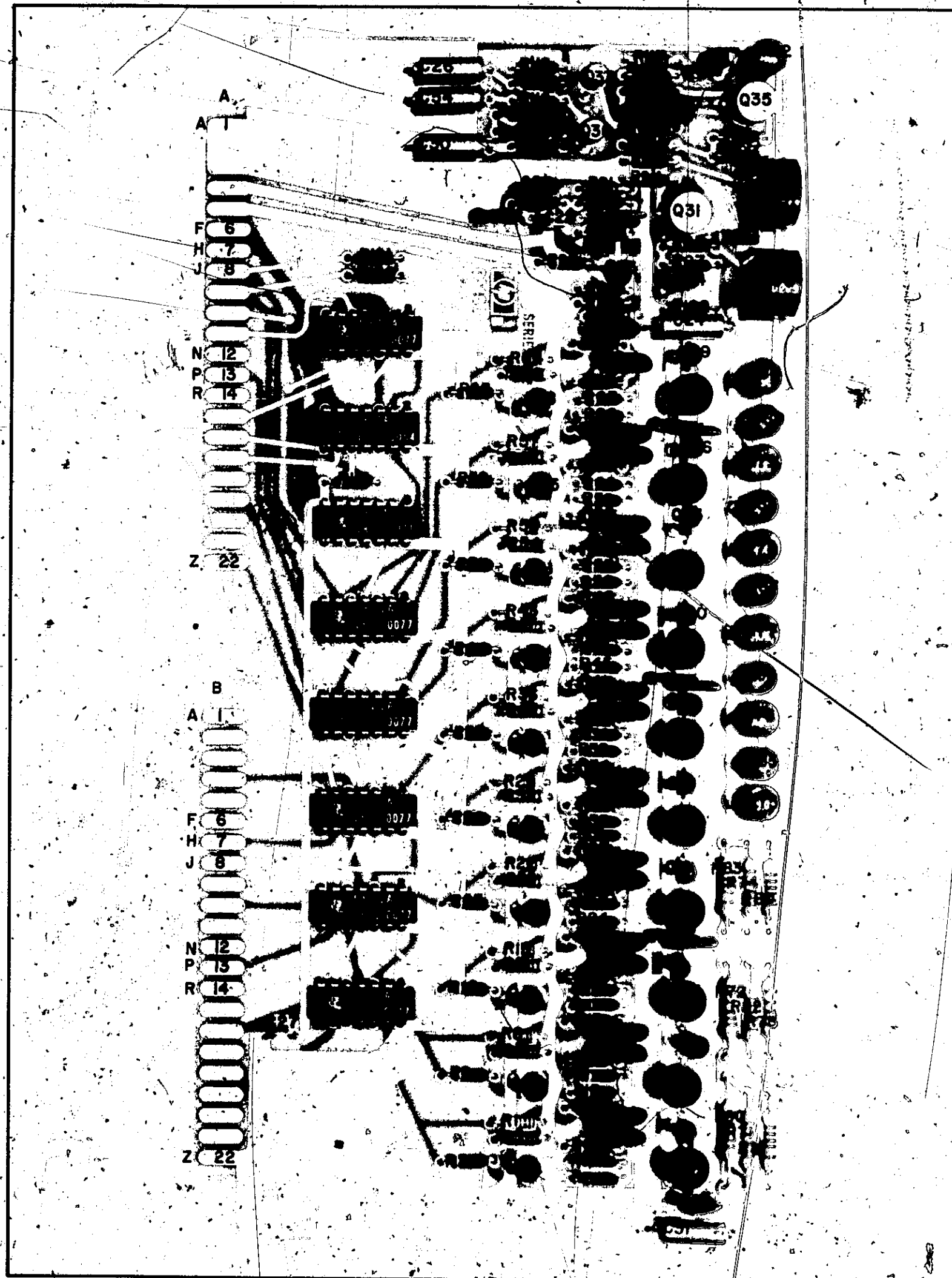
DESCRIPTION

General

The Vertical DAC converts 10-bit binary numbers to analog voltages which are used both for the Vertical CRT deflection, and in the analog feedback loop during the averaging program. The analog voltage range is ± 4.15 V. The board includes a 10-bit logic buffer register, a precision 8.3 V supply, and an output operational amplifier. Output voltage levels of ± 2 V, for adjusting amplifier level and precision voltage supply, are obtained by alternately grounding the ZERO and FULL inputs.

Most Significant Bit

The term "Most Significant Bit" refers to bit 23 of the Accumulator register; the term is abbreviated "MSB". The 5480A/B is organized so Accumulator bit 23 contains the sign of a number, and Accumulator bits 0 through 22 contain the magnitude of the number. To preserve the sign information in the display while the Accumulator is shifted to provide scaling of the accumulator data (magnitude), the MSB can be set into the Vertical DAC separately, before shifting. After the Accumulator shift, Accumulator bits 14 through 22 are set into the DAC by SET V NUM, and the MSB information is set into the DAC at the same time. SET V NUM does not override SET MSB. SET V NUM transfers current contents of Accumulator bit 23 to most significant DAC bit, unless a SET MSB signal occurred first. If a SET MSB occurred before SET V NUM, the contents of Accumulator bit 23 at the time of SET MSB will be transferred into the most significant DAC bit by SET V NUM.

Accumulator bits 14 through 22 are connected directly to the D inputs of the 9 less significant DAC bits. These bits are clocked in by SET V NUM.

If it is necessary to save the sign bit information (as in Summation or Display Programs), a low SET MSB pulse at A(5) sets IC12(5) high and clocks Accumulator bit 23 to IC13(8). IC11(12) will be low, so the D input to the most significant DAC bit will be the same as Accumulator bit 23. When the SET V NUM pulse arrives, this information is clocked through to IC4(8). Because IC12(2) is grounded, SET V NUM clocks a "0" to IC12(5) and a "1" to IC11(12). Now, unless again told to do otherwise by a SET MSB pulse, the next SET V NUM pulse will transfer current contents Accumulator bit 23 to most significant DAC bit.

A2A10 VERTICAL D.A. CONVERTER ASSEMBLY (05400-60003)(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

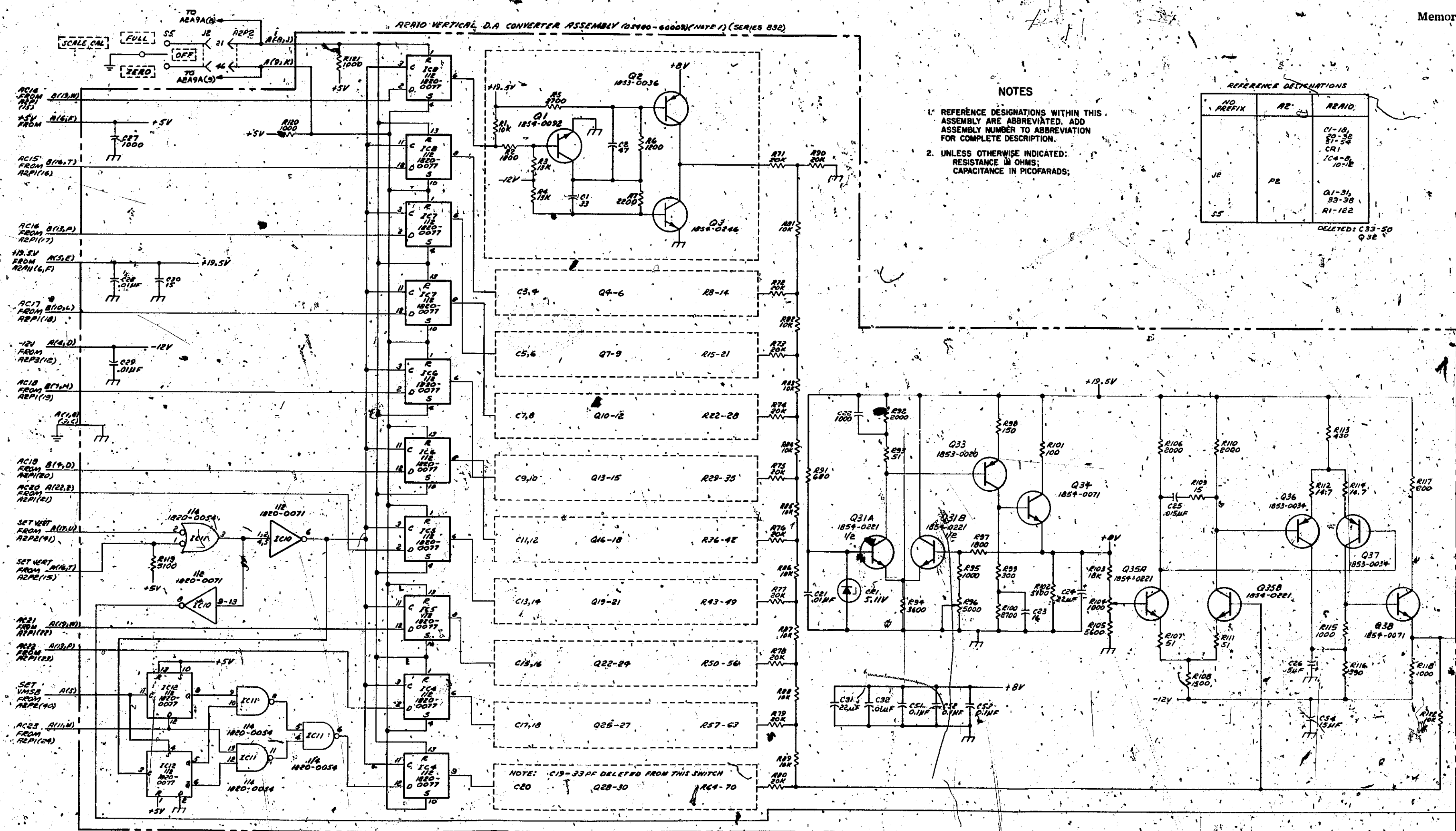| NO PREFIX	A2	A2A10
		C1–18, 50–52, 54
		CR1
		1C4–8, 10–12
J2	P2	
		Q1–34, 33–38
S5		R1–122

DELETED: C33–50
Q32

NOTE: C19–33 PF DELETED FROM THIS SWITCH

Figure 2-11
A2A10 Vertical DAC Series 832

2-23