

RM03 DISK DRIVE MAINTENANCE PRINT SET

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83322680



**CDC® STORAGE MODULE DRIVE
BK5B5-G, H
BK5C1-C**

DIAGRAMS
WIRE LISTS
MODULE LAYOUTS

HARDWARE MAINTENANCE MANUAL

LIST OF EFFECTIVE PAGES

Sheet 1 of 1

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KØR-0611B

PREFACE

This manual contains maintenance information applicable to the BK5B5G, BK5B5H, BK5C1C and BK5C1D Storage Module Drives (SMDs).

This manual provides the logic and wiring information relating to the SMDs. The manual assumes that the reader is already trained in the use of normal mechanical and electric repair equipment. In addition, the manual assumes that the reader has a working knowledge of the use and interpretation of logic.

Information in this manual is divided into two sections:

Section 1 - Diagrams

Section 2 - Wire Lists

Other manuals, also applicable to the SMDs covered in this manual, are as follows:

| <u>Publication Number</u> | <u>Title</u> |
|-------------------------------|---|
| 83322660 | Parts Data |
| 83322690 | Hardware Reference Manual - General Description, Operation, Theory of Operation, Key to Logic. |
| 83322670 | Logic Cards Manual - General Theory, Logic Symbology, Data Sheets. |

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ABBREVIATIONS

| | | | |
|--------|-------------------------------|--------|-------------------------------|
| ABR | Absolute Reserve | MULT | Multiple |
| ABV | Above | NC | No Connection |
| ADDR | Address | NEG | Negative |
| ADRS | Address | NO | Number |
| AGC | Automatic Gain Control | NOM | Nominal |
| AM | Address Mark | NORM | Normal |
| AMPL | Amplifier | NRM | Normal |
| BLK | Black | NRZ | Nonreturn To Zero |
| BLW | Below | PC PT | Piece Part |
| CAR | Cylinder Address Register | PLO | Phase Lock Oscillator |
| CH | Channel | PN | Part Number |
| CHAN | Channel | POS | Positive |
| CNTLGL | Centrifugal | PWR | Power |
| CNTR | Counter | RCVRS | Receivers |
| COMP | Compensation | RD | Read |
| CONFIG | Configuration | RDY | Ready |
| CONT | Continued | REC | Receiver |
| CR REF | Cross Reference | REF | Reference |
| CYL | Cylinder | REG | Register |
| D/A | Digital To Analog | REV | Reverse |
| DCCR | Decoder | RGTR | Register |
| DIFF | Difference | RTM | Reserve Timer |
| DLY | Delay | RTZ | Return To Zero |
| DRVR | Driver | S&IOBC | Sector and Index On B Cable |
| DSBL | Disable | S/C | Series Code |
| ECL | Emitter Coupled Logic | SEC | Second |
| ECO | Engineering Change Order | SEL | Select |
| EMER | Emergency | SEQ | Sequence |
| EN | Enable | SER | Servo |
| EOT | End Of Travel | SH | Sheet |
| EQUIP | Equipment | SOL | Solenoid |
| EQUIV | Equivalent | SR | Servo |
| FCO | Field Change Order | SW | Switch |
| FF | Flip Flop | T | Track |
| FIG | Figure | TBS | To Be Supplied |
| FLT | Fault | TLA | Top Level Assembly |
| FREQ | Frequency | TP | Test Point |
| FTU | Field Test Unit | TRK | Track |
| FWD | Forward | TTL | Transistor Transistor Logic |
| GND | Ground | UNREG | Unregulated |
| HD | Head | VCO | Voltage Controlled Oscillator |
| I/O | Input-Output | W+R | Write Or Read |
| INTLK | Interlock | W•R | Write and Read |
| LD | Load | W/ | With |
| MAINT | Maintenance | W/O | Without |
| MAX | Maximum | WRT | Write |
| MB | Megabyte | WT | White |
| MFM | Modified Frequency Modulation | XDUCER | Transducer |
| MK | Mark | XMTR | Transmitter |

SECTION 1

DIAGRAMS

INTRODUCTION

Section 1 is divided into three areas: diagram conventions, physical descriptions, and diagrams. The discussion on diagram conventions describes the elements included in the logic, and how to use the logic. The discussion on physical description identifies the functional elements on the drive and references them to the appropriate diagrams. The logic diagrams show how the drive functions.

DIAGRAM CONVENTIONS

The conventions used in the logic diagrams are:

- Symbology
- Abbreviations
- Logic Levels
- Signal Names
- Intersheet References
- Diagram Cover Sheets

An explanation of each of the above is included in the following paragraphs.

SYMBOLGY

The logic diagrams consist of MIL STD 806-B/C symbols for each of the microcircuit elements that make up the various logic networks in the drive. When discrete components are used to implement a function (or portion thereof) for which no microcircuit exists, the components (resistors, transistors, etc.) are shown in the diagrams.

Typically, a logic symbol contains three kinds of information:

1. Function (name)
2. CDC element identifier
3. Physical location code

The function name is usually omitted from distinctive shaped symbols (AND, OR, XOR, inverter, etc.). The function and the element identifier serve to define the element

type. Refer to the Logic Cards manual for a detailed description of the functions and identifiers associated with each microcircuit. The following discussion defines physical location codes. Refer to figure 1-1 to assist in understanding the discussion on physical location codes.

The physical location code is in the form of a two digit or a three digit code. The first two digits indicate the location of the microcircuit in relation to its position on the card. Each plug-in logic module, or printed-circuit card, has implicit locations for 20 microcircuit elements. The exact location of microcircuit can be found as follows: with the component side of the card up and the card connector to the right, form an imaginary grid on the card. Divide the card into five equal rows (using horizontal lines), and four equal columns (using vertical lines). Label the five rows A through E on the left hand side of the card, and number the columns 1 through 4 on the top of the card. To find a microcircuit location, intersect the rows and the columns as indicated by the physical location code. As shown in figure 1-1, the element at location B4 can be located by intersecting row B with column 4. When an entire element is not devoted to a single function, a third character may appear in the location code. A third character serves to distinguish the intended gate (or section) from others on the same chip.

ABBREVIATIONS

Abbreviations are used in the logic diagram when it is impractical or impossible to use complete nomenclature on logic diagrams. Standard abbreviations from ANSI Y1.1 were used when possible. Refer to the list of abbreviations included in the front matter for definitions of all abbreviations used in the manual.

LOGIC LEVELS

Two types of logic are used in the drives covered by this manual: TTL logic, and ECL logic. Logic voltage levels for both types are given in the table 1-1. Different circuit configurations, temperatures, and so on may result in legitimate readings that fall outside of the typical range. Such readings, however, should be suspect only in the event of trouble.

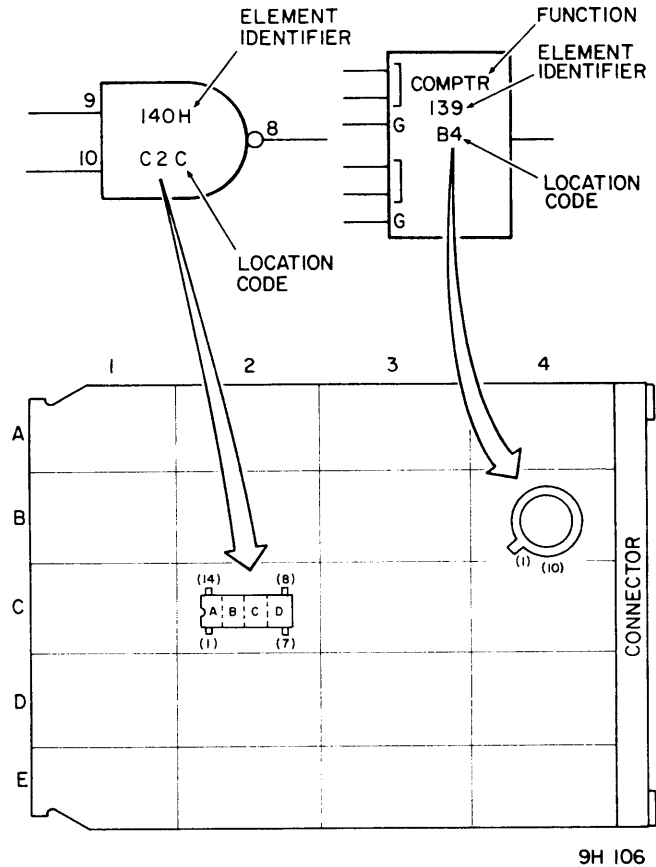


Figure 1-1. Identifying Element Locations on a Logic Module

SIGNAL NAMES

All input-output signals are labeled to reflect their particular function. If an output signal has no connection, and therefore no function, it will be labeled "NC" to indicate no connection. The polarity of a signal is identified by a plus or minus sign before the signal name. A plus sign before a signal name indicates that the signal is active when the logic level is high, or in a logical 1's state. A minus sign before a signal name indicates that the signal is active when the logic level is low, or in a logical 0's state. Refer to the discussion on logic levels.

INTERSHEET REFERENCES

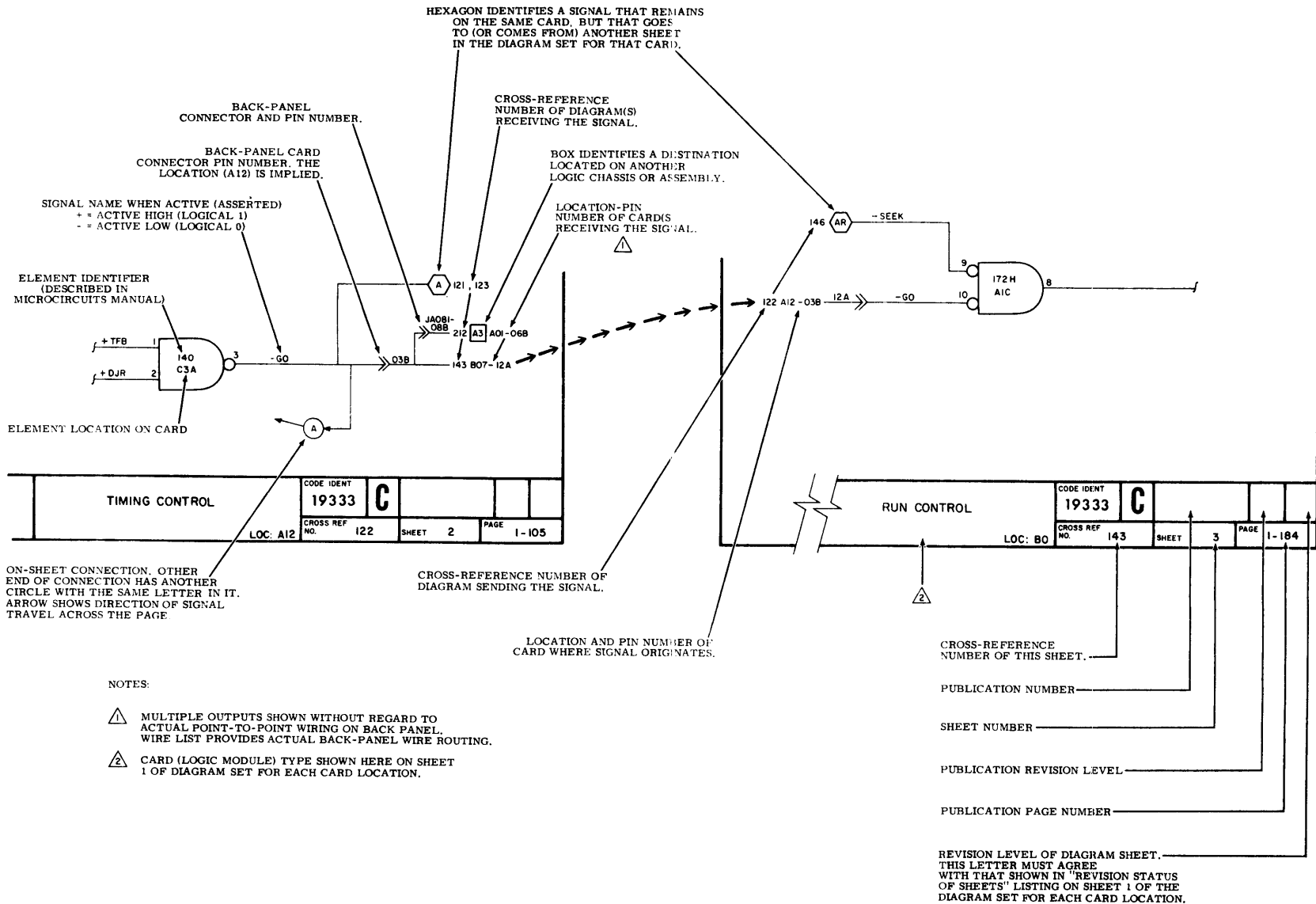
There are 27 sets of logic preceded by a functional introduction. The key to understanding how each set relates to another is in identifying three basic components. Each set contains cross-reference numbers, physical location codes, and pin numbers (see figure 1-2). The cross-reference number is

a three digit, two part number. The first part (first two digits) indicates which set is being referenced. The second part (third digit) indicates which page of the set is being referenced. For example, in reference number 131, the first two digits indicate that set 13 is being referenced. The third

TABLE 1-1. LOGIC VOLTAGE LEVELS

| Logical State | Nominal Voltage | Typical Range |
|---------------|-----------------|--------------------|
| TTL "1" | +3 V | +2.5 V to +4.0 V * |
| TTL "0" | 0 V | 0 V to +0.9 V |
| ECL "1" | -0.9 V | -0.61 V to -0.97 V |
| ECL "0" | -1.8 V | -1.52 V to -2.38 V |

* Measuring a TTL open collector voltage may result in a reading that is close to the actual power supply voltage.



94105

Figure 1-2. Intersheet Referencing

digit indicates that page 1 of set 13 is being referenced. Cross-reference numbers are also used within the logic, so that logic can be traced from one logic set to another. A cross-reference number on the output of a logic signal indicates that the logical sequence continues in the logic set identified by the cross-reference number. Typically, other identifying information, such as the physical location code, or the pin number will follow the cross-reference number on the logic. A cross-reference number on the input of a signal indicates the origin of the signal. Where a logic signal does not leave the logic, but is continued on some other sheet of the same set, the cross-reference number of the destination sheet will be shown. In such cases, the cross-reference number will be preceded by a hexagon. The hexagon will be identified with a letter to indicate a specific location on the destination sheet. Where a logical sequence cannot be shown in series and it does not leave the logic sheet, "line of sight" arrows are used to indicate the origin and destination of the sequence. The end of a logical sequence will be shown with a line of sight arrow pointing away from a small circle identified with a letter. A second circle, identified with the same letter, will have a line of sight arrow pointing in the same direction as the first. The second arrow indicates where the logical sequence continues.

The physical location code is an alpha-numerical code, such as A2A05, that identifies the relationship between the logic sets and their location on the drive. All physical location codes are represented in the logic. However, several miscellaneous codes that do not warrant their own logic set are shown in a related logic set. For example, A3L2 (shown on cross-reference sheet 072) is not shown in the A3 logic set. A3L2 is shown with A2 logic, since A2 is more closely related. Refer to the table and figure on physical location codes to locate particular physical location codes.

The pin numbers used in the logic are for identifying logic signals at their respective input-output locations. Pin numbers are identified by a three character number, such as 14A. The tagging information on all input-output signals should reflect a reference number, a physical location code, and a pin number, respectively.

Logic set 34X contains the cabling information for all inter-chassis logic signals on logic sets 01X through 33X. Inter-chassis connections are designated by a small square

identified with a location code, such as A3. An inter-chassis designator used at the output of a logic signal indicates that the signal leaves the assembly shown, and continues on the assembly indicated by the indicator. An inter-chassis designator at the input of the logic signal indicates that the signal originated on the assembly shown by the designator. When it becomes necessary to view the cabling in its entirety, refer to logic set 34X. Logic set 34X shows only the various cables and connectors as used in the drive. All logic chassis backpanel wiring is shown in the wirelist.

DIAGRAM COVER SHEETS

The diagram cover sheet is the first sheet of a logic set. Power and ground connections, revision status, card type information, and a list of unused circuit elements are found on the cover sheet. Power enters the drive from the Drive Power Plug (Pl on reference sheet 302), is rectified (refer to reference sheets 31X, 32X, and 33X), and then distributed to the backpanel fastons. The backpanel then distributes power to the logic cards. The cover sheets show which pins receive that power. All power connections show the point of origin for the power source except those that are most common. The most common power connections are:

- -20V faston, which feeds pin 2B on cards A01-A09
- +20V faston, which feeds pin 33B on cards A01-A09
- -5V faston, which feeds pin 1B on all cards
- +5V faston, which feeds pin 34B on all cards
- GND faston, which feeds pins 1A and 34A on all cards

The revision of each logic sheet within the logic set is shown in the upper left-hand corner of the cover sheet. The upper right-hand corner of the sheet contains a record of the changes made to the logic set. The latest revision letter shown in the revision record should always match the letter of the cover sheet.

The cover sheet also shows the card type which appears in the title block below the card name. Refer to figure 1-2 for an explanation of all pertinent information shown in the title block.

PHYSICAL DESCRIPTION

The physical arrangement of the drive is described on figures 1-3 through 1-5, and table 1-2. Figure 1-3 separates the drive into three sections. Each section and its assemblies and components have been assigned a physical location code. All physical location codes shown on figure 1-3 are listed in

table 1-2. Table 1-2 identifies the physical location code by title, and refers to the logic set in which the code is shown. The drive backpanel is shown on figure 1-4. The view shown is the wired side of the backpanel. The relative position of the backpanel, and all other card assemblies in the drive, is shown on the chassis (see figure 1-5).

TABLE 1-2. PHYSICAL LOCATION CODES

| PHYSICAL LOCATION CODE | TITLE | CROSS REFERENCE NUMBERS |
|------------------------|---|-------------------------|
| A1 | Base Assembly (AC Power System) | 302 |
| ALA01 | Plus and Minus 42V Supply and Emergency Retract | 31X |
| ALA02 | Plus and Minus, Plus and Minus 12V Supplies | 32X |
| ALA03 | Plus and Minus 5V Supply | 33X |
| ALBM1 | Blower Motor | 302 |
| ALC1 | Servo Capacitor (+) | 312 |
| ALC2 | Servo Capacitor (-) | 312 |
| ALC5 | Blower Motor Start Capacitor | 302 |
| ALC8 | Transformer Tuning Capacitor | 302 |
| ALCB1 | AC Power Circuit Breaker | 302 |
| ALCB2 | Power Supply Circuit Breaker | 302 |
| ALFL1 | Line Filter | 302 |
| ALK1 | Run Triac | 302 |
| ALK2 | Emergency Retract Relay | 312 |
| ALM1 | Elapsed Time Meter | 302 |
| ALS4 | Deck Interlock Switch | 302 |
| ALT1 | AC Power Transformer | 302 |
| ALTB1 | Terminal Board | 302 |
| ALJ1A | Power Supply Connector | 31X-33X |
| ALJ1B | Power Supply Connector | 31X-33X |
| ALJ100 | Power Supply Connector | 31X-33X |
| ALP1 | AC Power Connector | 302 |
| A2 | Logic Chassis | -- |

Table continued on next page

TABLE 1-2. PHYSICAL LOCATION CODES (Contd)

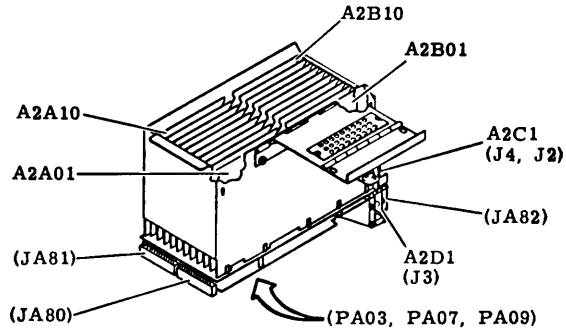
| PHYSICAL LOCATION CODE | TITLE | CROSS REFERENCE NUMBERS |
|------------------------|--|-------------------------|
| A2A01 | Write Clock (806 kHz) | 01X |
| A2A02 | FTU/Head Alignment Card Slot | 02X |
| A2A03 | Fine Servo Decoder | 03X |
| A2A04 | Fault Card | 04X |
| A2A05 | Data Latch | 05X |
| A2A06 | Read PLO | 06X |
| A2A07 | D/A Function Generator | 07X |
| A2A08 | Access Control NO 2 | 08X |
| A2A09 | Switching Mode Control | 09X |
| A2A10 | Interlocks and Speed Detector | 10X |
| A2B01 | Transmitters and Receivers Head Address Register | 11X |
| A2B02 | Receivers | 12X |
| A2B03 | | 13X |
| A2B04 | | 14X |
| A2B05 | | 15X |
| A2B06 | Difference Generator Controls | 16X |
| A2B07 | NRZ to Compensated MFM | 17X |
| A2B08 | Access Control and Index/Sector Decode | 18X |
| A2B09 | Access Control NO 1 | 19X |
| A2B10 | | 20X |
| A2C1 | | 21X |
| A2C2 | | 22X |
| A2D1 | I/O | 23X |
| | | 24X |
| A3 | Deck Assembly | -- |
| A3A01 | Control Panel | 25X |
| A3A02 | Head Select and Read Amplifier | 26X |
| A3A03 | Writer | 27X |
| A3A04 | Power Amplifier | 28X |
| A3A05 | Track Servo Preamplifier | 29X |
| A3C6 | Drive Motor Capacitor | 302 |
| A3DM1 | Drive Motor | 302 |

Table continued on next page

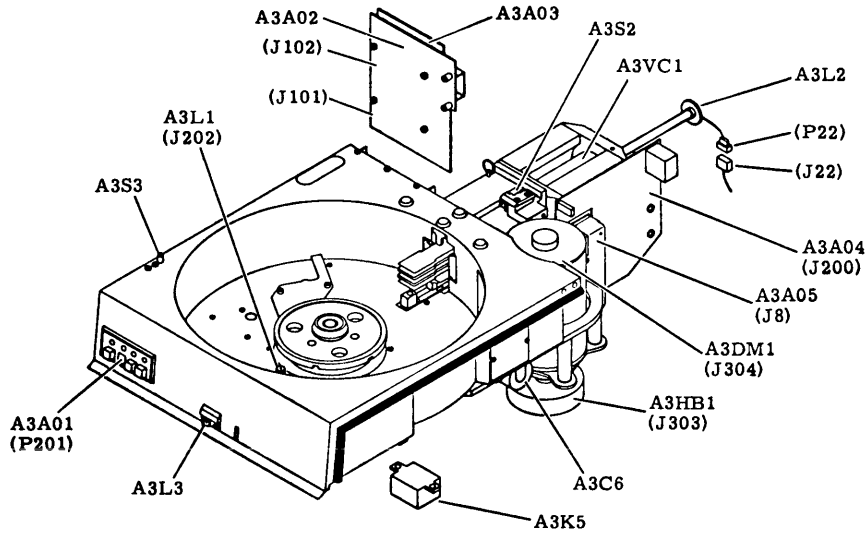
TABLE 1-2. PHYSICAL LOCATION CODES (Contd)

| PHYSICAL LOCATION CODE | TITLE | CROSS REFERENCE NUMBERS |
|------------------------|--------------------------------|-------------------------|
| A3HB1 | Hysteresis Brake | 302 |
| A3K5 | Start Triac | 302 |
| A3L1 | Speed Transducer | 103 |
| A3L2 | Velocity Transducer | 072 |
| A3L3 | Pack Cover Solenoid (Optional) | 102 |
| A3S2 | Heads Loaded Switch | 302 |
| A3S3 | Pack Cover Switch | 252 |
| A3VC1 | Voice Coil | 312 |

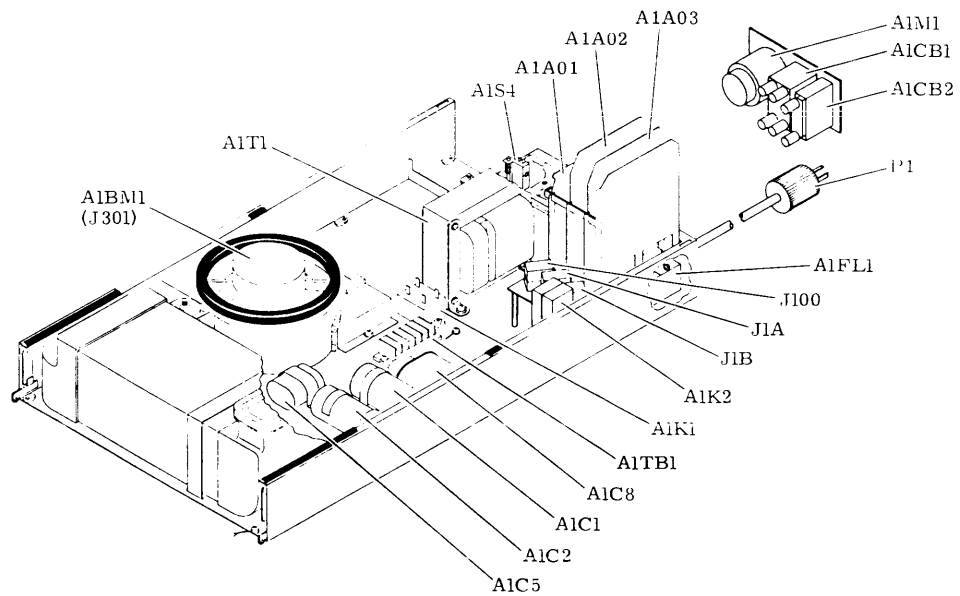
A2



A3

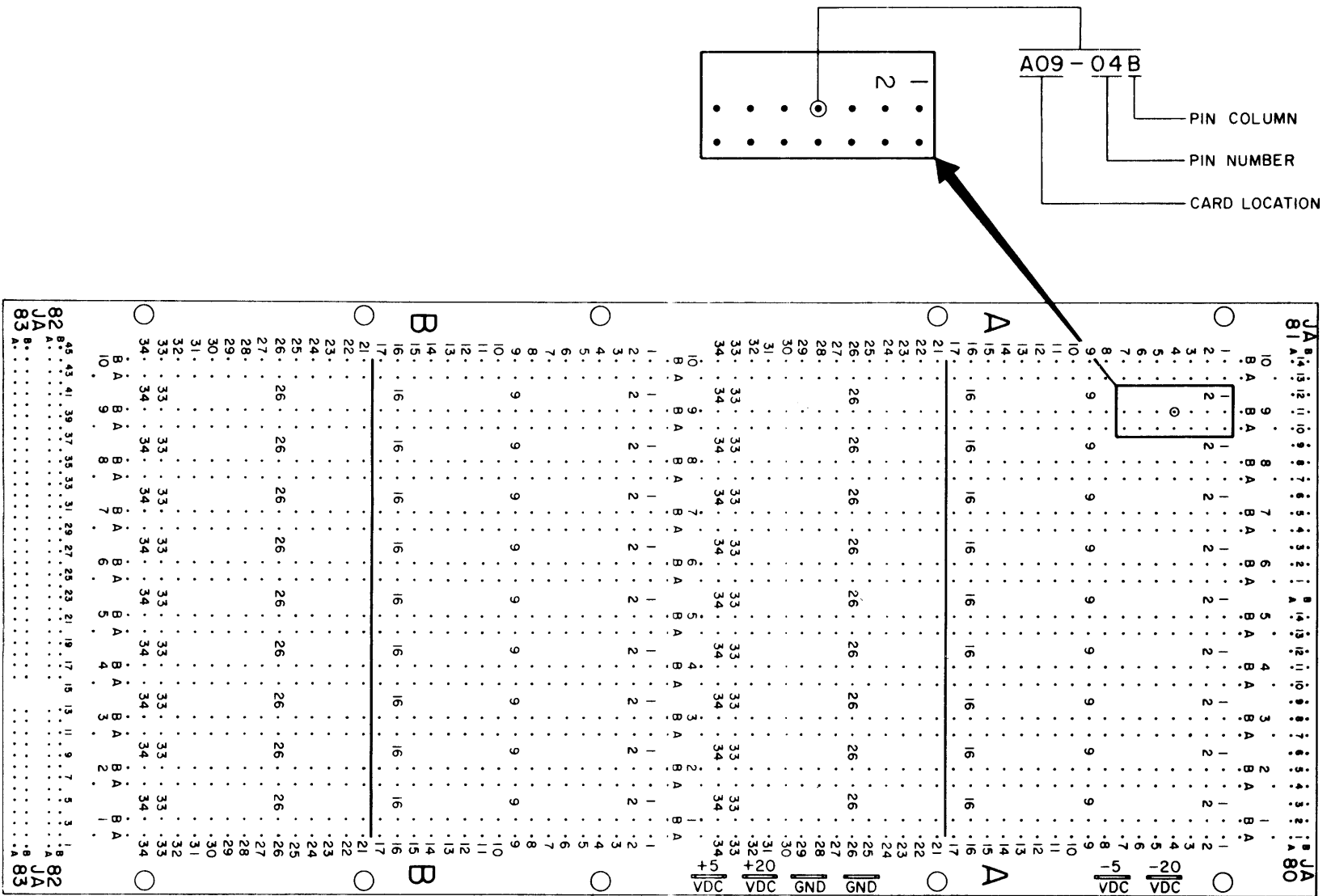


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Figure 1-3. Physical Location Codes



VIEWED FROM W REWRAP SIDE

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Figure 1-4. Backpanel Layout

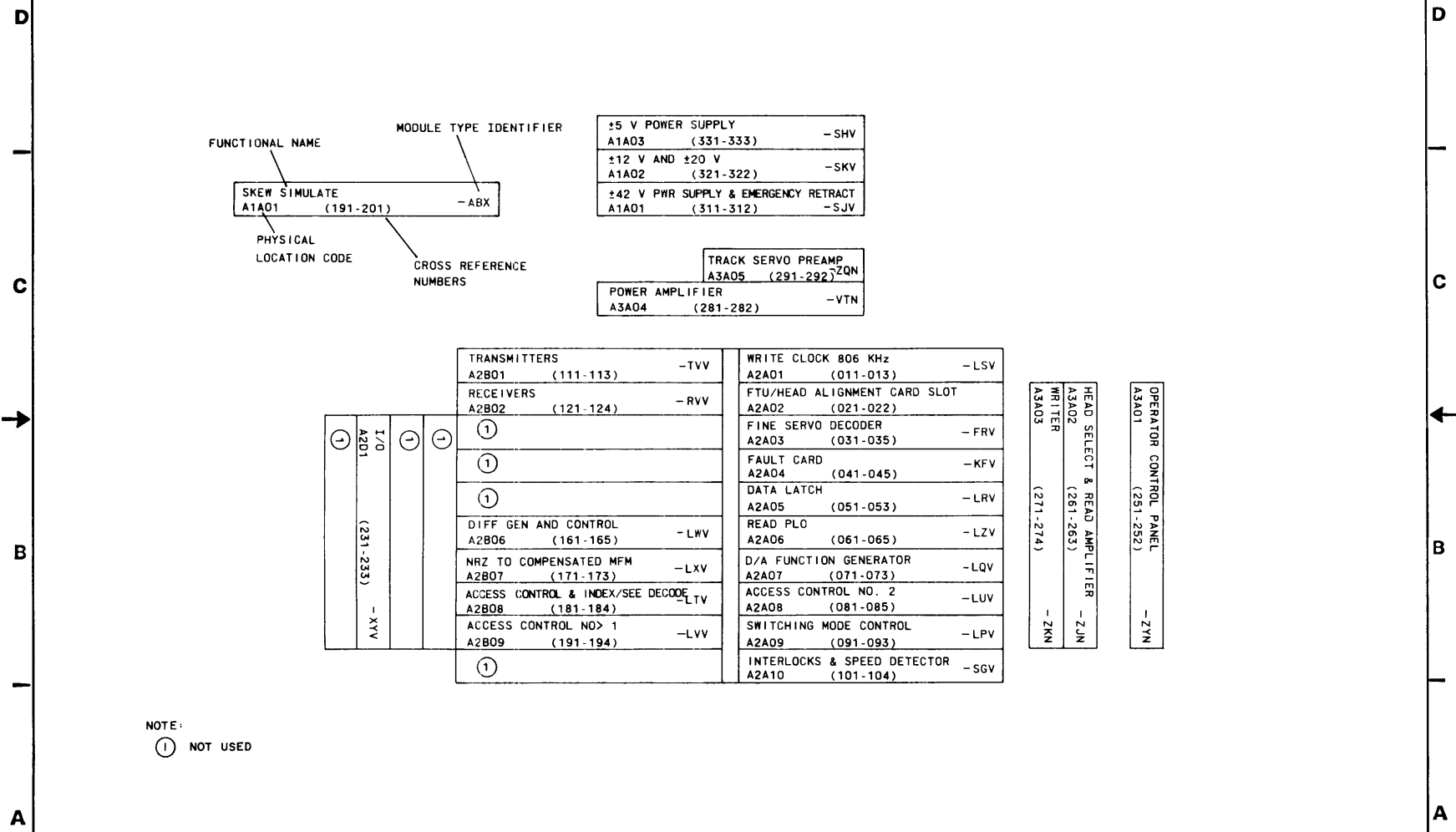
LOGIC DIAGRAM SETS

| REVISION STATUS OF SHEETS | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| A | A | | | | | | | | | | | | | | | | | | |
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| REVISIONS | | | | | | | |
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| REV. | ECO. | DESCRIPTION | | | ORFT. | DATE | CHK'D |
| A | PE23000 | RELEASED | | | | | |
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| <table border="1" style="width: 100%;"> <tr> <td>DRAWN</td><td>G. RABINE</td><td>J.H. 77</td><td rowspan="3" style="text-align: center; vertical-align: middle;">CONTROL DATA NORMAN DALE DIVISION</td> </tr> <tr> <td>CHECKED</td><td></td><td></td> </tr> <tr> <td>ENGINEER</td><td></td><td></td> </tr> <tr> <td>APPROVED</td><td></td><td></td><td></td> </tr> </table> | DRAWN | G. RABINE | J.H. 77 | CONTROL DATA NORMAN DALE DIVISION | CHECKED | | | ENGINEER | | | APPROVED | | | | CHASSIS MAP DIAGRAMS | <table border="1" style="width: 100%;"> <tr> <td>CODE IDENT</td><td>19333</td><td rowspan="2" style="font-size: 2em; text-align: center; vertical-align: middle;">C</td><td>83322680</td><td>A</td><td>A</td> </tr> <tr> <td>CROSS REF NO</td><td></td><td>SHEET 1 of 2</td><td>PAGE 1-11</td><td></td><td></td> </tr> </table> | CODE IDENT | 19333 | C | 83322680 | A | A | CROSS REF NO | | SHEET 1 of 2 | PAGE 1-11 | | |
| DRAWN | G. RABINE | J.H. 77 | CONTROL DATA NORMAN DALE DIVISION | | | | | | | | | | | | | | | | | | | | | | | | | |
| CHECKED | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ENGINEER | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| APPROVED | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CODE IDENT | 19333 | C | 83322680 | A | A | | | | | | | | | | | | | | | | | | | | | | | |
| CROSS REF NO | | | SHEET 1 of 2 | PAGE 1-11 | | | | | | | | | | | | | | | | | | | | | | | | |
| REF 83215700 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

4 3 2 1



FUNCTIONAL NAME
MODULE TYPE IDENTIFIER
PHYSICAL LOCATION CODE
CROSS REFERENCE NUMBERS

SKEW SIMULATE
A1A01 (191-201) - ABX

±5 V POWER SUPPLY -SHV
A1A03 (331-333)
±12 V AND ±20 V -SKV
A1A02 (321-322)
±42 V PWR SUPPLY & EMERGENCY RETRACT -SJV
A1A01 (311-312)

TRACK SERVO PREAMP -ZQN
A3A05 (291-292)
POWER AMPLIFIER -VTN
A3A04 (281-282)

| | |
|---|---|
| TRANSMITTERS A2B01 (111-113) -TVV | WRITE CLOCK 806 KHz A2A01 (011-013) -LSV |
| RECEIVERS A2B02 (121-124) -RVV | FTU/HEAD ALIGNMENT CARD SLOT A2A02 (021-022) |
| ① | FINE SERVO DECODER A2A03 (031-035) -FRV |
| ① | FAULT CARD A2A04 (041-045) -KFV |
| ① | DATA LATCH A2A05 (051-053) -LRV |
| DIFF GEN AND CONTROL A2B06 (161-165) -LWV | READ PLO A2A06 (061-065) -LZV |
| NRZ TO COMPENSATED MFM A2B07 (171-173) -LXV | D/A FUNCTION GENERATOR A2A07 (071-073) -LQV |
| ACCESS CONTROL & INDEX/SEE DECODE A2B08 (181-184) -LTV | ACCESS CONTROL NO. 2 A2A08 (081-085) -LUV |
| ACCESS CONTROL NO> 1 A2B09 (191-194) -LVV | SWITCHING MODE CONTROL A2A09 (091-093) -LPV |
| ① | INTERLOCKS & SPEED DETECTOR A2A10 (101-104) -SGV |

HEAD SELECT & READ AMPLIFIER WRITER
A3A02 (261-263)
A3A03 (271-274)
-ZKN

OPERATOR CONTROL PANEL
A3A01 (251-252)
-ZYN

①
①
①
T/O
A2D1 (231-233)
-XYV

NOTE:
① NOT USED

4 3 2 1

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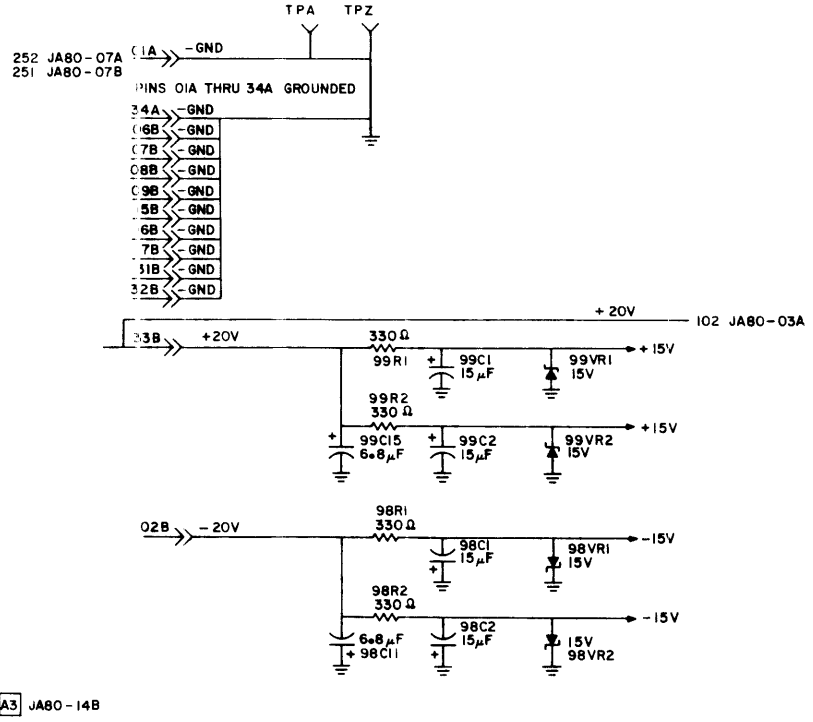
2

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| REVISION STATUS OF SHEETS | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| A | A | A | | | | | | | | | | | | | | | | | |
| B | A | B | | | | | | | | | | | | | | | | | |

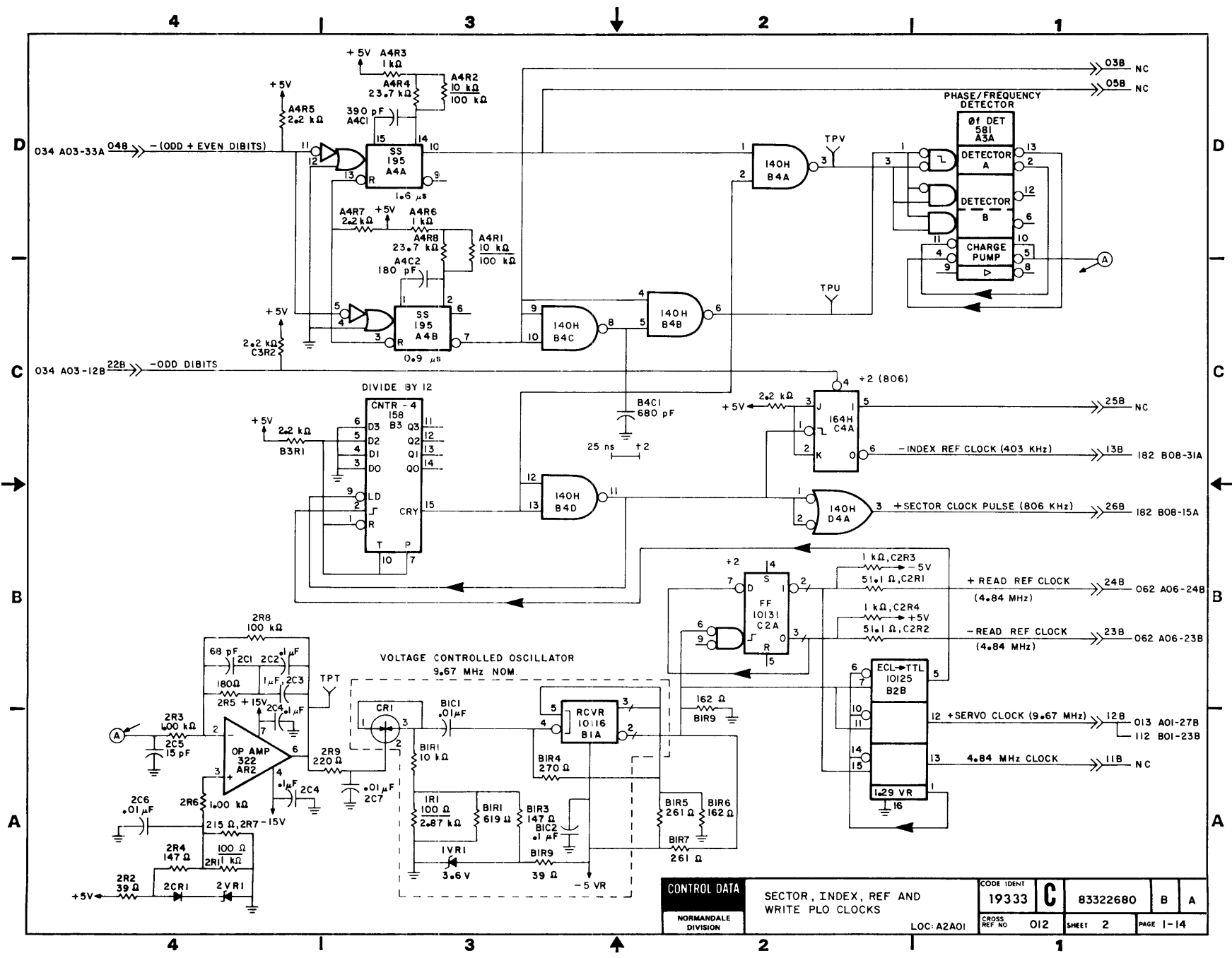
| UNUSED LOGIC ELEMENTS | | |
|-----------------------|----------|----------------|
| TYPE | LOCATION | OUTPUT PIN (S) |
| 10131 | C2 | 14, 15 |
| 10131 | D2 | 14, 15 |
| 10116 | B1 | 6, 7, 14, 15 |
| 10116 | D1 | 2, 3, 6, 7 |
| 10125 | D3 | 4, 13 |
| 10125 | B2 | 4 |
| 140H | D4 | 6 |

| REVISIONS | | | | | |
|-----------|---------|------------------|------|--------|-------|
| REV | ECO | DESCRIPTION | DRFT | DATE | CHK'D |
| A | PE23000 | RELEASED | | | |
| B | | TECHNICAL CHANGE | GR | 4 4 78 | |

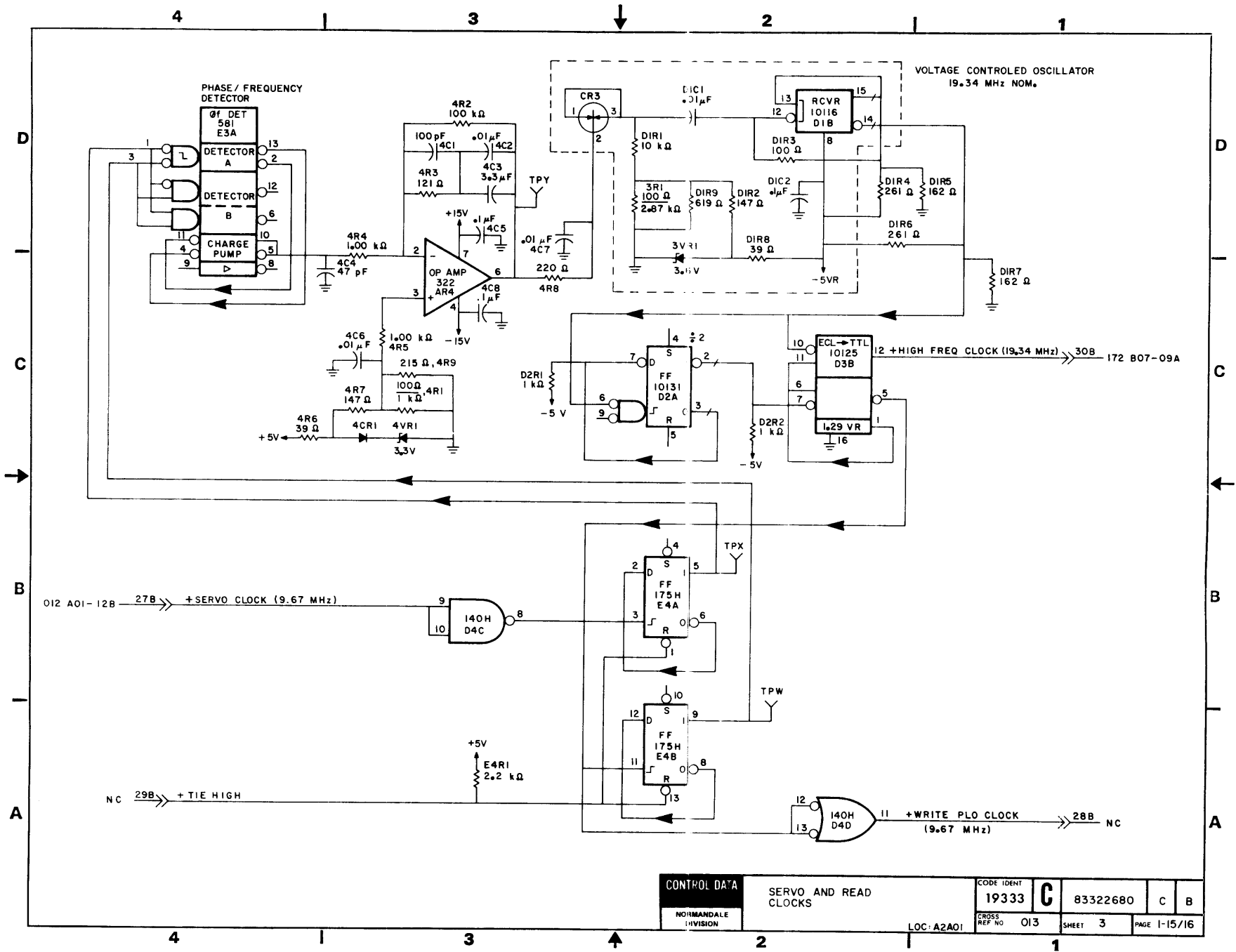


| | | | | | | | | | | |
|----------|--------------------|--------|---------------------|--|--------------|----------|----------|------|------|--------|
| DRAWN | <i>[Signature]</i> | 3-2-77 | CONTROL DATA | WRITE CLOCK 806 KHZ TO 9.67 MHZ DIAGRAMS | CODE IDENT | C | 83322680 | C | B | |
| CHECKED | | | | | 19333 | | | | | |
| ENGINEER | <i>[Signature]</i> | | | | CROSS REF NO | | | | | O11 |
| APPROVED | | | | | SHEET | | | | | 1 of 3 |
| | | | HYRMANDALE DIVISION | TYPE | CLS V | LOC | A2A01 | PAGE | 1-13 | |

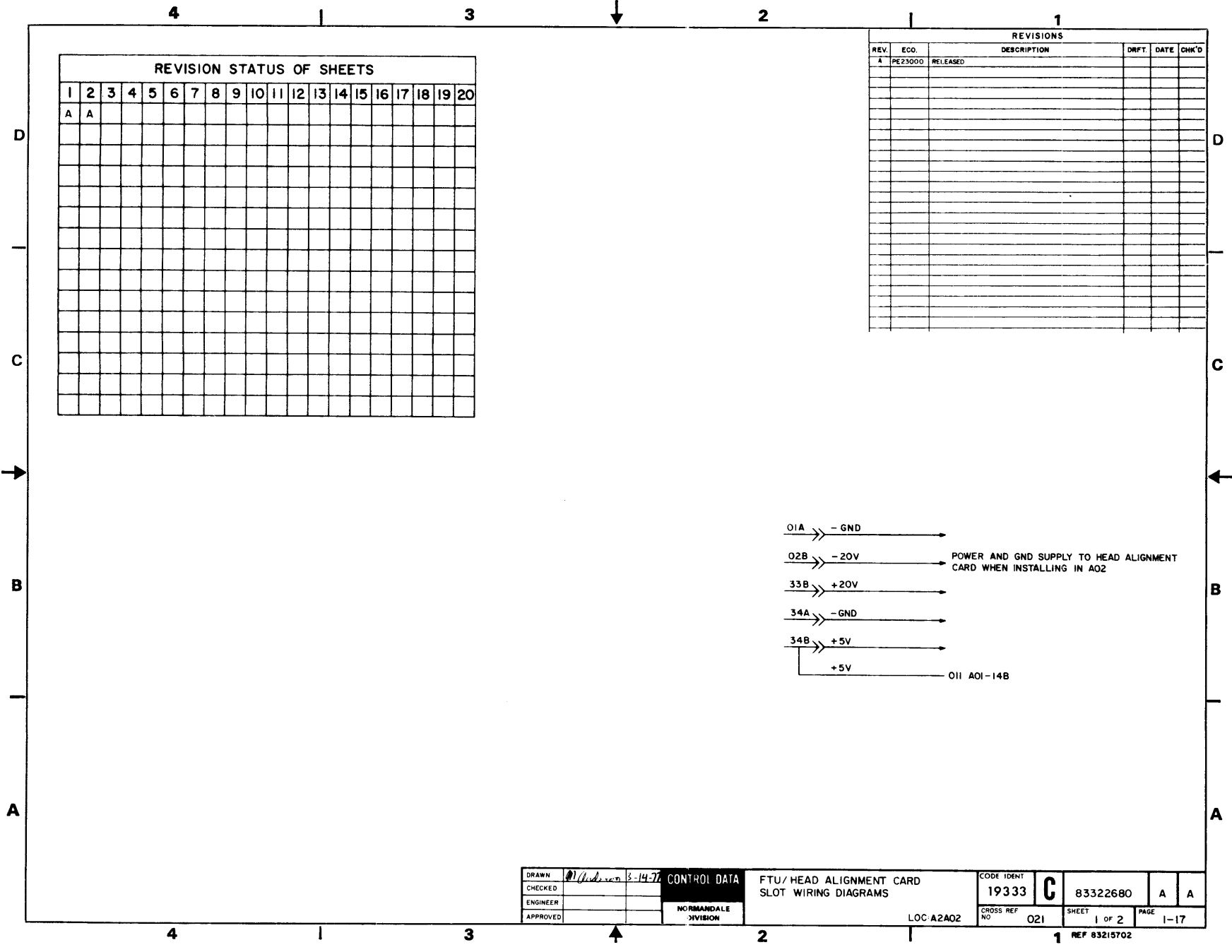
1 REF 83215701



| | | | | | | |
|----------------------|------------------------|--------------|-----|----------|------|------|
| CONTROL DATA | SECTOR, INDEX, REF AND | CODE IDENT | C | 83322680 | B | A |
| | WRITE PLO CLOCKS | 19333 | | | | |
| NORMANDEALE DIVISION | LOC: A2A01 | CROSS REF NO | 012 | SHEET | 2 | PAGE |
| | | | | | 1-14 | |



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|--------------|----------|-----------------------|--------------|------------|-------|---|----------|---------|---|
| CONTROL DATA | | SERVO AND READ CLOCKS | | CODE IDENT | 19333 | C | 83322680 | C | B |
| NORMANDEALE | INVISION | LOC: A2A01 | CROSS REF NO | 013 | SHEET | 3 | PAGE | 1-15/16 | |

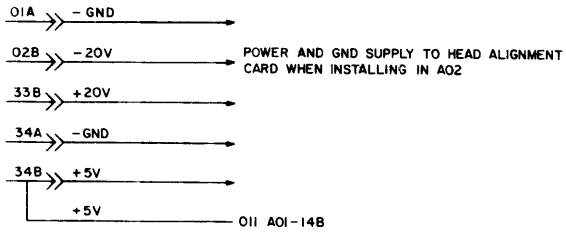


REVISION STATUS OF SHEETS

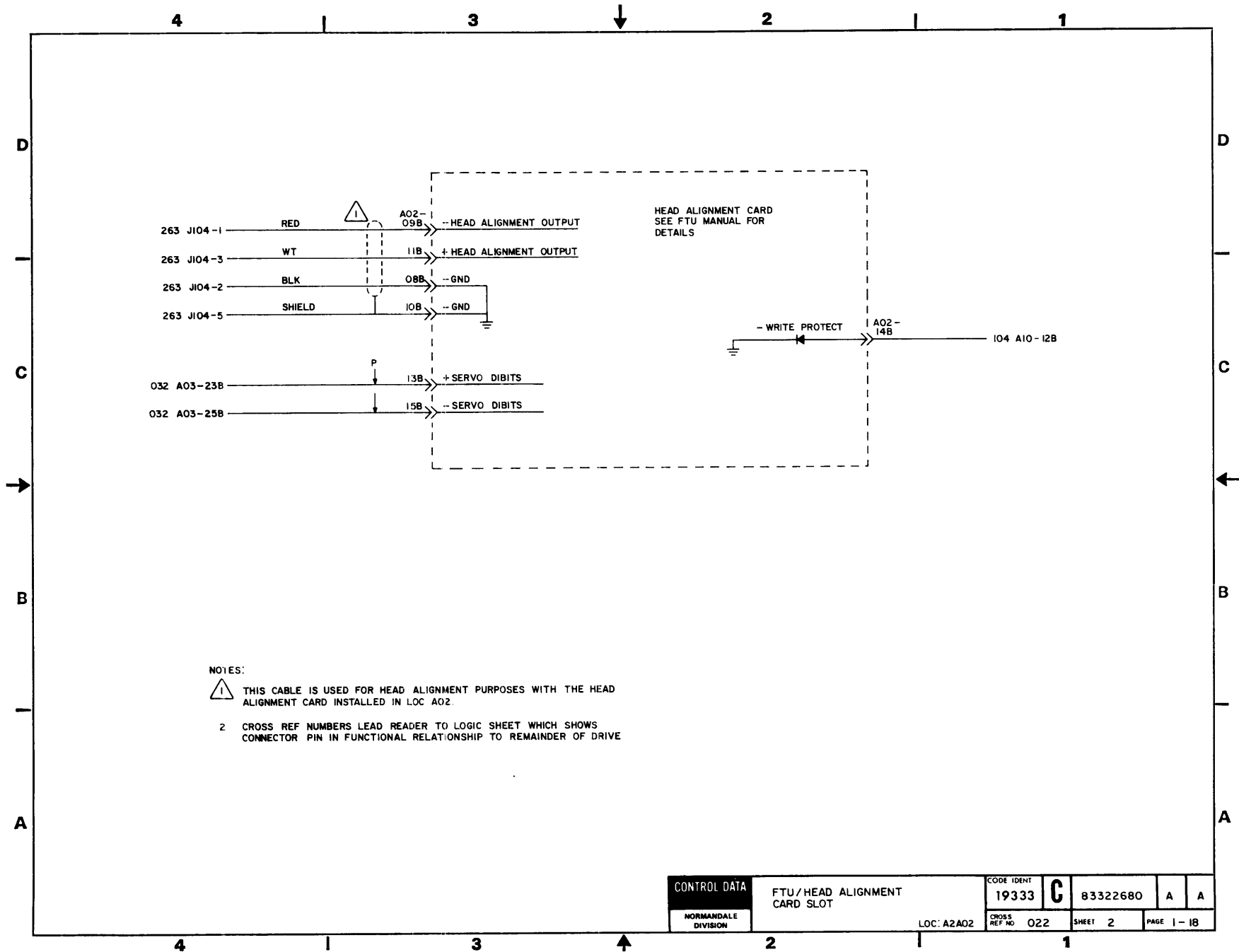
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|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| A | A | | | | | | | | | | | | | | | | | | | |
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REVISIONS

| REV. | ECO. | DESCRIPTION | DRFT. | DATE | CHK'D |
|------|---------|-------------|-------|------|-------|
| A | PE23000 | RELEASED | | | |
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|-----------------------------|-------------------------------|----------|----------|------------------------|--|----------------------------|-----------------|--------------|--------------|---|
| DRAWN <i>(Signature)</i> | CHECKED <i>(Signature)</i> | ENGINEER | APPROVED | CONTROL DATA | FTU/ HEAD ALIGNMENT CARD SLOT WIRING DIAGRAMS | CODE IDENT 19333 | C | 83322680 | A | A |
| | | | | NORMANDALE DIVISION | LOC A2A02 | CROSS REF NO 021 | SHEET 1 of 2 | PAGE 1-17 | REF 83215702 | |



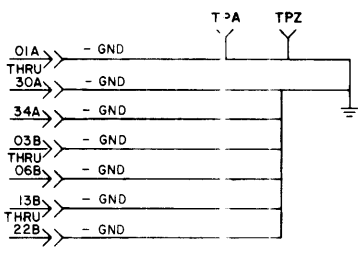
| | | | | | | | |
|---|---------------------------------|----------------------|---------------------|-----------|----------|---|---|
| CONTROL DATA NORMANDEALE DIVISION | FTU/HEAD ALIGNMENT CARD SLOT | LOC: A2A02 | CODE IDENT 19333 | C | 83322680 | A | A |
| | | CROSS REF NO. 022 | SHEET 2 | PAGE 1-18 | | | |

4 | 3 | 2 | 1

REVISION STATUS OF SHEETS

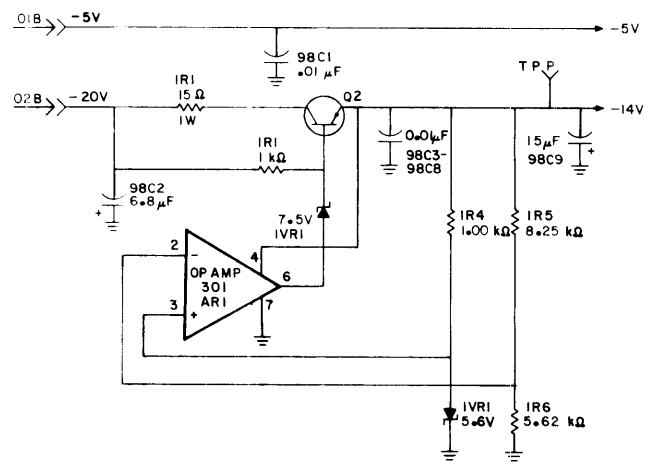
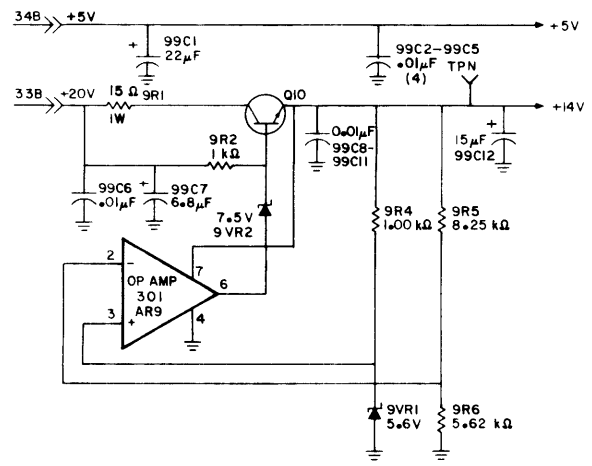
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|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| A | A | A | A | A | | | | | | | | | | | | | | | | |

| REVISIONS | | | | | |
|-----------|---------|-------------|------|------|-------|
| REV | ECO | DESCRIPTION | DRFT | DATE | CHK'D |
| A | PE23000 | RELEASED | | | |



UNUSED LOGIC ELEMENTS

| TYPE | LOCATION | OUTPUT PIN(S) |
|------|----------|---------------|
| 200 | D3 | 4,6 |



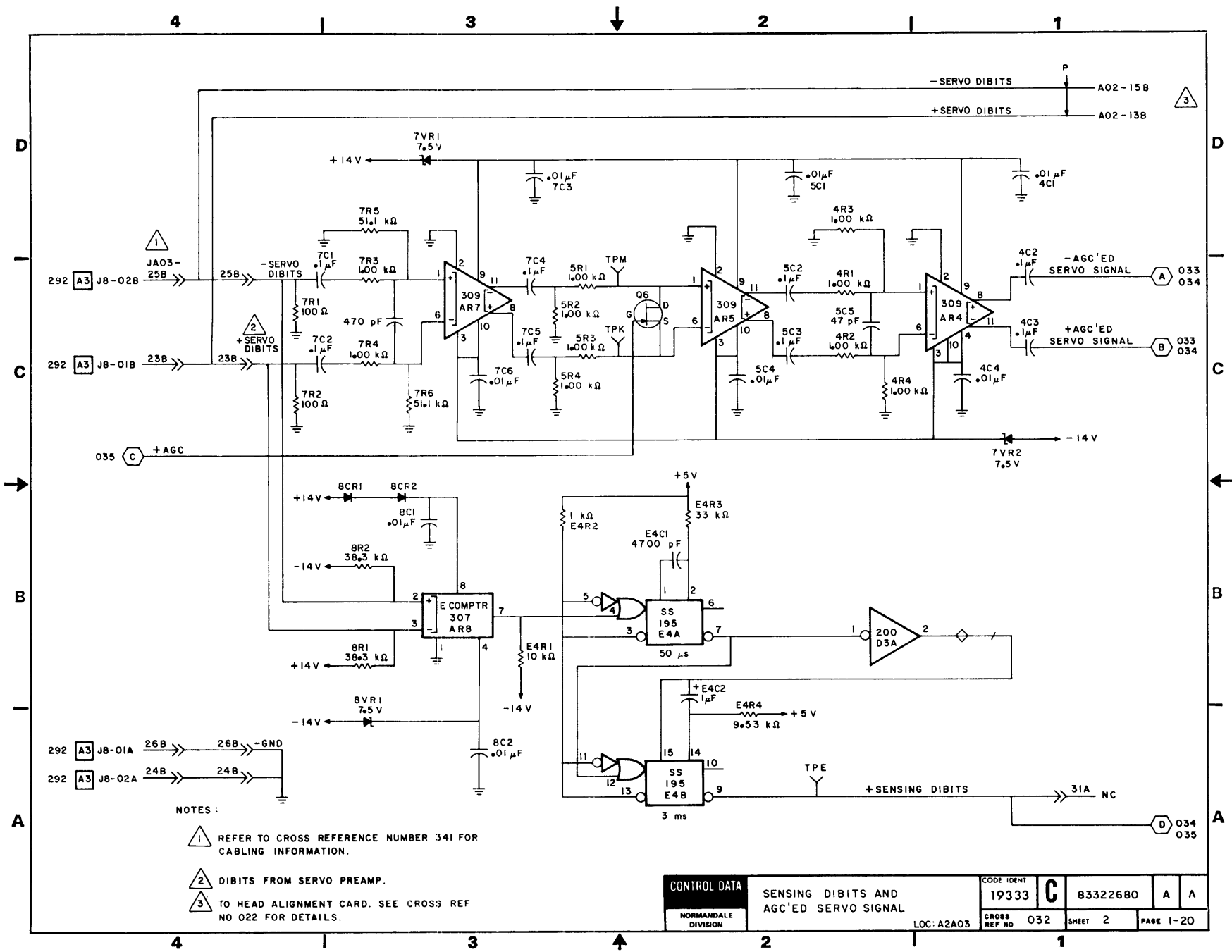
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C
B
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D
C
B
A

4 | 3 | 2 | 1

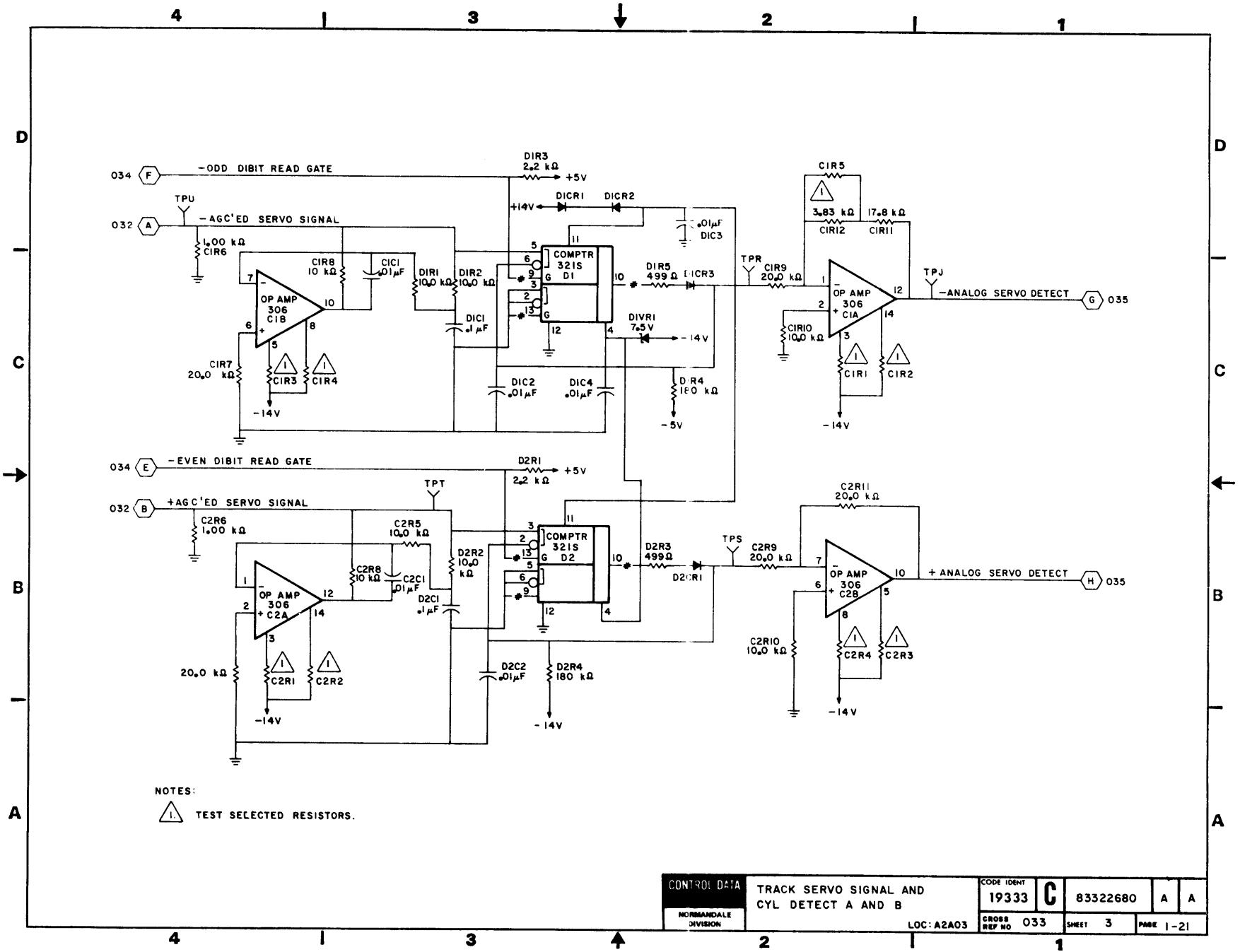
| | | | | | | | | | |
|----------|-----------------|--------|----------------------|------------|-------|-----|----------|--------------|--------|
| DRAWN | <i>W. Dwyer</i> | 3-4-77 | CONTROL DATA | CODE IDENT | 19333 | C | 83322680 | A | A |
| CHECKED | | | | | | | | | |
| ENGINEER | | | | | | | | | |
| APPROVED | | | NORMANDEALE DIVISION | TYPE | HFRV | LOC | A2A03 | CROSS REF NO | O31 |
| | | | | | | | | SHEET | 1 of 5 |
| | | | | | | | | PAGE | 1-19 |

REF 83215703



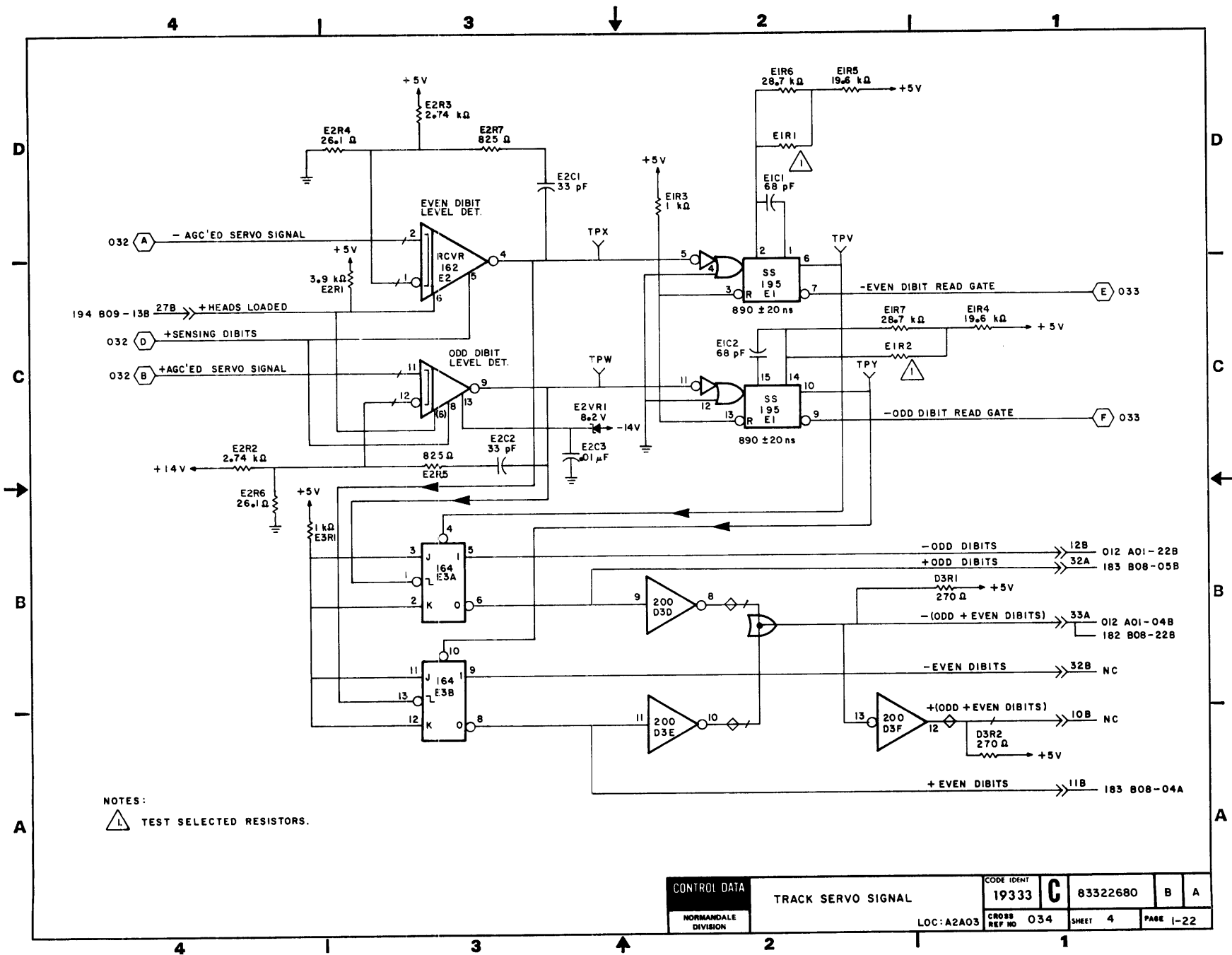
- NOTES:
- 1 REFER TO CROSS REFERENCE NUMBER 341 FOR CABLING INFORMATION.
 - 2 DIBITS FROM SERVO PREAMP.
 - 3 TO HEAD ALIGNMENT CARD. SEE CROSS REF NO 022 FOR DETAILS.

| | | | | | | |
|---------------------|--|---------------------|---------------------|------------|--------------|---|
| CONTROL DATA | | CODE IDENT 19333 | C | 83322680 | A | A |
| NORMANDALE DIVISION | SENSING DIBITS AND AGC'ED SERVO SIGNAL | | CROSS REF NO 032 | SHEET 2 | PAGE 1-20 | |
| LOC: A2A03 | | | | | | |



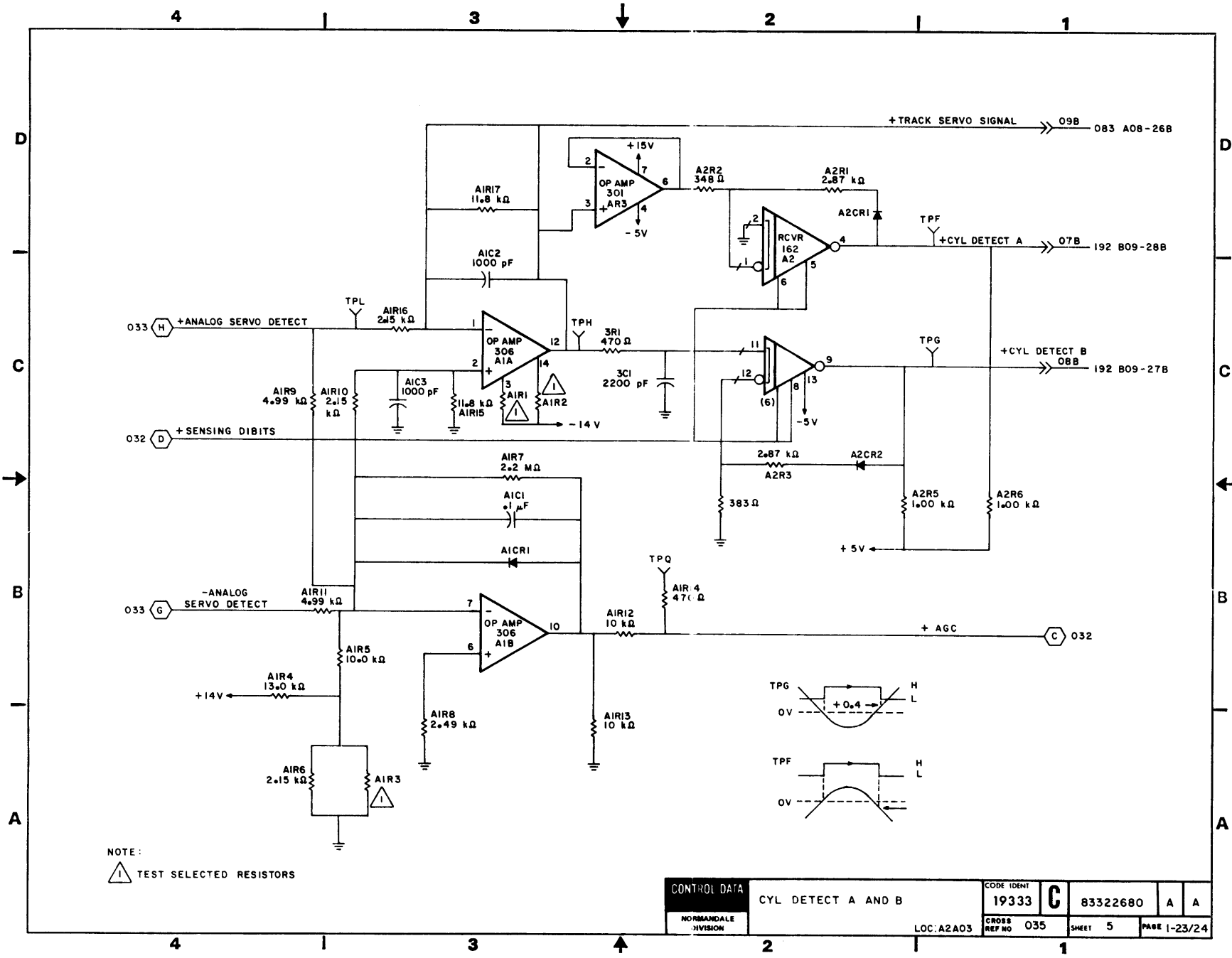
NOTES:
 TEST SELECTED RESISTORS.

| | | | | | | | | |
|-------------------------|--|--|--|-----------------|----------|----------|-----------|---|
| CONTROL DATA | | TRACK SERVO SIGNAL AND CYL DETECT A AND B | | CODE IDENT | C | 83322680 | A | A |
| NORMANDEALE DIVISION | | LOC: A2A03 | | CROSS REF NO | 033 | SHEET 3 | PAGE 1-21 | |



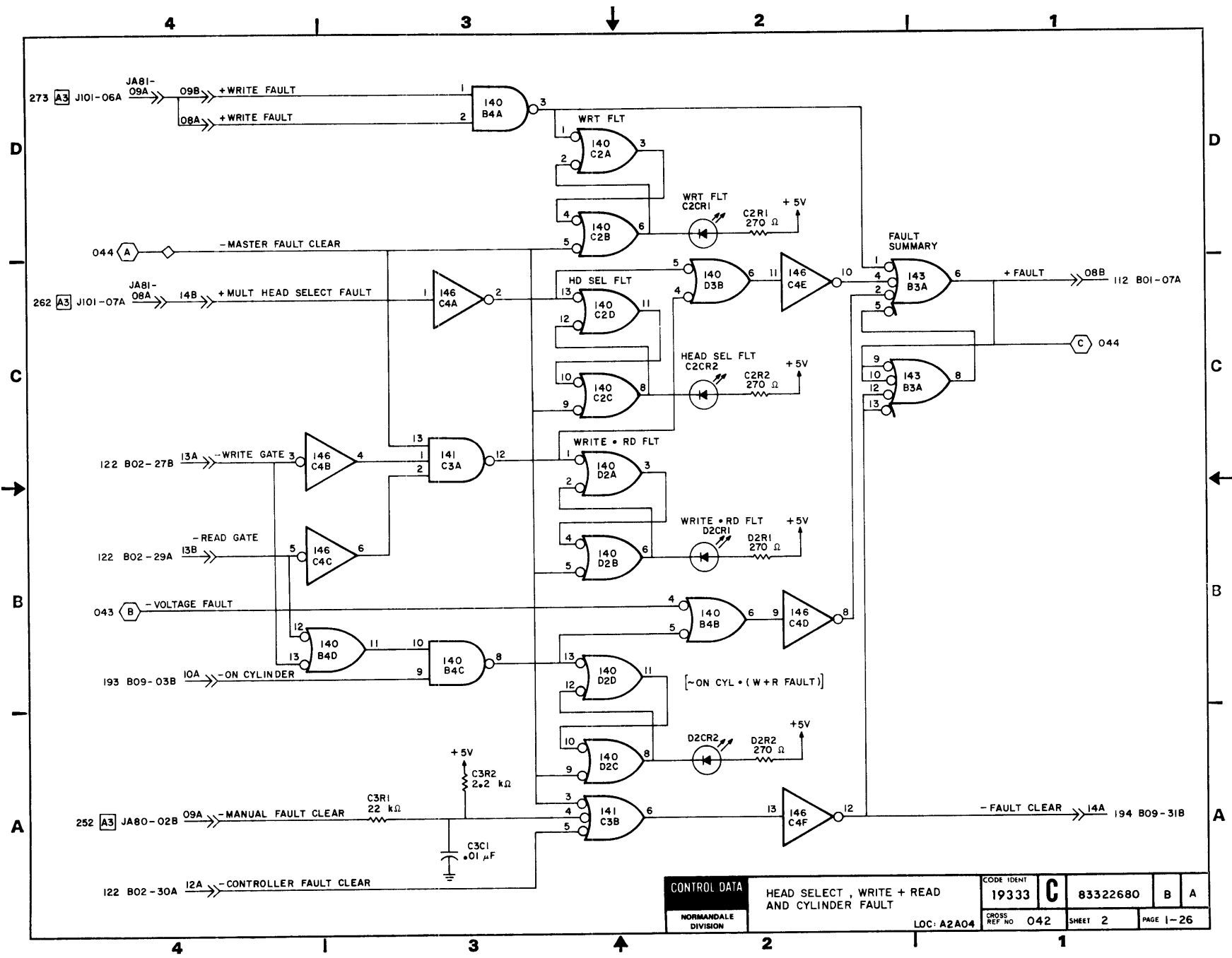
NOTES:
 [Triangle symbol] TEST SELECTED RESISTORS.

| | | | | | | | |
|---|--------------------|--|---------------------|---------|-----------|---|---|
| CONTROL DATA NORMANDEALE DIVISION | TRACK SERVO SIGNAL | | CODE IDENT 19333 | C | 83322680 | B | A |
| | LOC: A2A03 | | CROSS REF NO 034 | SHEET 4 | PAGE 1-22 | | |

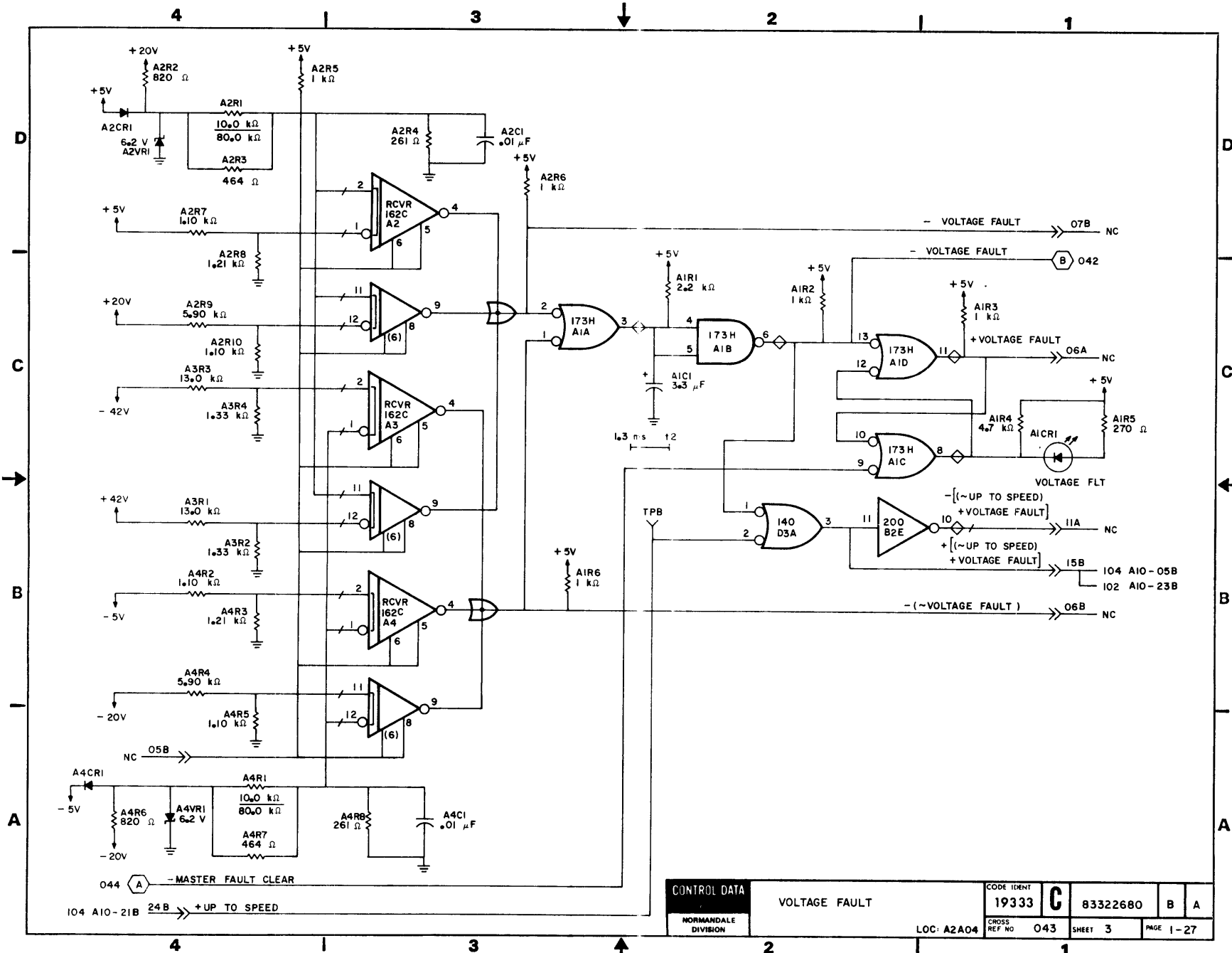


NOTE:
 TEST SELECTED RESISTORS

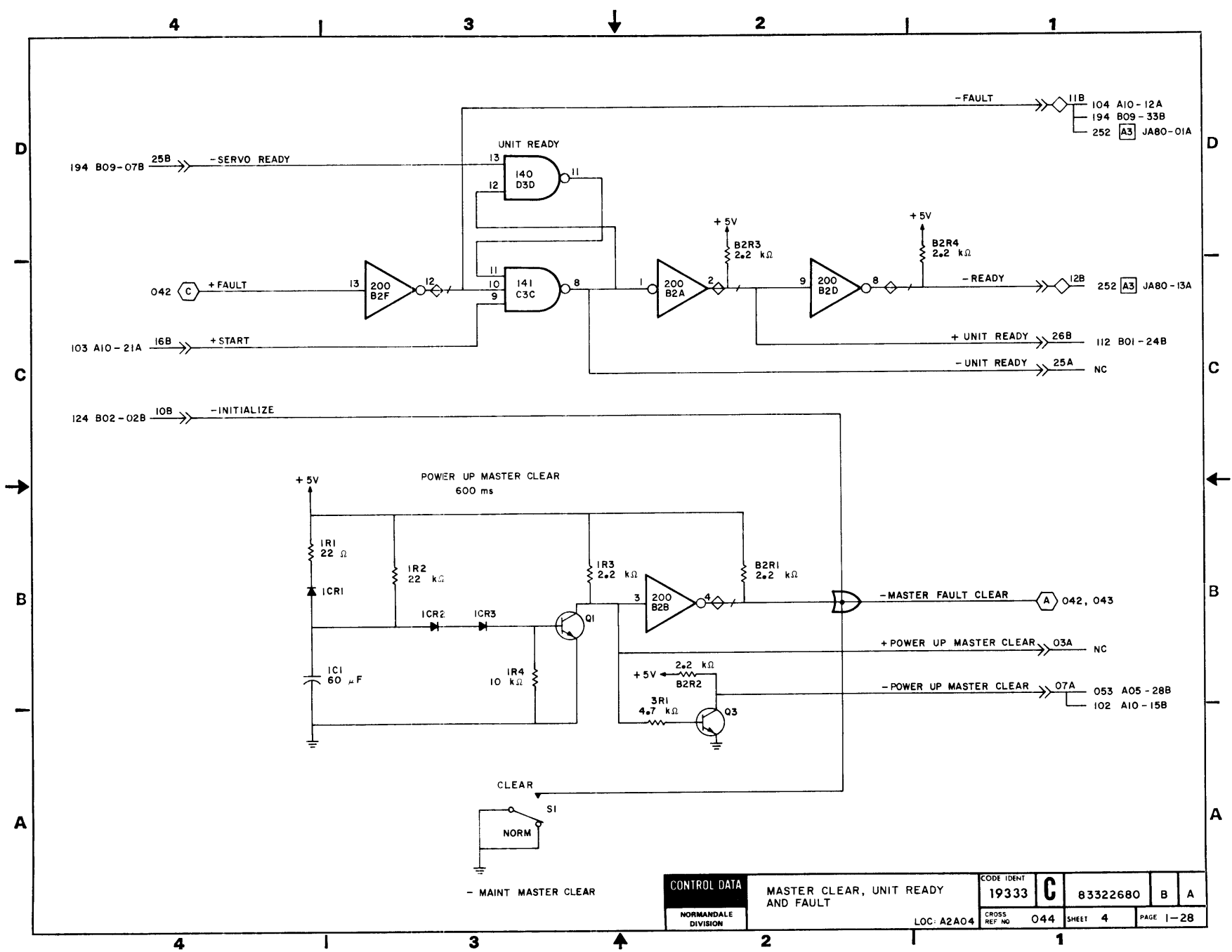
| | | | | |
|----------------------|------------|--------------|--------------|----------|
| CONTROL DATA | | CODE IDENT | | |
| CYL DETECT A AND B | | 19333 | C | 83322680 |
| NORMANDEALE DIVISION | LOC: A2A03 | CROSS REF NO | 035 | SHEET 5 |
| | | | PAGE 1-23/24 | |



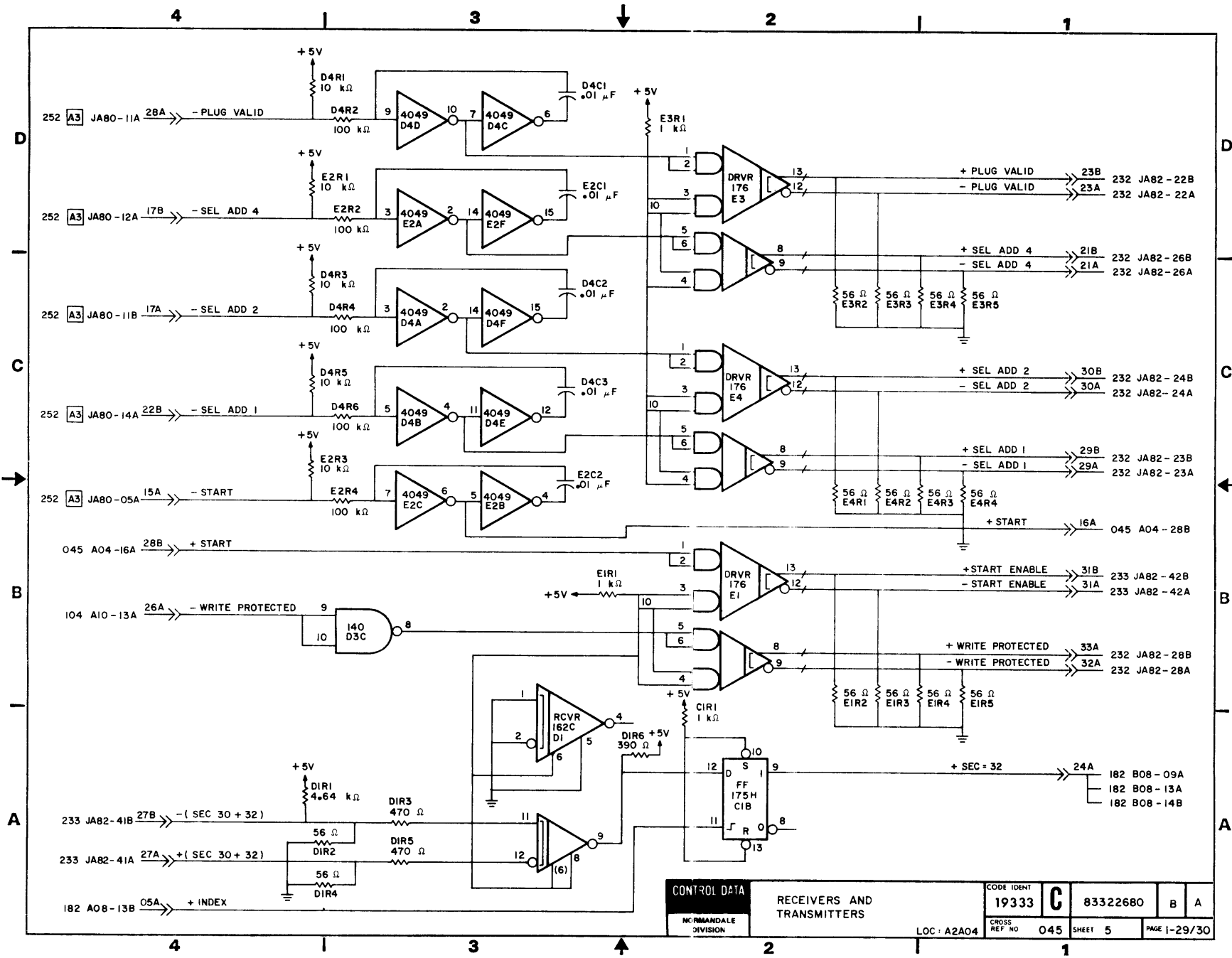
| | | | | | | | | |
|--------------|--|------------|--------------|-------|-------|----------|------|------|
| CONTROL DATA | HEAD SELECT, WRITE + READ AND CYLINDER FAULT | | CODE IDENT | 19333 | C | 83322680 | B | A |
| | NORMANDEALE DIVISION | LOC: A2A04 | CROSS REF NO | 042 | SHEET | 2 | PAGE | 1-26 |



| | | | | | | | | | |
|---------------------|--|---------------|--|--------------|-------|-------|----------|-----------|---|
| CONTROL DATA | | VOLTAGE FAULT | | CODE IDENT | 19333 | C | 83322680 | B | A |
| NORMANDALE DIVISION | | LOC: A2A04 | | CROSS REF NO | 043 | SHEET | 3 | PAGE 1-27 | |



| | | | | | | |
|----------------------|--|--------------|-----|----------|------|------|
| CONTROL DATA | | CODE IDENT | C | 83322680 | B | A |
| NORMANDEALE DIVISION | | 19333 | | | | |
| LOC: A2A04 | | CROSS REF NO | O44 | SHEET | 4 | PAGE |
| | | | | | 1-28 | |



| | | | | | | | |
|----------------------|----------------------------|--------------|-------|---|----------|--------------|---|
| CONTROL DATA | RECEIVERS AND TRANSMITTERS | CODE IDENT | 19333 | C | 83322680 | B | A |
| | | CROSS REF NO | 045 | | SHEET 5 | PAGE 1-29/30 | |
| NORMANDEALE DIVISION | | LOC : A2A04 | | | | | |

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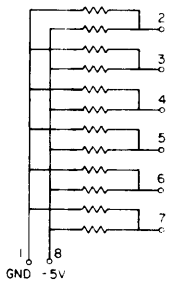
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REVISION STATUS OF SHEETS

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| A | A | A | | | | | | | | | | | | | | | | | | |
| B | A | B | | | | | | | | | | | | | | | | | | |
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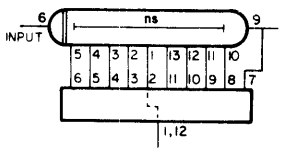
| REVISIONS | | | | | |
|-----------|---------|-------------------|------|--------|-------|
| REV | ECO | DESCRIPTION | DRFT | DATE | CHK'D |
| A | PE2304C | REF. EASE | | | |
| B | PE4891B | CHG DELAY ON CARD | GR | 4 4 78 | |
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NOTES
 △ TYPICAL CONFIGURATION FOR TERMINATORS AT-C2A, AT-C2B AND AT-B4A AS FOLLOWS



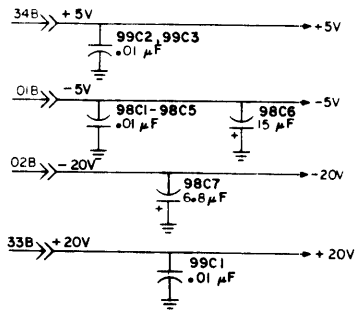
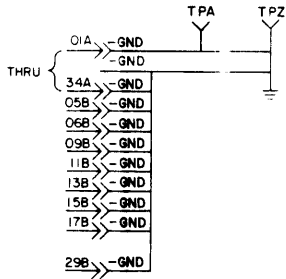
2 DELAY LINES ARE CONNECTED TO JUMPER BLOCK AS SHOWN IN DIAGRAM BELOW. ACTUAL DELAYS ARE SELECTED DURING MANUFACTURING. THIS DIAGRAM SHOWS TYPICAL CONNECTIONS. DELAY TIME FOR EACH DELAY LINE PIN RELATIVE TO PIN 6 INPUT IS SHOWN IN CHART BELOW.

| PIN | DELAY TIMES (NS) | |
|-----|------------------|-----|
| | B1 | A2 |
| 5 | 5 | 10 |
| 4 | 10 | 20 |
| 3 | 15 | 30 |
| 2 | 20 | 40 |
| 1 | 25 | 50 |
| 13 | 30 | 60 |
| 12 | 35 | 70 |
| 11 | 40 | 80 |
| 10 | 45 | 90 |
| 9 | 50 | 100 |

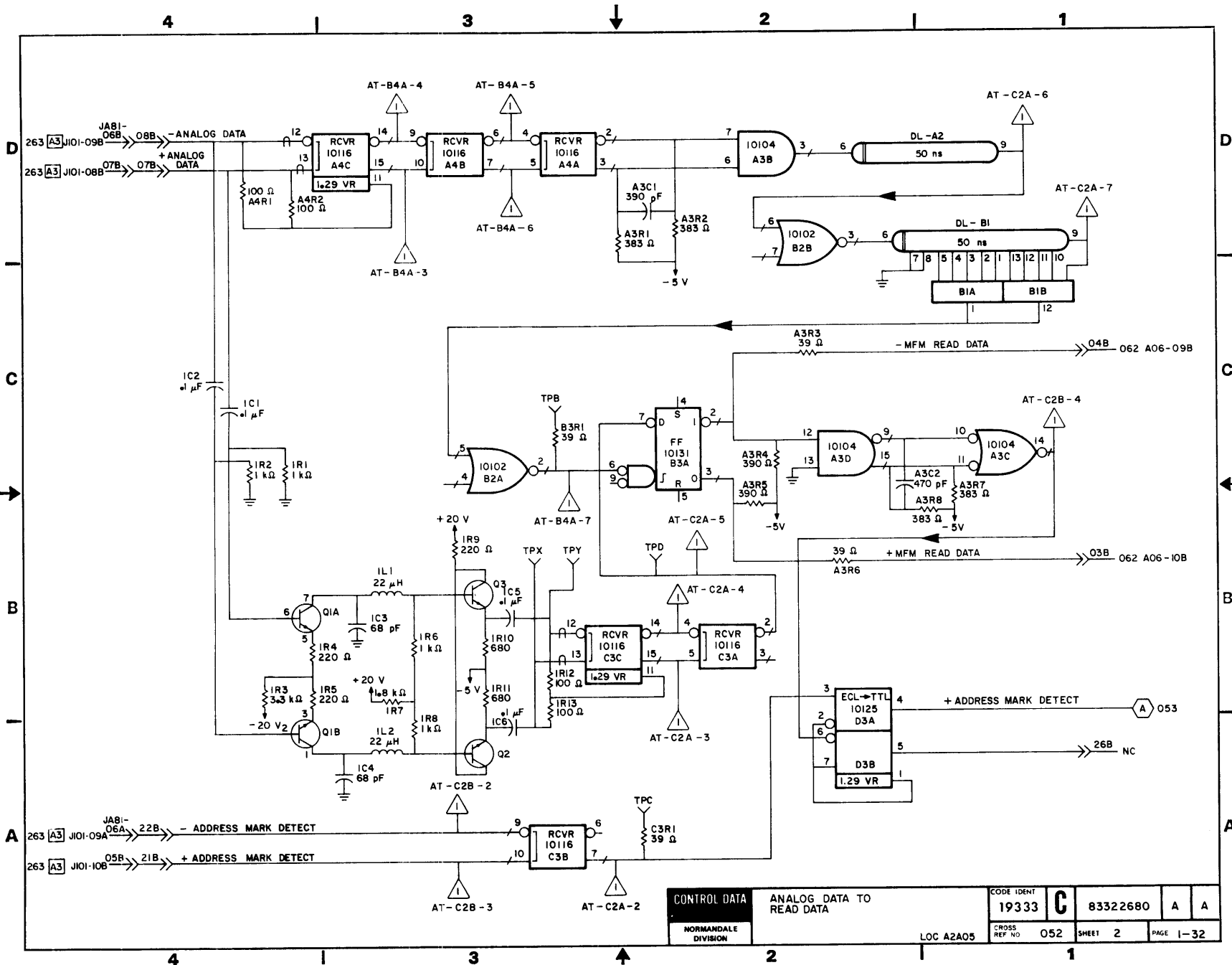


UNUSED LOGIC ELEMENTS

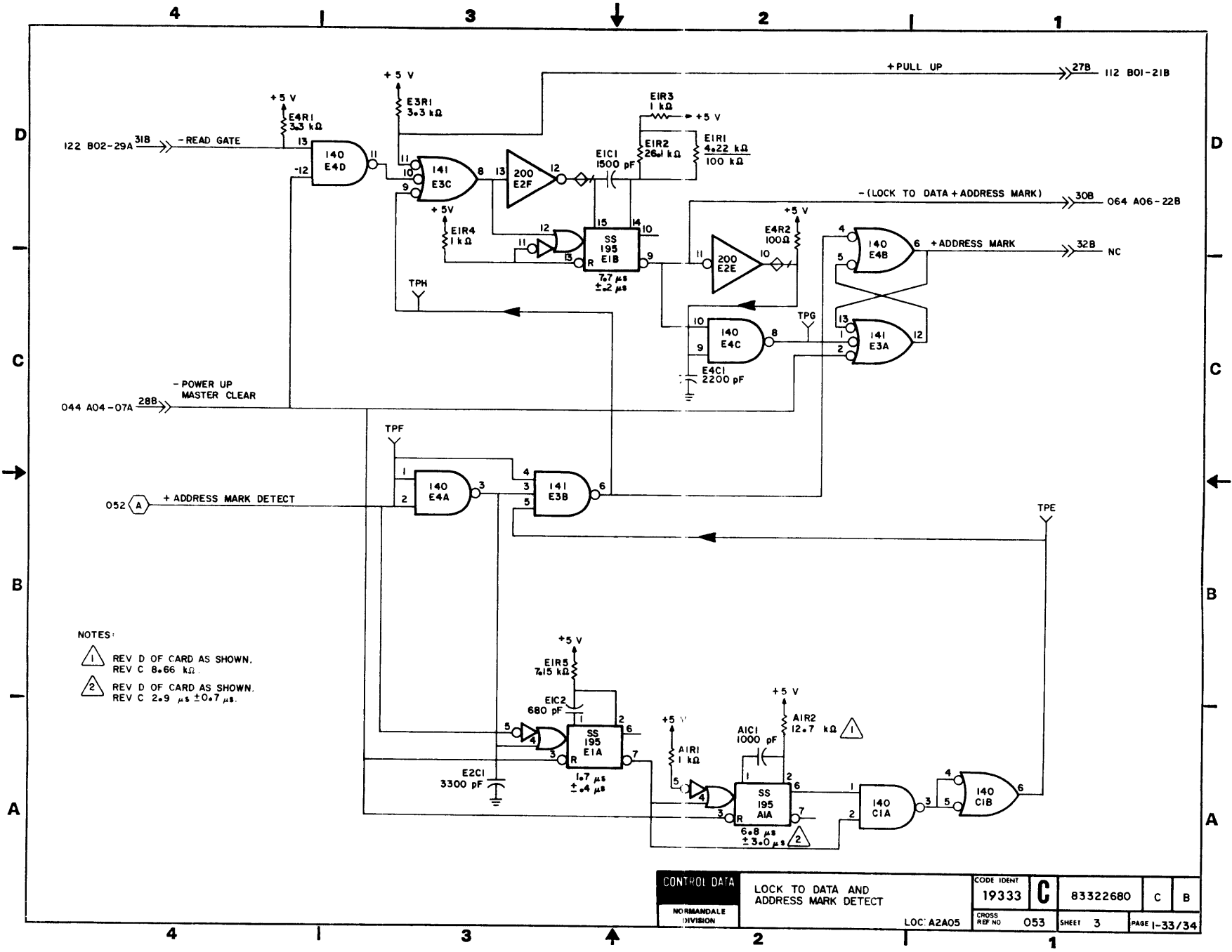
| TYPE | LOCATION | OUTPUT PIN(S) |
|-------|----------|---------------|
| 145 | A1 | 9, 10 |
| 164S | D2 | 8, 9 |
| 10104 | A3 | 2 |
| 10102 | B2 | 9, 15, 14 |
| 10125 | D3 | 12, 13 |
| 10131 | B3 | 14, 15 |
| 200 | E2 | 2, 4, 6, 8 |



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|------------------------------|-----------------------------------|-----------------------|---------------------|
| DRAWN MANDERSON 1-4-77 | CONTROL DATA | CODE IDENT 19333 C | DATA LATCH DIAGRAMS |
| CHECKED | ENGINEER [Signature] 3/2/77 | 83322680 | C B |
| APPROVED | NONMANDALE DIVISION | CROSS REF NO 051 | SHEET 1 of 3 |
| | | LOC: A2A05 | PAGE 1-31 |
| | | | REF 83215705 |



| | | | | | | |
|--|-----------------------------|---------------------|---|----------|---|---|
| CONTROL DATA NORMANDALE DIVISION | ANALOG DATA TO READ DATA | CODE IDENT 19333 | C | 83322680 | A | A |
| | LOC A2A05 | CROSS REF NO 052 | | | | |



- NOTES:
- ① REV D OF CARD AS SHOWN.
REV C 8.66 kΩ.
 - ② REV D OF CARD AS SHOWN.
REV C 2.9 μs ± 0.7 μs.

| | | | | | | | | | |
|---------------------|------------|--------------------------------------|-----|------------|-------|----------|----------|---|---|
| CONTROL DATA | | LOCK TO DATA AND ADDRESS MARK DETECT | | CODE IDENT | 19333 | C | 83322680 | C | B |
| NORMANDALE DIVISION | LOC: A2A05 | CROSS REF NO | 053 | SHEET | 3 | PAGE | 1-33/34 | | |

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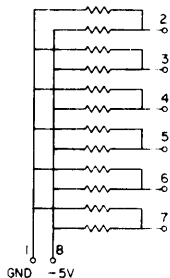
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REVISION STATUS OF SHEETS

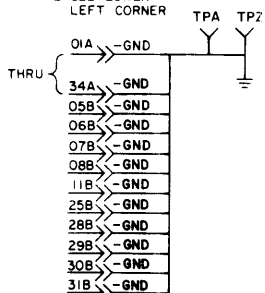
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|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| A | A | A | A | A | | | | | | | | | | | | | | | | |

| REVISIONS | | | | | | |
|-----------|---------|-------------|------|------|-------|--|
| REV | ECO | DESCRIPTION | DRFT | DATE | CHK'D | |
| A | PE23000 | RELEASED | | | | |

NOTES
 1 TYPICAL CONFIGURATION FOR TERMINATORS ATA3, ATB2, ATB3, ATB4, ATC3, ATD4, ATE2 AS FOLLOWS



NOTE
 2 SEE LOWER LEFT CORNER

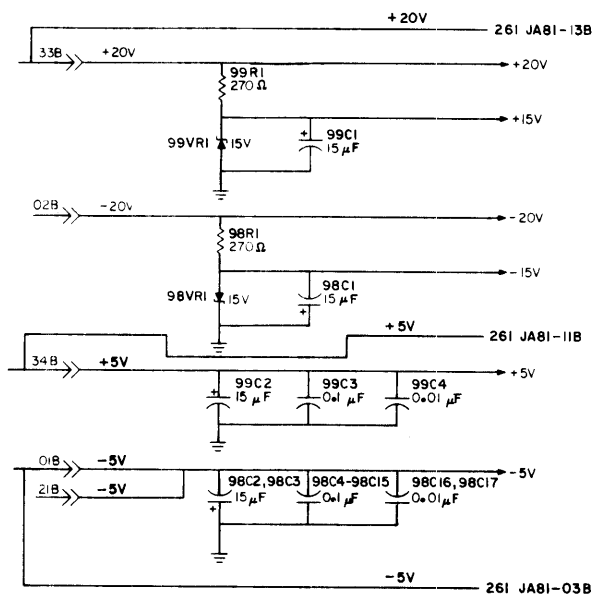
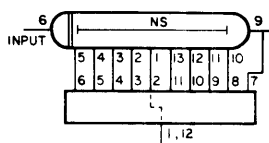


UNUSED LOGIC ELEMENTS

| TYPE | LOCATION | OUTPUT PIN (S) |
|-------|----------|----------------|
| 10131 | E4 | 2,3 |
| 10116 | E1 | 14,15 |
| 10116 | C3 | 2,3,14,15 |
| 10125 | D4 | 4,5 |

| PIN | DELAY TIMES (NS) | |
|-----|------------------|-----|
| | B1 | A2 |
| 5 | 5 | 10 |
| 4 | 10 | 20 |
| 3 | 15 | 30 |
| 2 | 20 | 40 |
| 1 | 25 | 50 |
| 13 | 30 | 60 |
| 12 | 35 | 70 |
| 11 | 40 | 80 |
| 10 | 45 | 90 |
| 9 | 50 | 100 |

2 DELAY LINES ARE CONNECTED TO JUMPER BLOCK AS SHOWN IN DIAGRAM BELOW. ACTUAL DELAYS ARE SELECTED DURING MANUFACTURING. THIS DIAGRAM SHOWS TYPICAL CONNECTIONS. DELAY TIME FOR EACH DELAY LINE PIN RELATIVE TO PIN 6 INPUT IS SHOWN IN CHART BELOW.



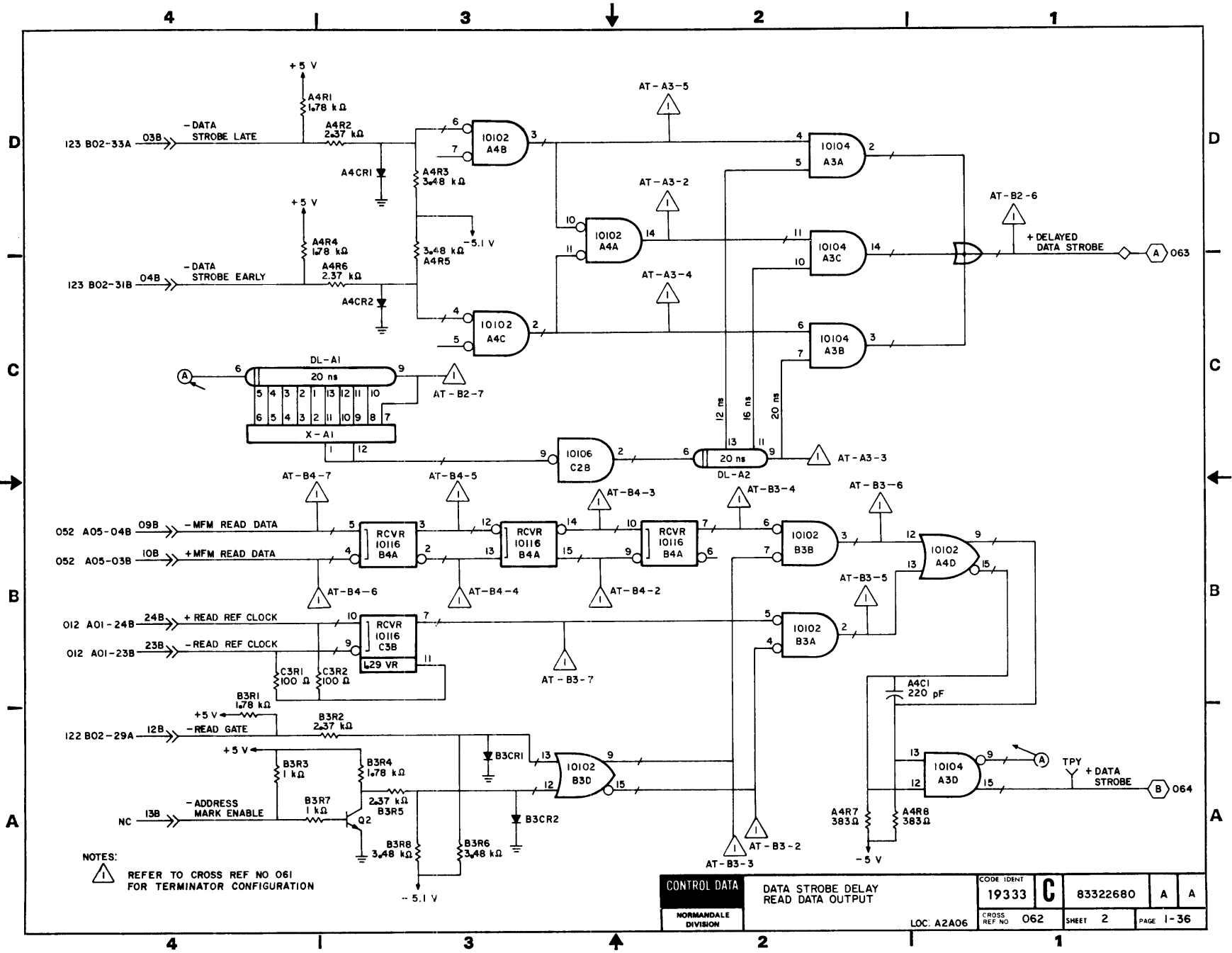
| | | | | | | | | | | |
|----------|-----------|----|--------------|-------------------|--------------|-------|---|--------------|-----------|---|
| DRAWN | MANDERSON | 17 | CONTROL DATA | READ PLO DIAGRAMS | CODE IDENT | 19333 | C | 83322680 | A | A |
| CHECKED | | | | | | | | | | |
| ENGINEER | | | NORMANDE | TYPE BLZV | CROSS REF NO | 061 | | SHEET 1 of 5 | PAGE 1-35 | |
| APPROVED | | | DIVISION | | LOC | A2A06 | | REF 83215706 | | |

4

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2

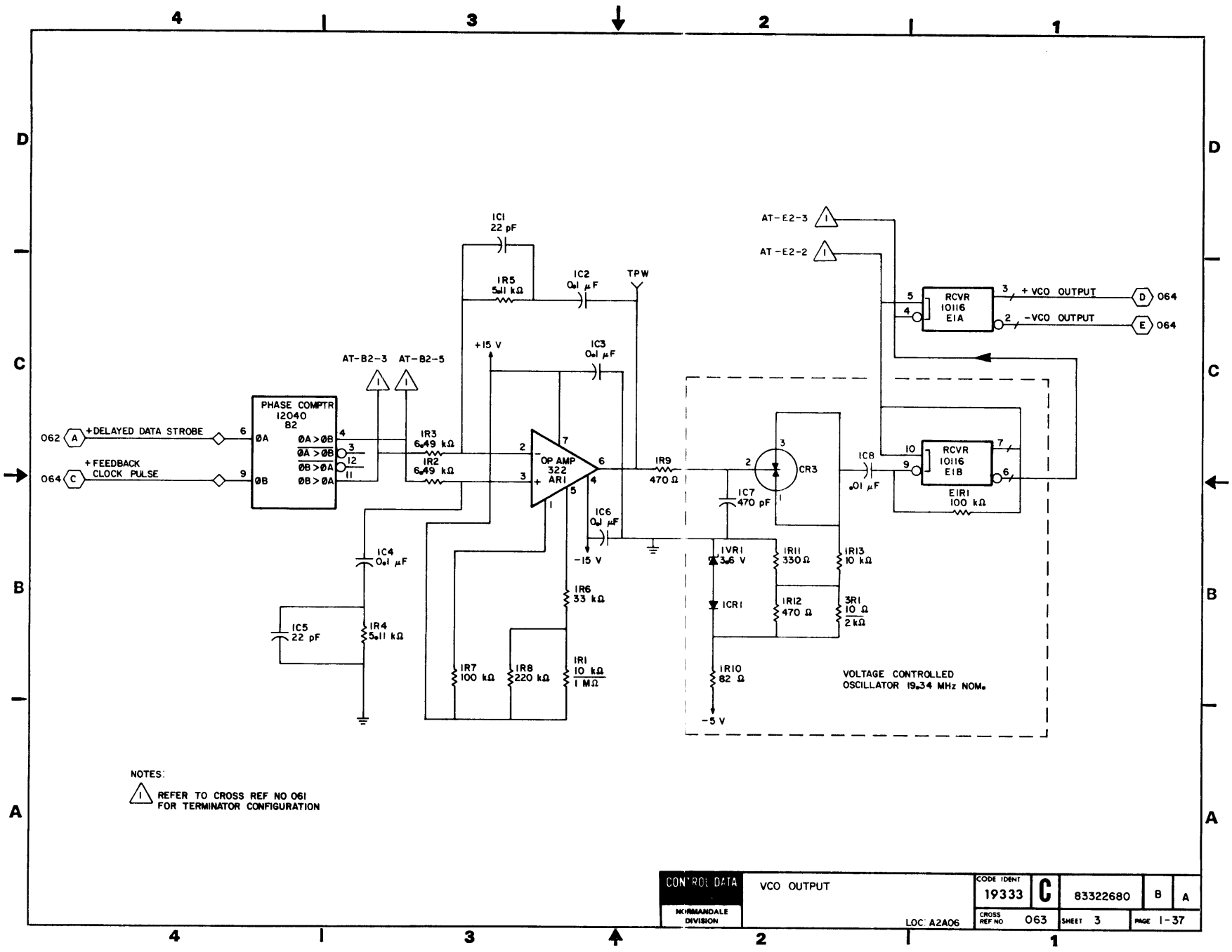
1



NOTES:
 1 REFER TO CROSS REF NO 061 FOR TERMINATOR CONFIGURATION

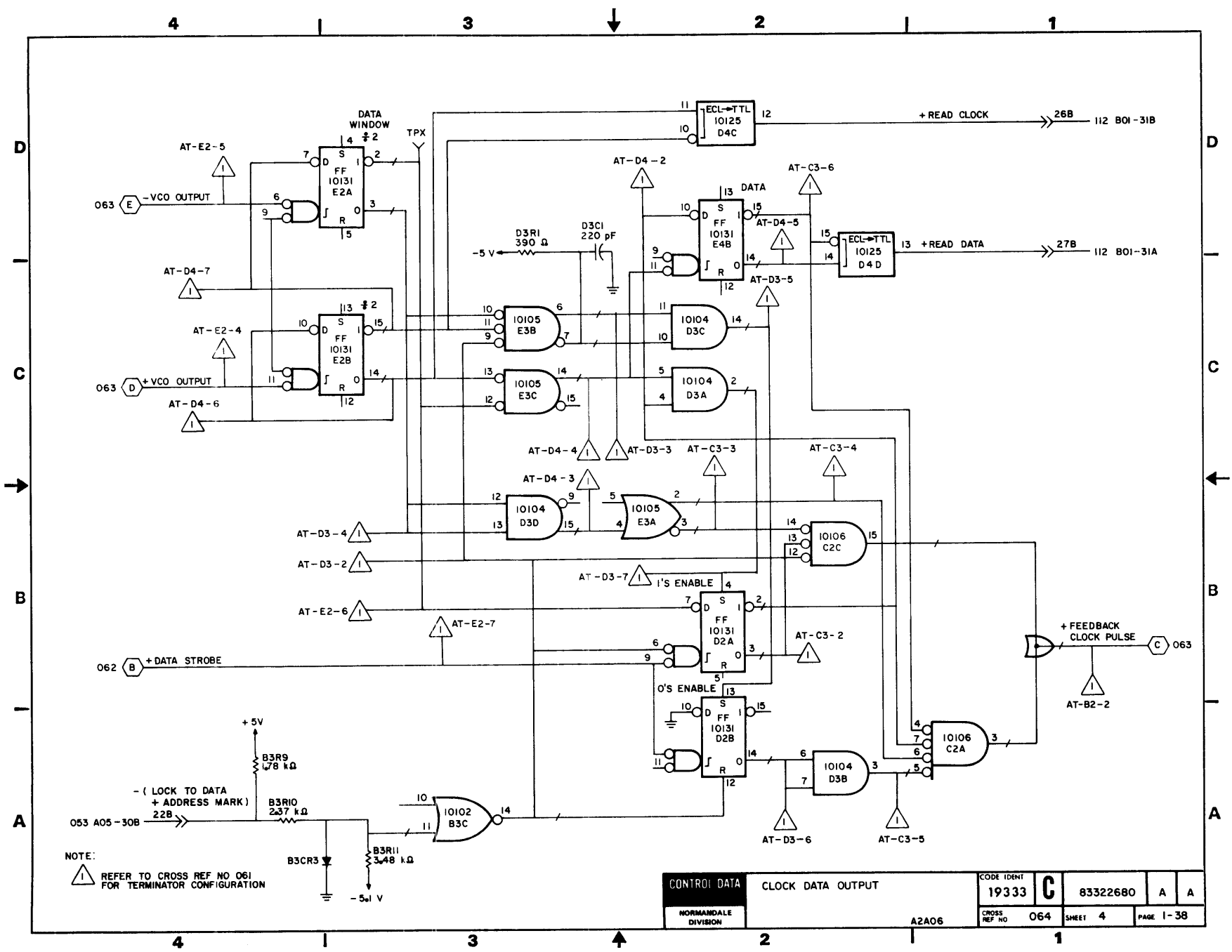
| | | | | | | |
|-------------------------------------|-------------------|---------------------|---|----------|---|---|
| CONTROL DATA NORMANDALE DIVISION | DATA STROBE DELAY | CODE IDENT 19333 | C | 83322680 | A | A |
| | READ DATA OUTPUT | CROSS REF NO 062 | | | | |

LOC: A2A06



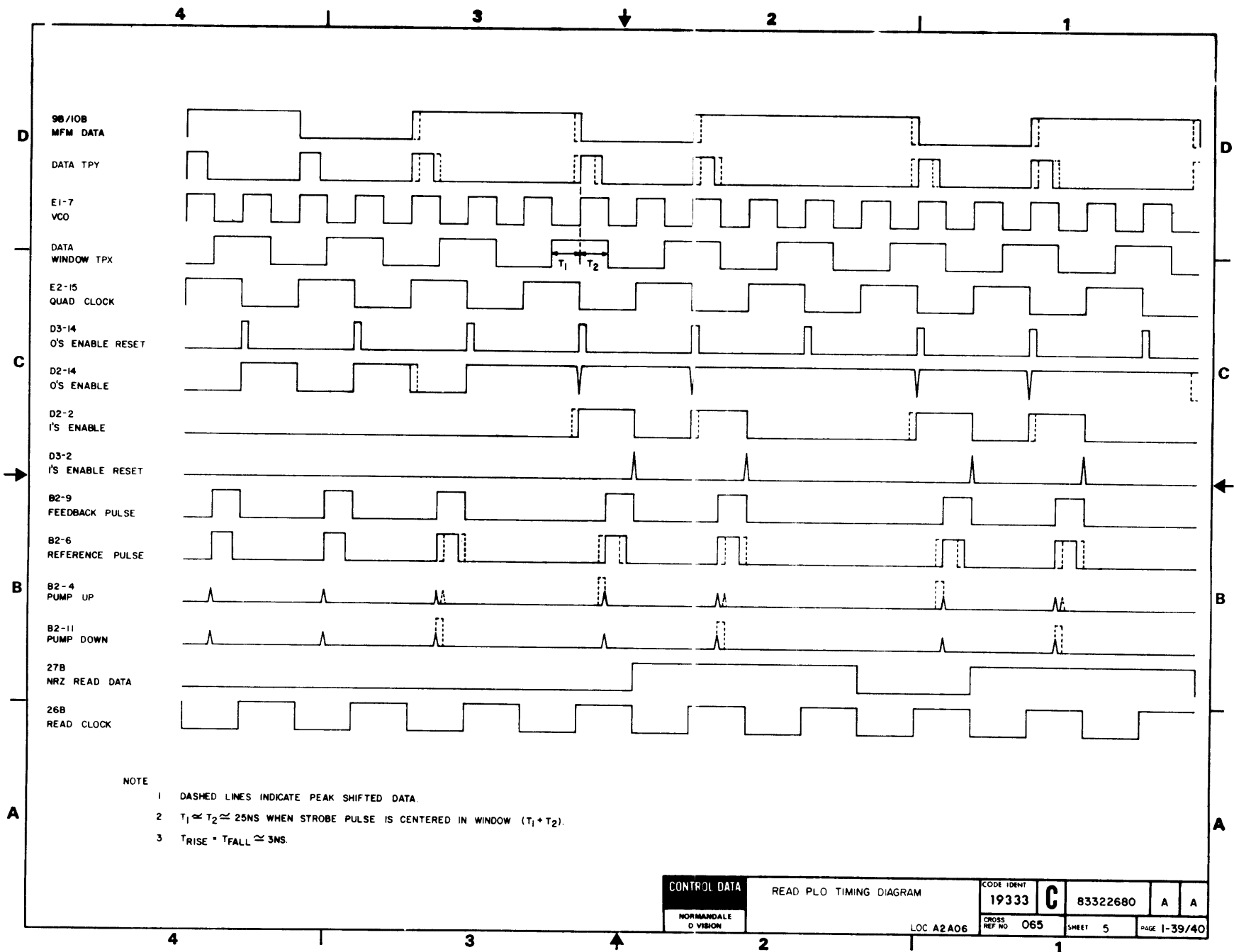
NOTES:
 1 REFER TO CROSS REF NO 061 FOR TERMINATOR CONFIGURATION

| | | | | | | | | |
|----------------------|--|------------|--|--------------|-----|----------|-----------|---|
| CONTROL DATA | | VCO OUTPUT | | CODE IDENT | C | 83322680 | B | A |
| NORMANDEALE DIVISION | | LOC: A2A06 | | 19333 | | | | |
| | | | | CROSS REF NO | 063 | SHEET 3 | PAGE 1-37 | |



NOTE:
 ⚠ REFER TO CROSS REF NO 061 FOR TERMINATOR CONFIGURATION

| | | | | | | | |
|---|-------------------|--|---------------------|------------|--------------|---|---|
| CONTROL DATA NORMAN DALE DIVISION | CLOCK DATA OUTPUT | | CODE IDENT 19333 | C | 83322680 | A | A |
| | A2A06 | | CROSS REF NO 064 | SHEET 4 | PAGE 1-38 | | |



CONTROL DATA

READ PLO TIMING DIAGRAM

CODE IDENT

19333

C

83322680

A

A

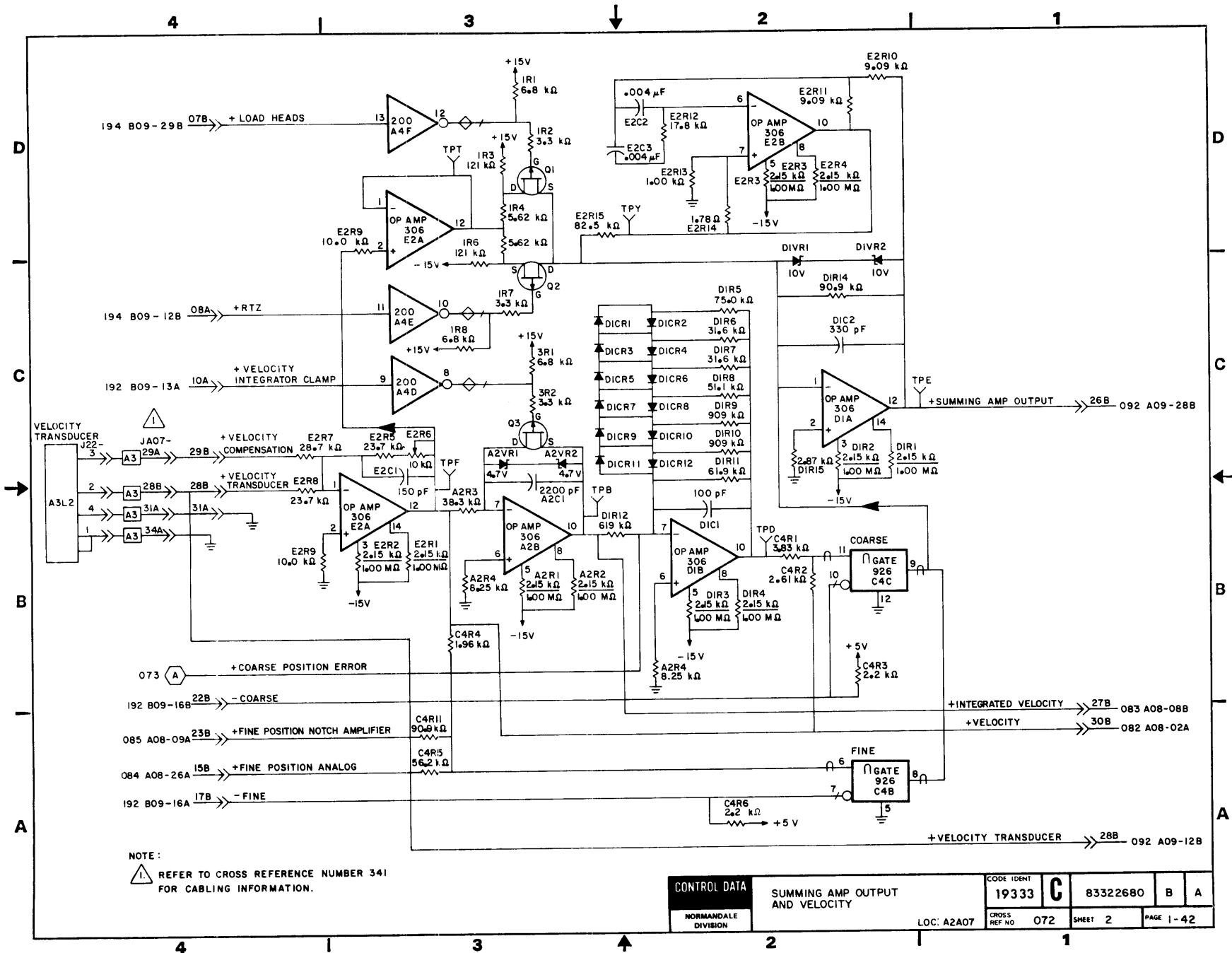
NORMANDEALE
D VISION

LOC A2A06

CROSS
REF NO 065

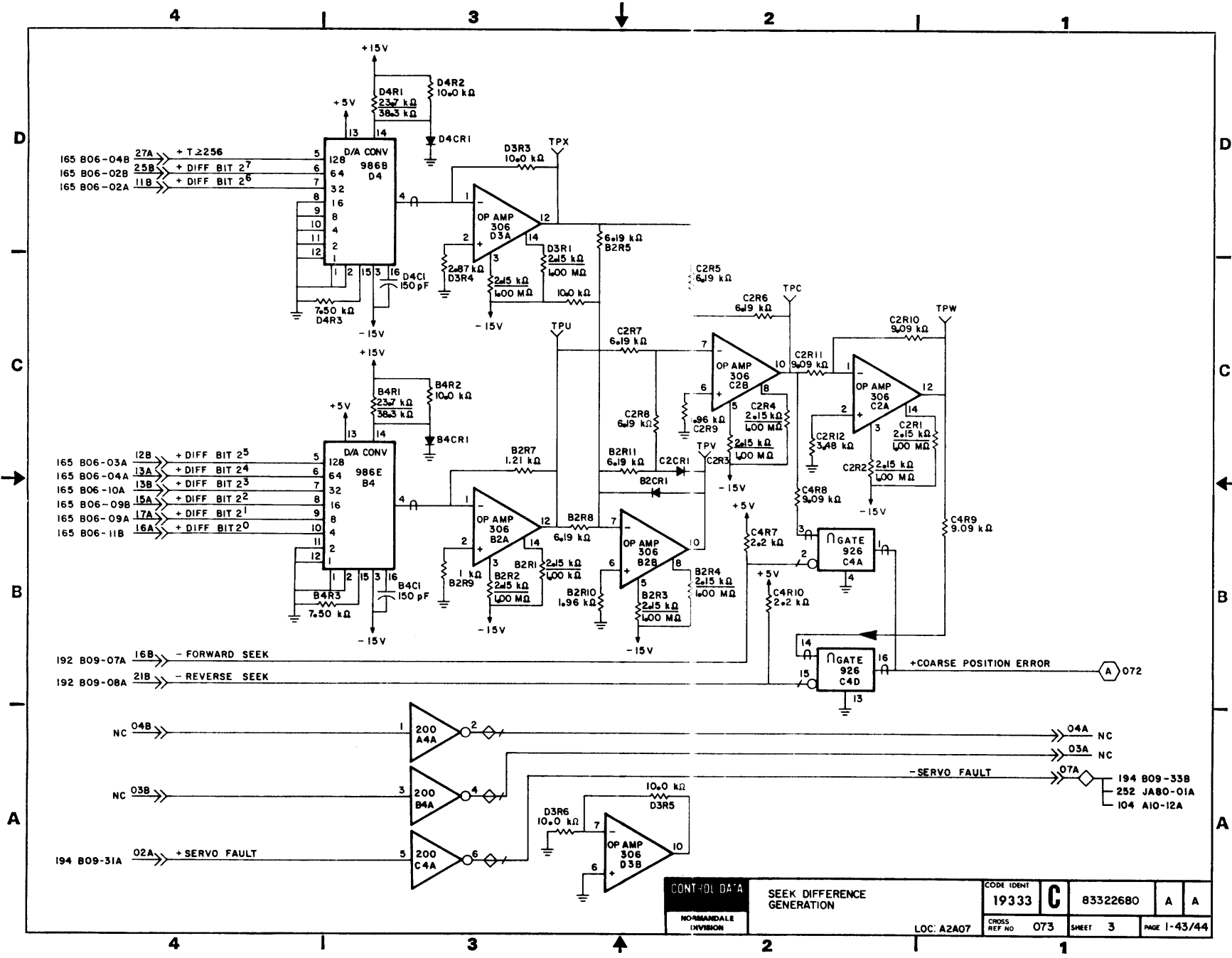
SHEET 5

PAGE 1-39/40

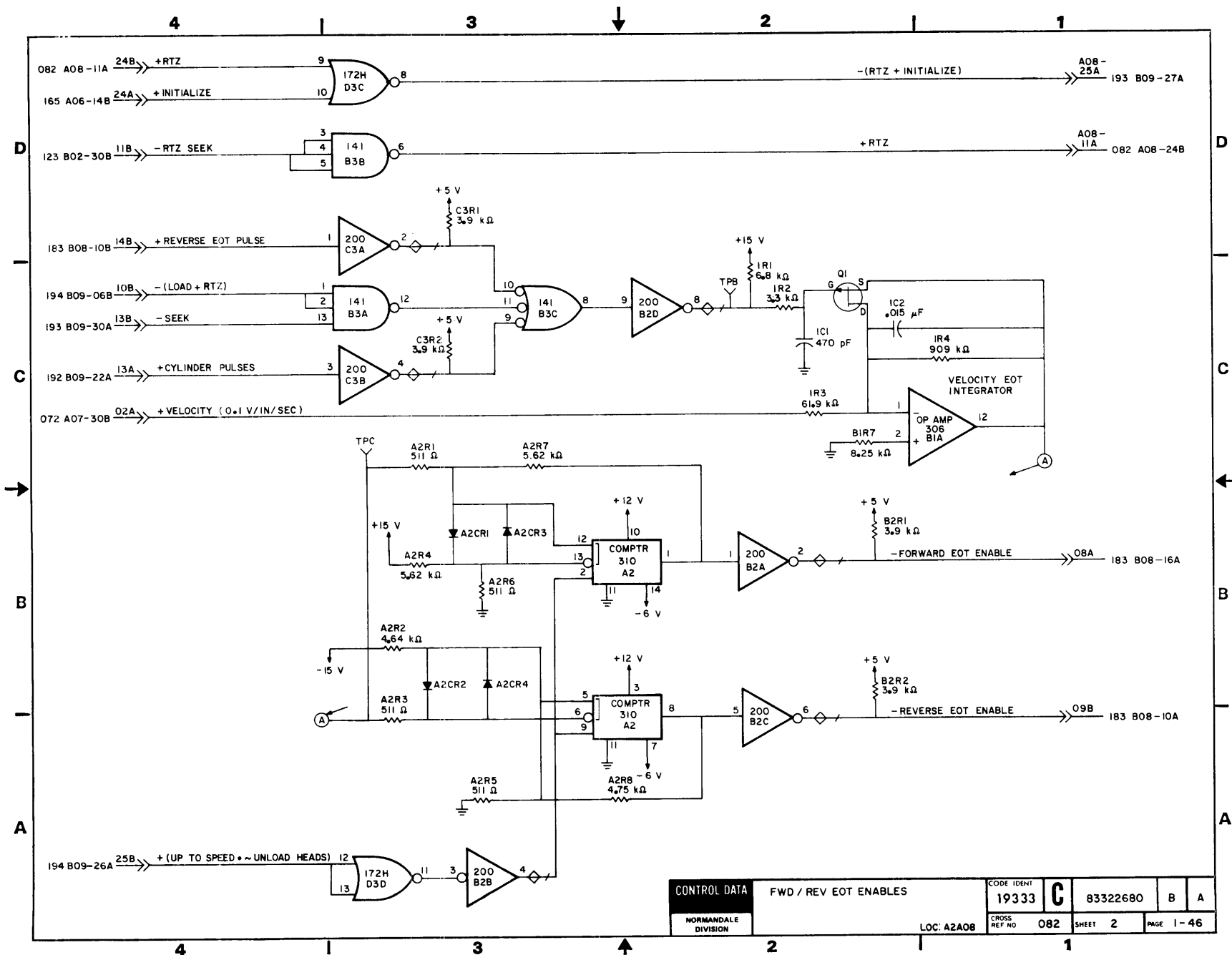


NOTE:
 ⚠ REFER TO CROSS REFERENCE NUMBER 341
 FOR CABLING INFORMATION.

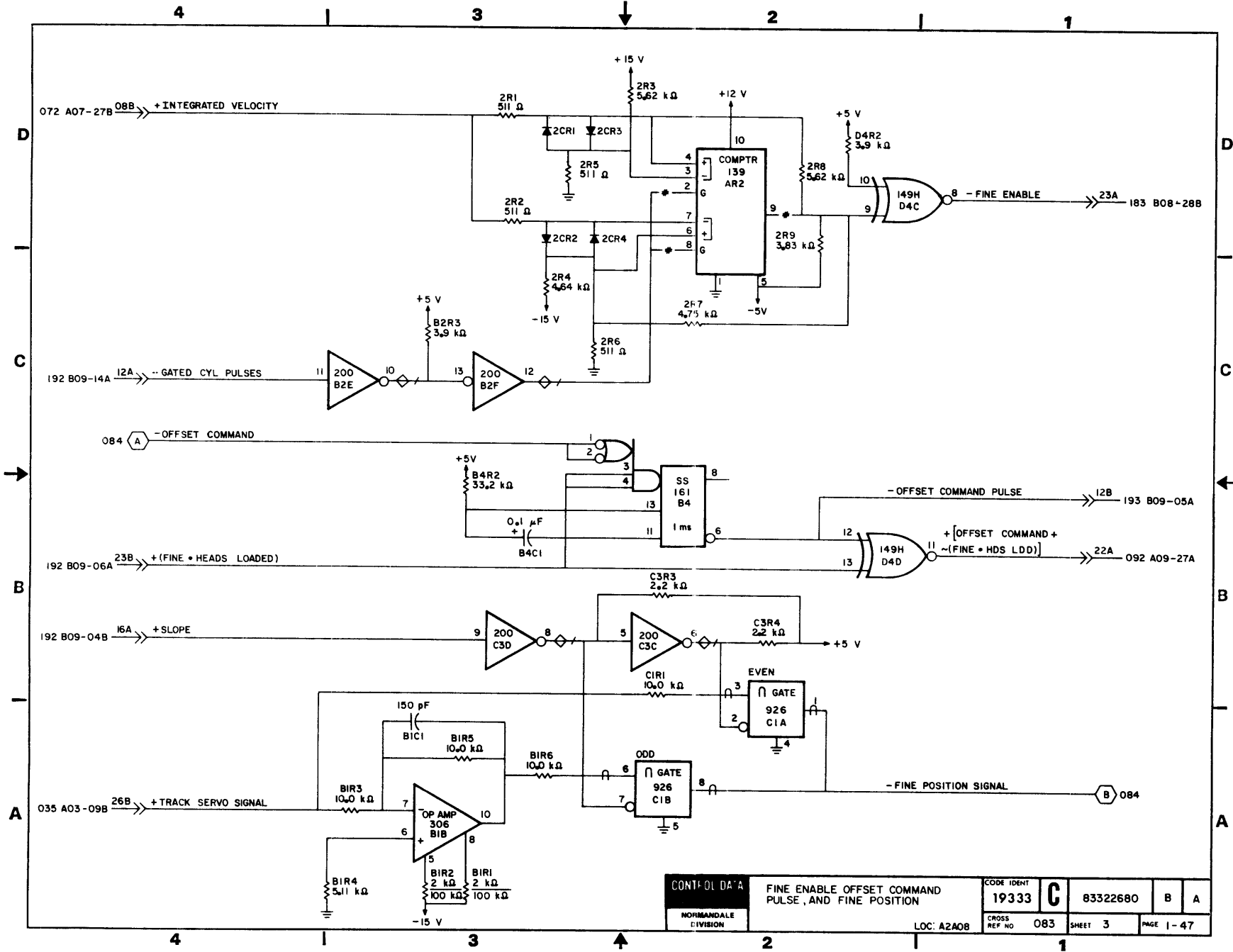
| | | | | | | | | |
|--------------|---------------------------------|------------|--------------|-------|---|----------|---|---|
| CONTROL DATA | SUMMING AMP OUTPUT AND VELOCITY | | CODE IDENT | 19333 | C | 83322680 | B | A |
| | NORMANDEALE DIVISION | LOC: A2A07 | CROSS REF NO | | | | | |



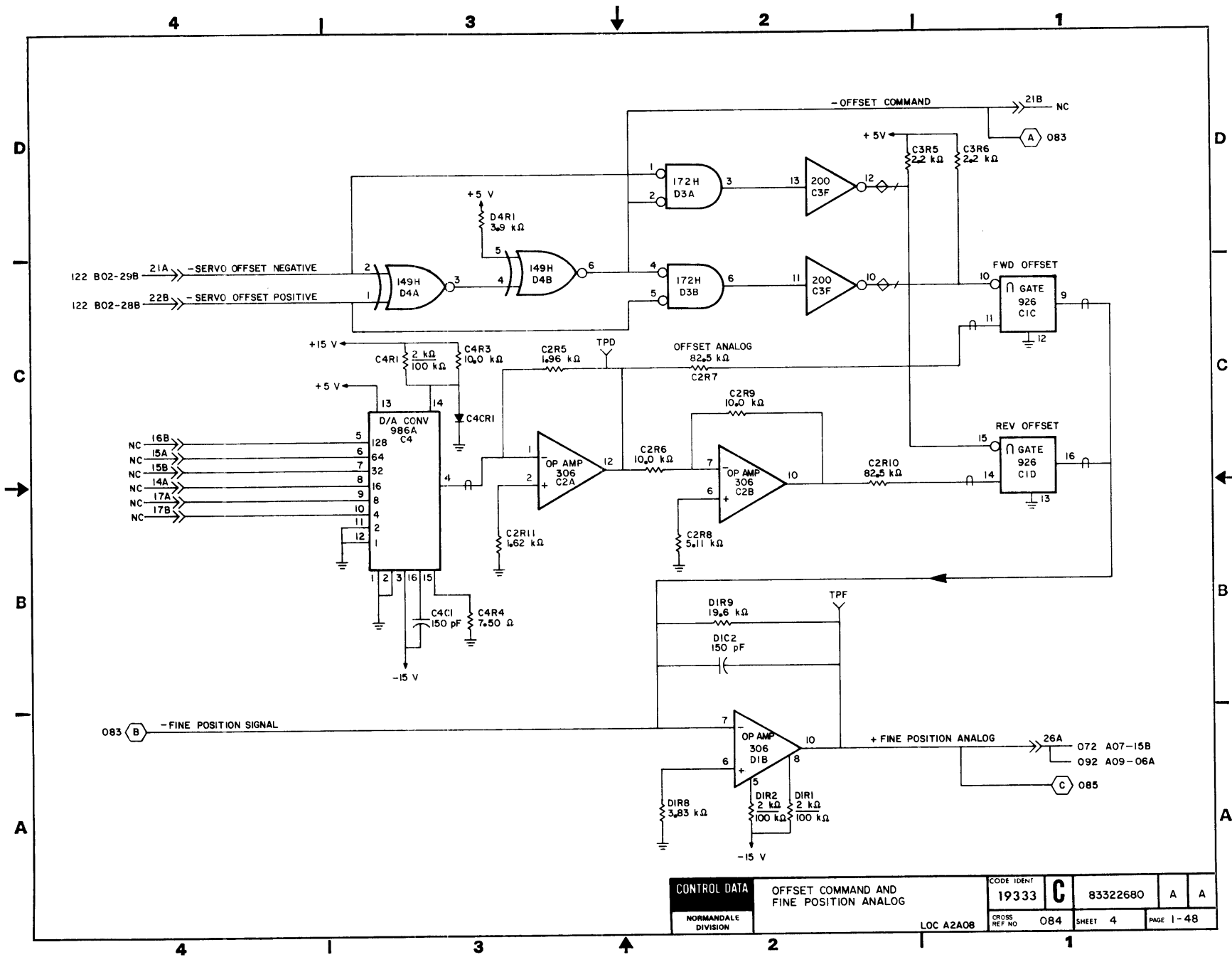
| | | | | | | | |
|---------------|-----------|--------------|-------|-------|----------|--------------|---|
| CONTROL DATA | | CODE IDENT | 19333 | C | 83322680 | A | A |
| NO-BRAND/DALE | (VERSION) | CROSS REF NO | 073 | SHEET | 3 | PAGE 1-43/44 | |
| | | LOC: | A2A07 | | | | |

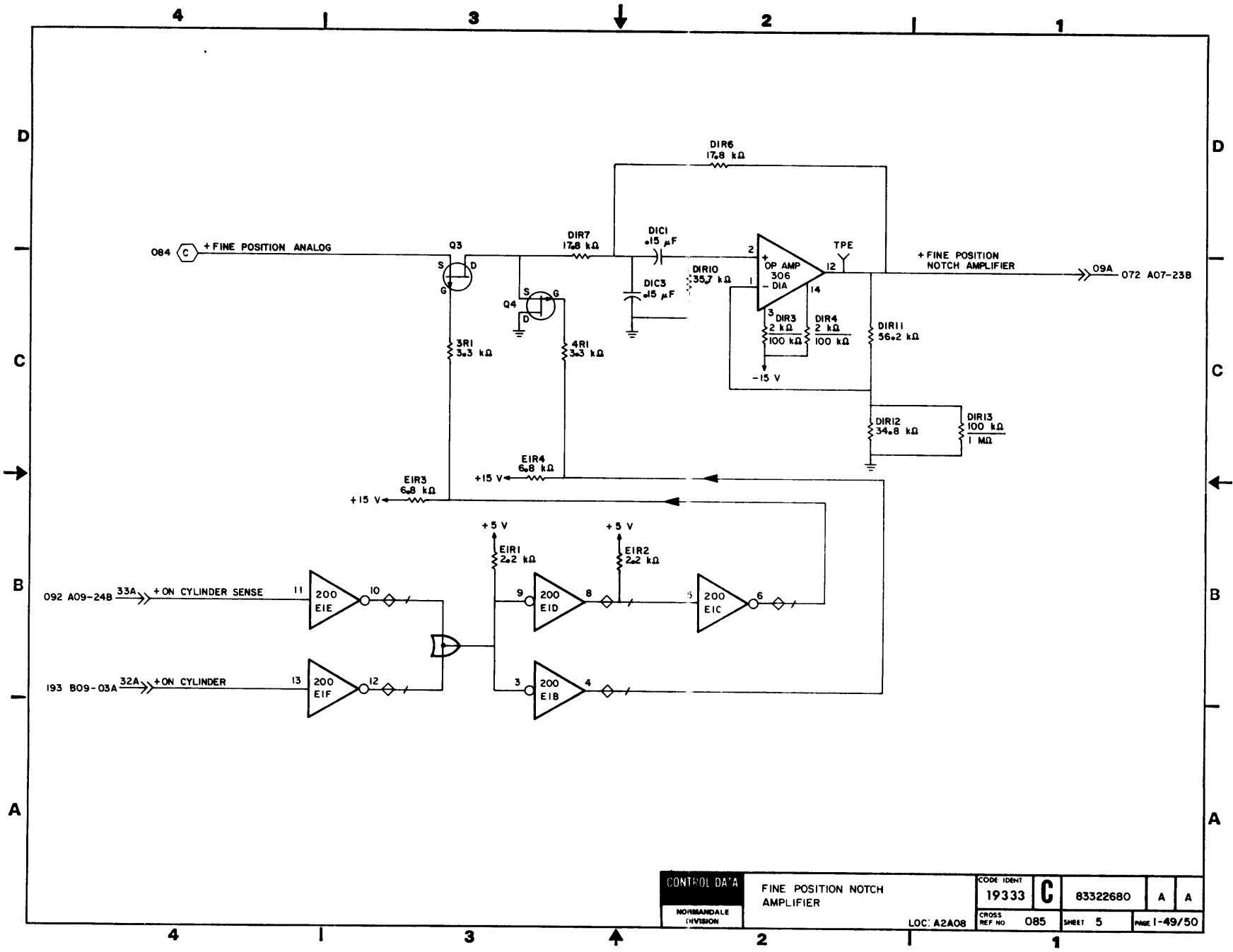


| | | | | | | |
|--|-----------------------|---------------------|---|----------|-----------|---|
| CONTROL DATA NORMANDALE DIVISION | FWD / REV EOT ENABLES | CODE IDENT 19333 | C | 83322680 | B | A |
| | LOC: A2A08 | CROSS REF NO 082 | | SHEET 2 | PAGE 1-46 | |



| | | | | | | |
|--|--|----------------------------|----------|-----------|---|---|
| CONTROL DATA NORMANDALE DIVISION | FINE ENABLE OFFSET COMMAND PULSE, AND FINE POSITION | CODE IDENT 19333 | C | 83322680 | B | A |
| | LOC: A2A0B | CROSS REF NO 083 | SHEET 3 | PAGE 1-47 | | |





| | | | | | | |
|---|----------------------------------|---------------------|---|----------|---|---|
| CONTROL DATA NORMANVILLE (VISION) | FINE POSITION NOTCH AMPLIFIER | CODE IDENT 19333 | C | 83322680 | A | A |
| | LOC: A2A08 | CROSS REF NO 085 | | | | |

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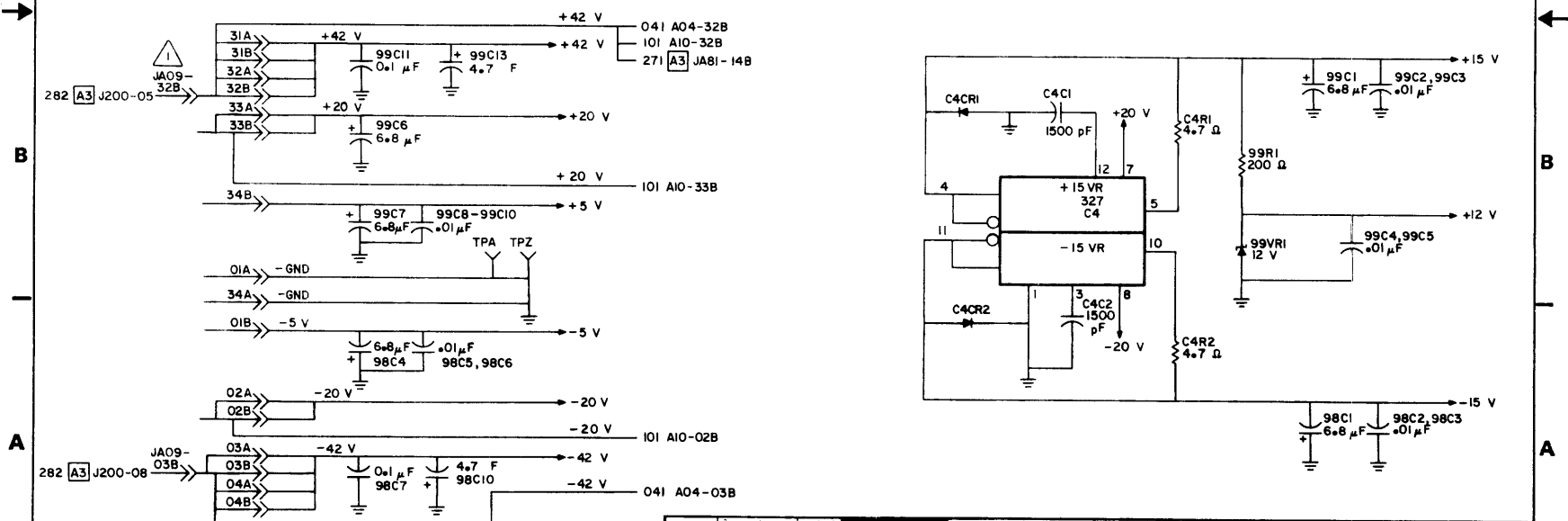
1

| REVISION STATUS OF SHEETS | | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| A | A | A | | | | | | | | | | | | | | | | | | |

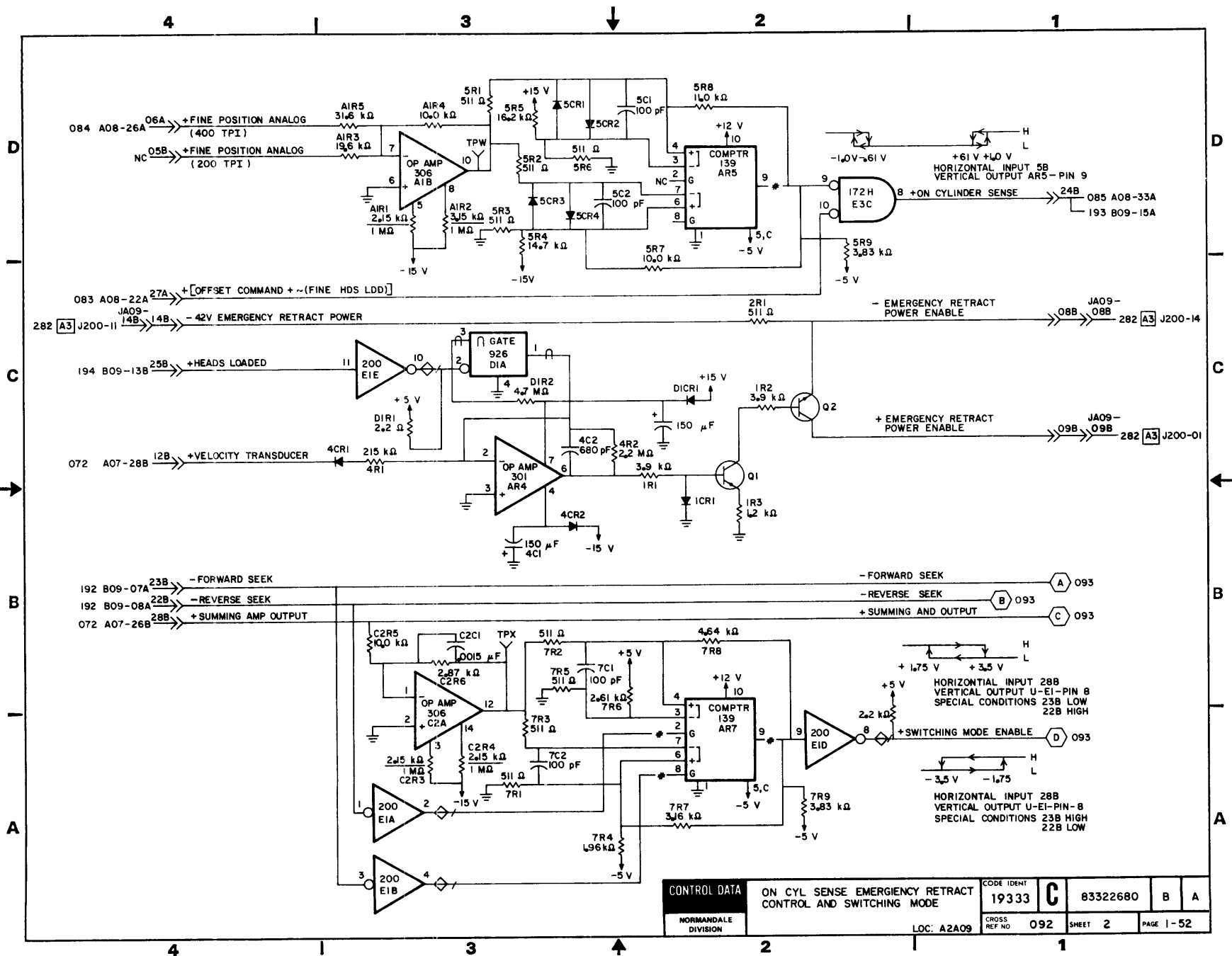
| REVISIONS | | | | | |
|-----------|--------|-------------|-------|------|-------|
| REV. | ECO. | DESCRIPTION | DRFT. | DATE | CHK'D |
| A | PE2300 | RELEASED | | | |

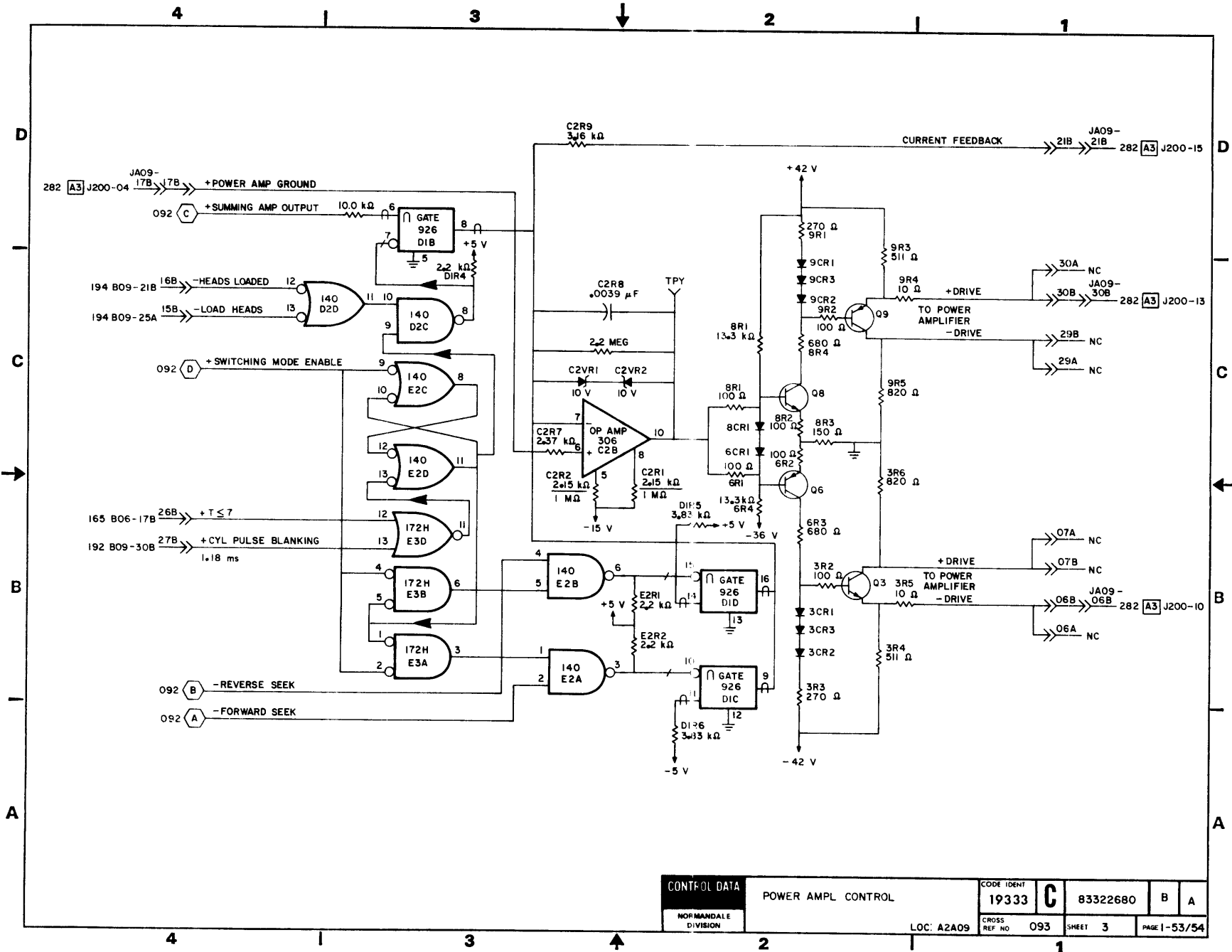
| UNUSED LOGIC ELEMENTS | | |
|-----------------------|----------|---------------|
| TYPE | LOCATION | OUTPUT PIN(S) |
| 140 | D2 | 3,6 |
| 200 | E1 | 6,12 |
| 306 | A1 | 12 |

NOTE:
 REFER TO CROSS REFERENCE NUMBER 341 FOR CABLING INFORMATION



| | | | | | | | | | | | | | | |
|---------------------------|---------|----------|----------|--------|--------------|---------------------------------|-----------|------------|------------------|------------------|---|----------|---|---|
| DRAWN <i>M. Casper</i> | CHECKED | ENGINEER | APPROVED | 3-6-77 | CONTROL DATA | SWITCHING MODE CONTROL DIAGRAMS | TYPE FLPV | LOC A2A09- | CROSS REF NO 091 | CODE IDENT 19333 | C | 83322680 | B | A |
|---------------------------|---------|----------|----------|--------|--------------|---------------------------------|-----------|------------|------------------|------------------|---|----------|---|---|





| | | | | | | | |
|----------------------|--|--------------|---------|-------|----------|--------------|---|
| CONTROL DATA | | CODE IDENT | 19333 C | | 83322680 | B | A |
| NORMANDEALE DIVISION | | CROSS REF NO | 093 | SHEET | 3 | PAGE 1-53/54 | |
| LOC: A2A09 | | | | | | | |

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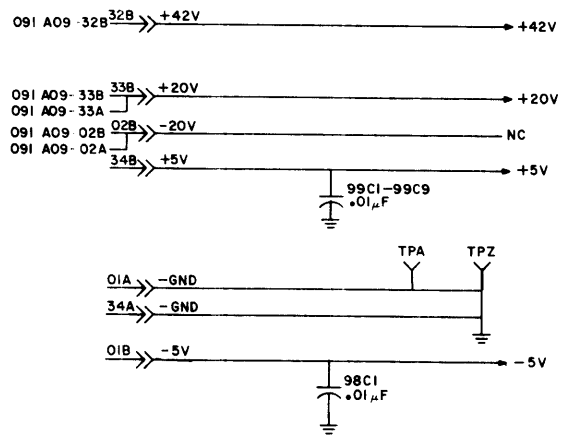
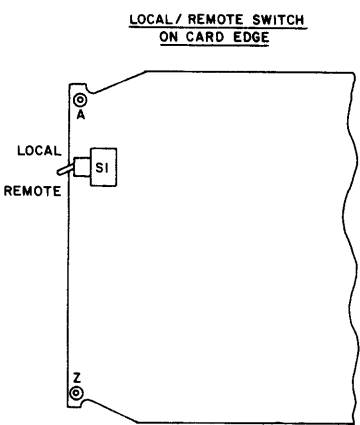
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REVISION STATUS OF SHEETS

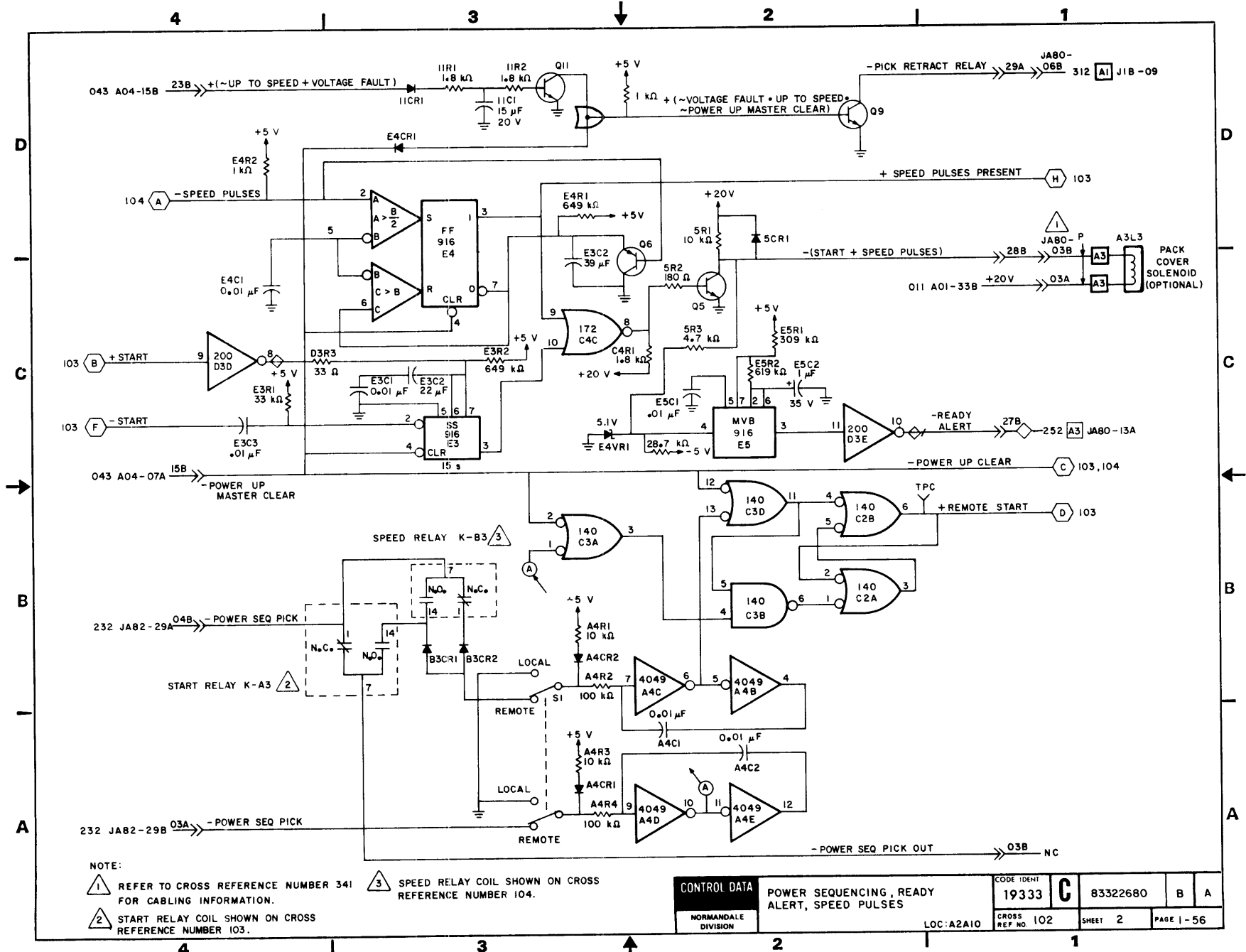
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| A | A | A | A | | | | | | | | | | | | | | | | | |

REVISIONS

| REV | ECO | DESCRIPTION | DRFT | DATE | CHK'D |
|-----|---------|-------------|------|------|-------|
| A | PE23000 | RELEASED | | | |



| | | | | | | | | | | |
|----------|--------------------|--------|---------------------|--|--------------|-------|-------|----------|------|------|
| DRAWN | <i>[Signature]</i> | 7-9-77 | CONTROL DATA | INTERLOCKS AND SPEED DETECTOR DIAGRAMS | CODE IDENT | 19333 | C | 83322680 | B | A |
| CHECKED | | | NORMANDALE DIVISION | TYPE: ASGV | CROSS REF NO | 101 | SHEET | 1 of 4 | PAGE | 1-55 |
| ENGINEER | | | | LOC: A2A10 | | | | | | |
| APPROVED | | | | | | | | | | |



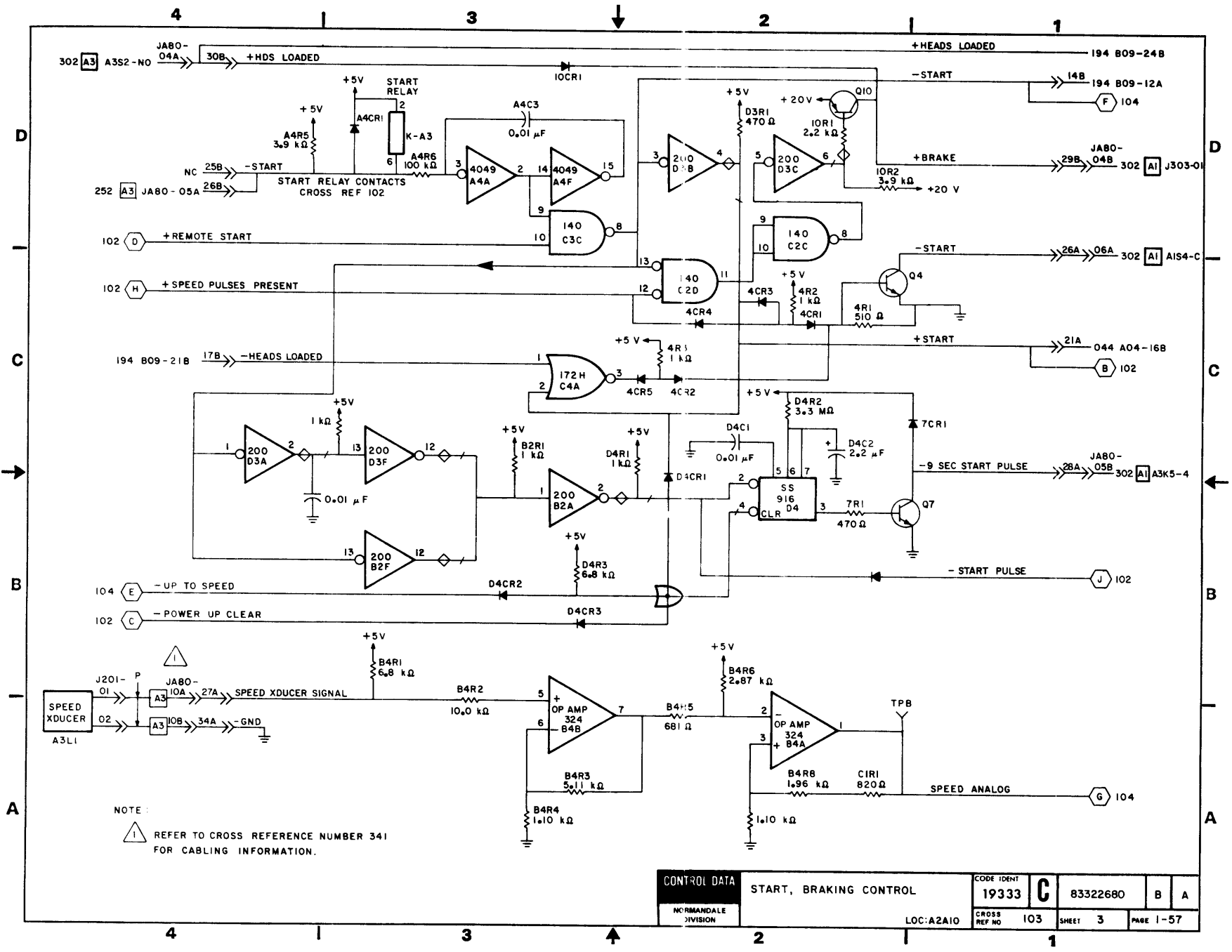
NOTE:

1 REFER TO CROSS REFERENCE NUMBER 341 FOR CABLING INFORMATION.

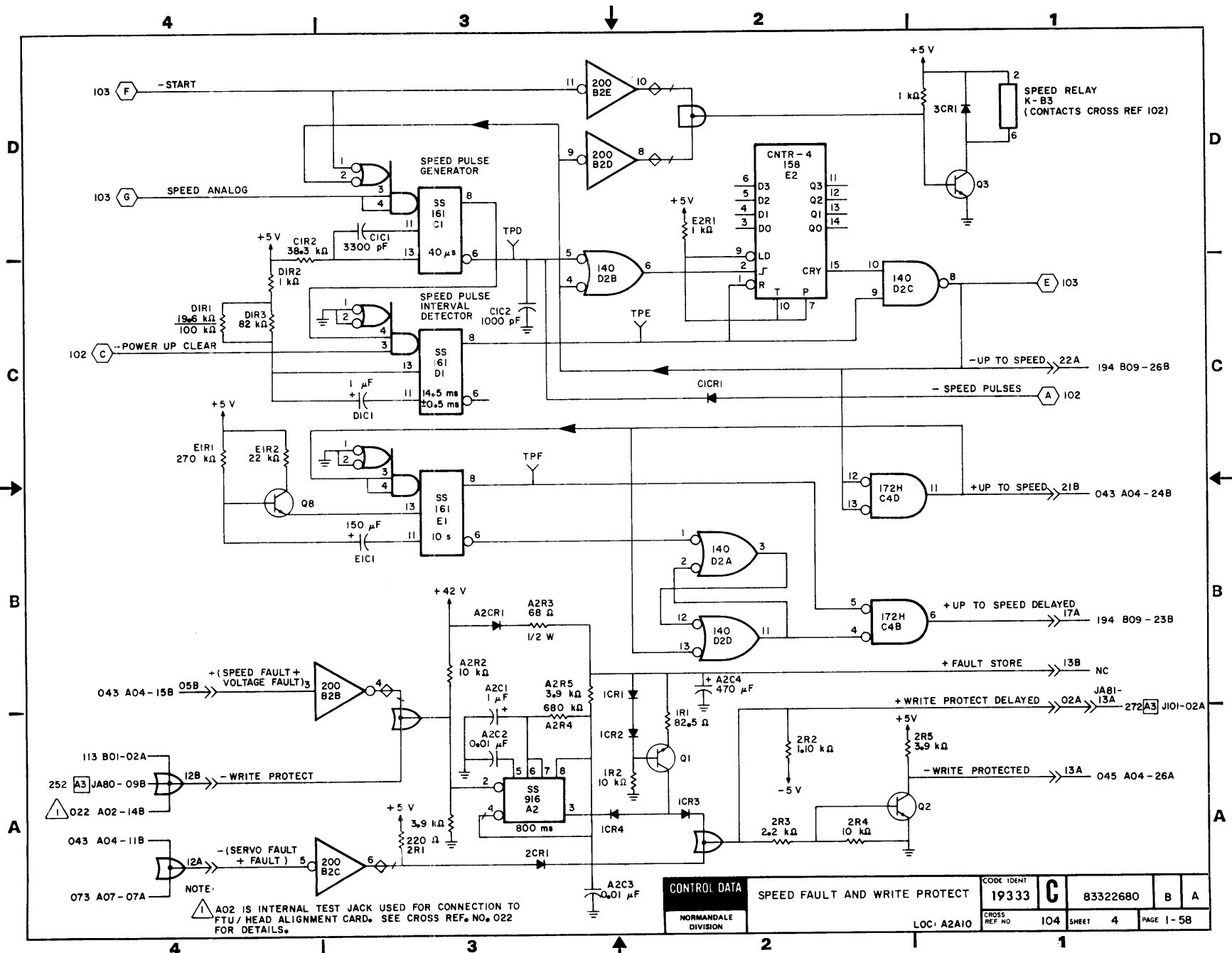
2 START RELAY COIL SHOWN ON CROSS REFERENCE NUMBER 103.

3 SPEED RELAY COIL SHOWN ON CROSS REFERENCE NUMBER 104.

| | | | | | | | | | | |
|--------------|---|------------|--|--------------|------------|-------|---|----------|---|---|
| CONTROL DATA | POWER SEQUENCING, READY ALERT, SPEED PULSES | | | | CODE IDENT | 19333 | C | 83322680 | B | A |
| | NORMANDALE DIVISION | LOC: A2A10 | | CROSS REF NO | 102 | | | | | |

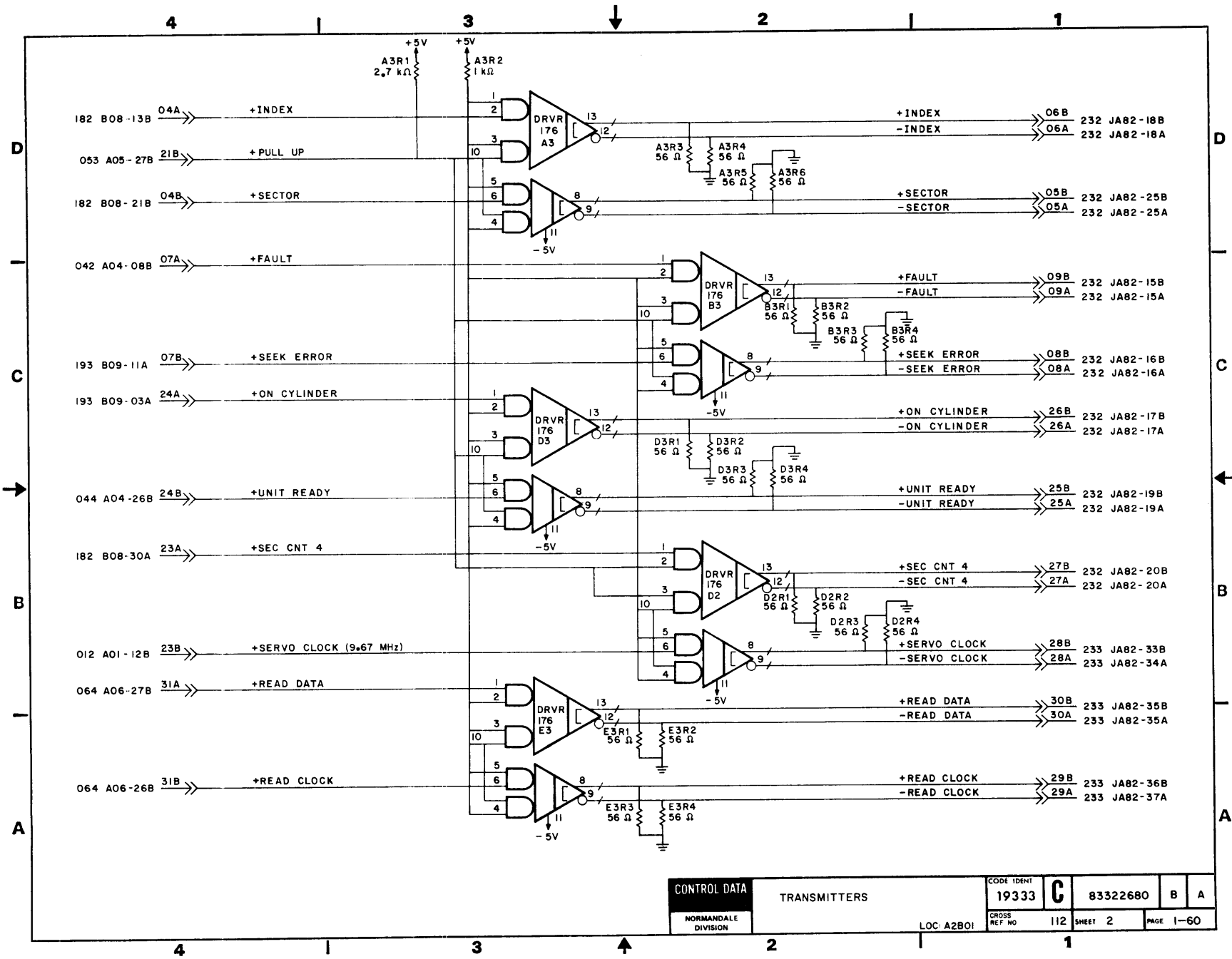


| | | | | | | | | | |
|---------------------|--|------------------------|--------------|------------|-------|---|----------|------|---|
| CONTROL DATA | | START, BRAKING CONTROL | | CODE IDENT | 19333 | C | 83322680 | B | A |
| NORMANDALE DIVISION | | LOC:A2A10 | CROSS REF NO | 103 | SHEET | 3 | PAGE | 1-57 | |

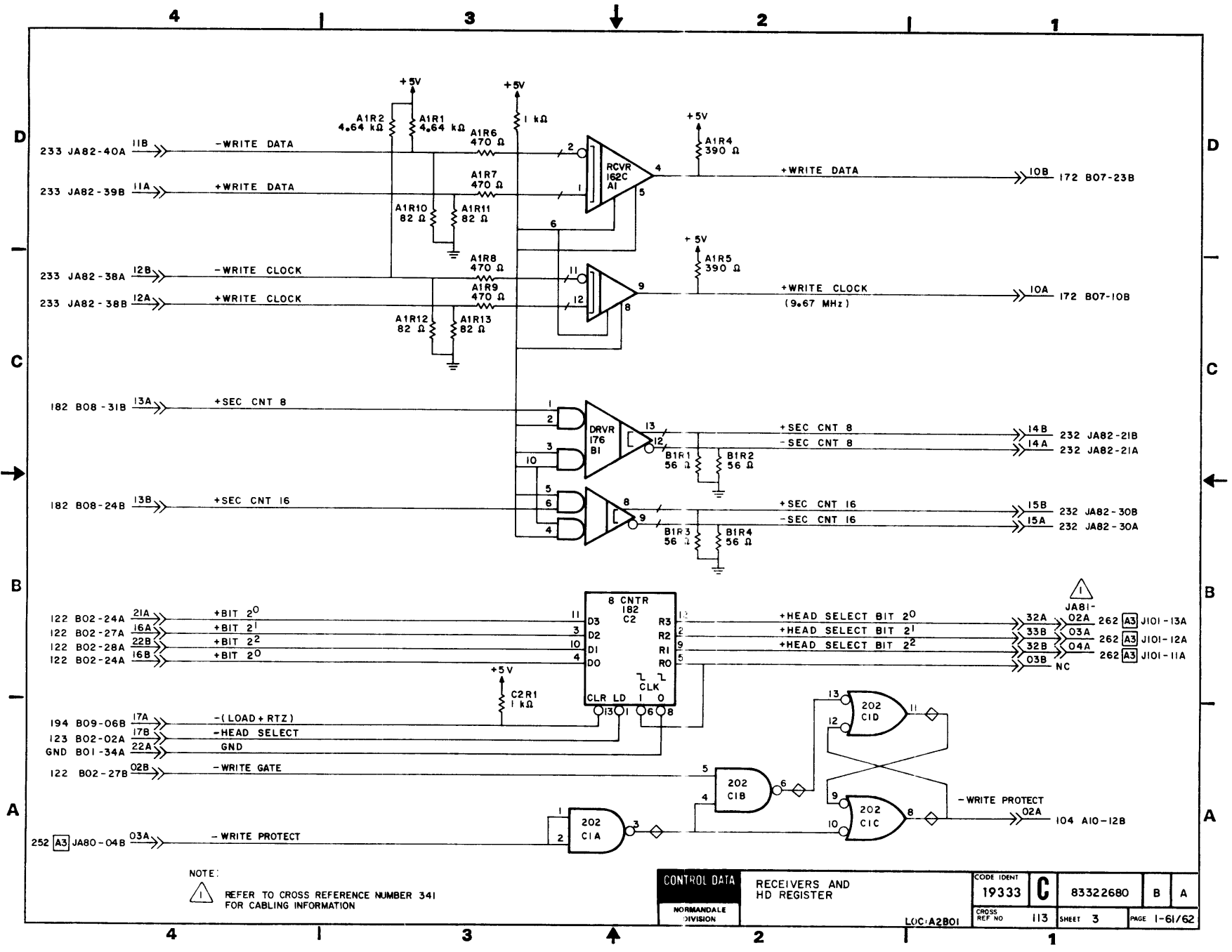


NOTE:
 ⚠ A02 IS INTERNAL TEST JACK USED FOR CONNECTION TO FTU / HEAD ALIGNMENT CARD. SEE CROSS REF. NO. 022 FOR DETAILS.

| | | | | | | | | |
|--------------|-------------------------------|------------|--------------|-------|---|----------|---|---|
| CONTROL DATA | SPEED FAULT AND WRITE PROTECT | | CODE IDENT | 19333 | C | 83322680 | B | A |
| | NORMANDE DIVISION | LOC: A2A10 | CROSS REF NO | | | | | |

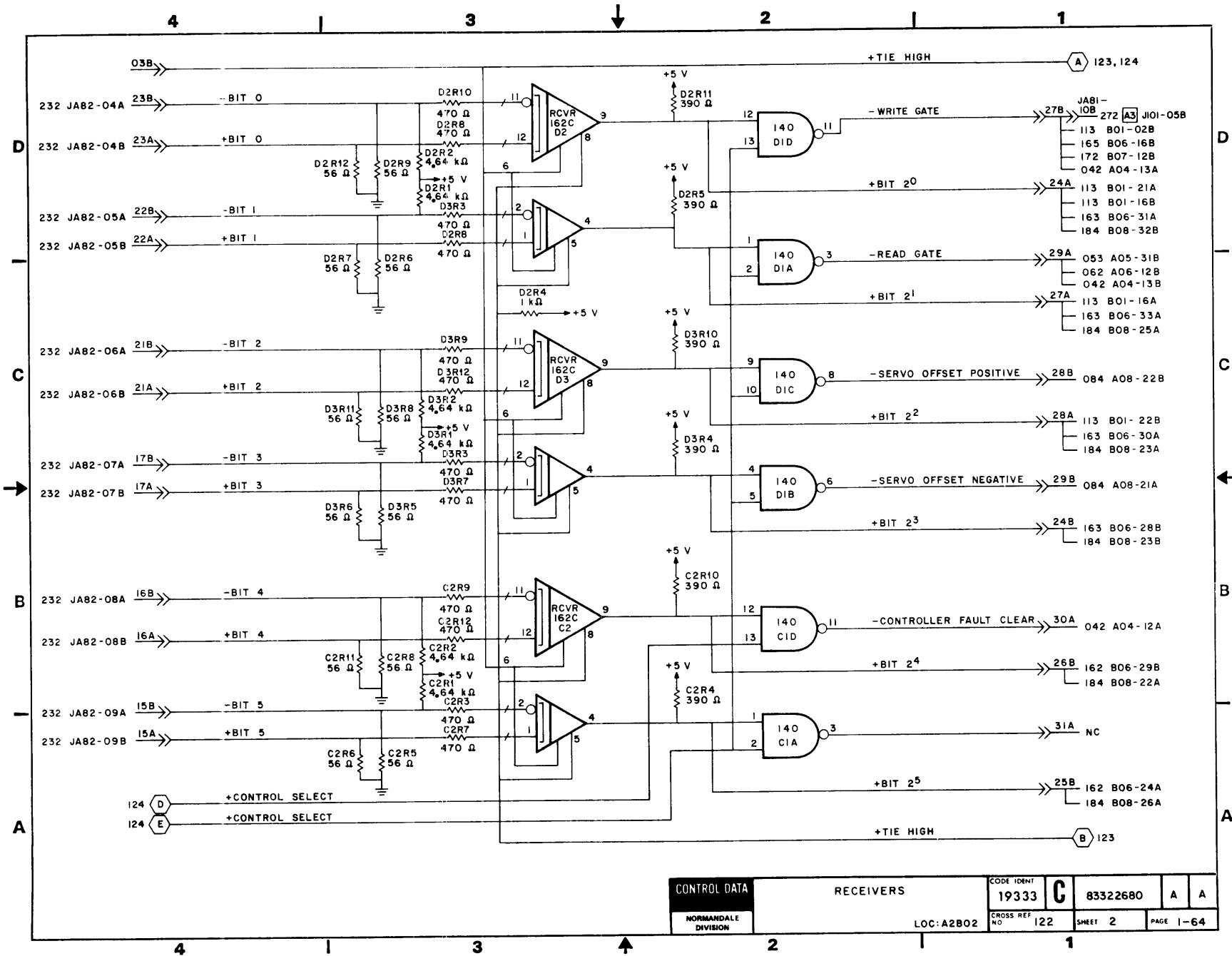


| | | | | | | | |
|--|--------------|--|---------------------|-----|----------|-----------|---|
| CONTROL DATA NORMANDALE DIVISION | TRANSMITTERS | | CODE IDENT 19333 | C | 83322680 | B | A |
| | LOC: A2B01 | | CROSS REF NO | 112 | SHEET 2 | PAGE 1-60 | |

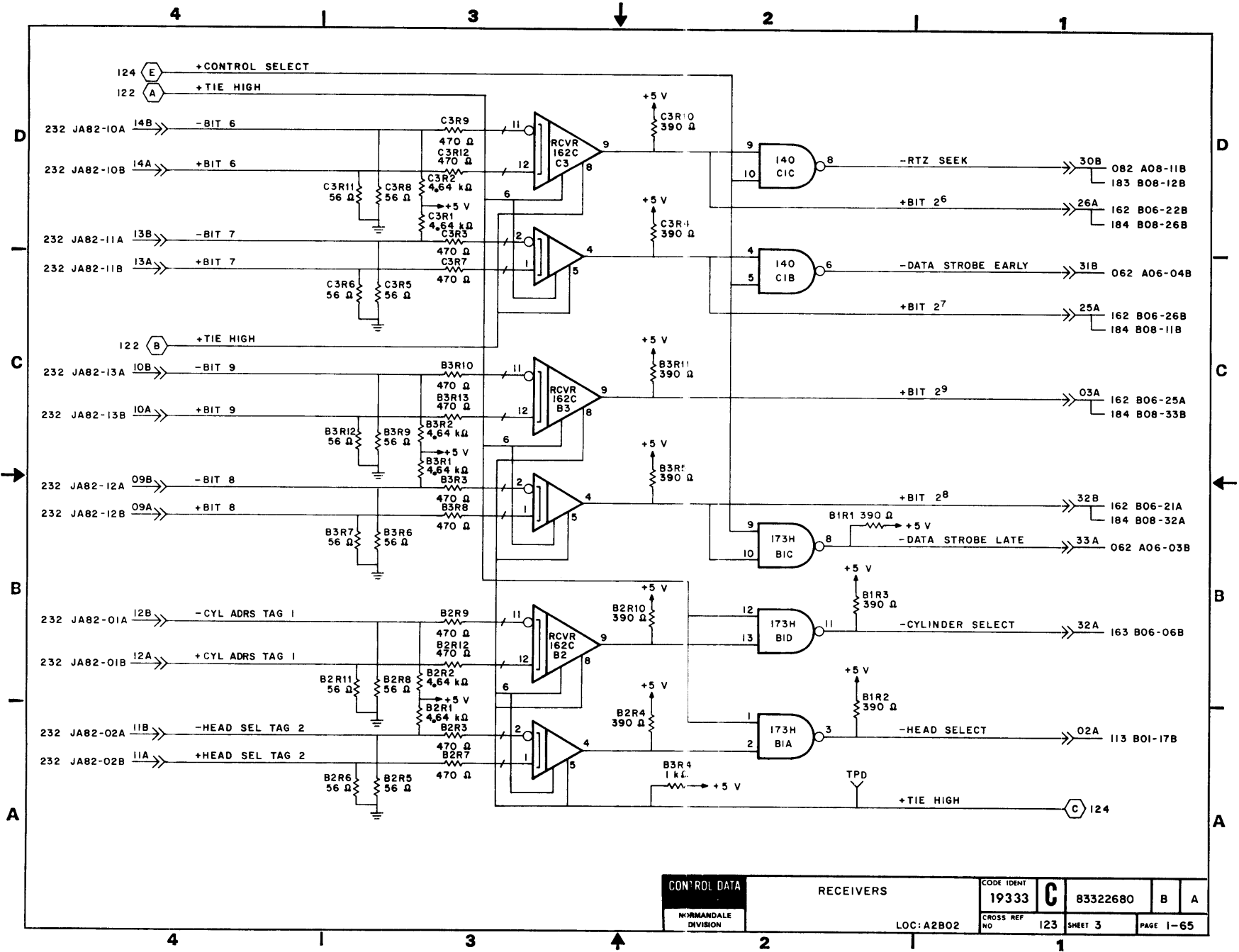


NOTE:
 1 REFER TO CROSS REFERENCE NUMBER 341 FOR CABLING INFORMATION

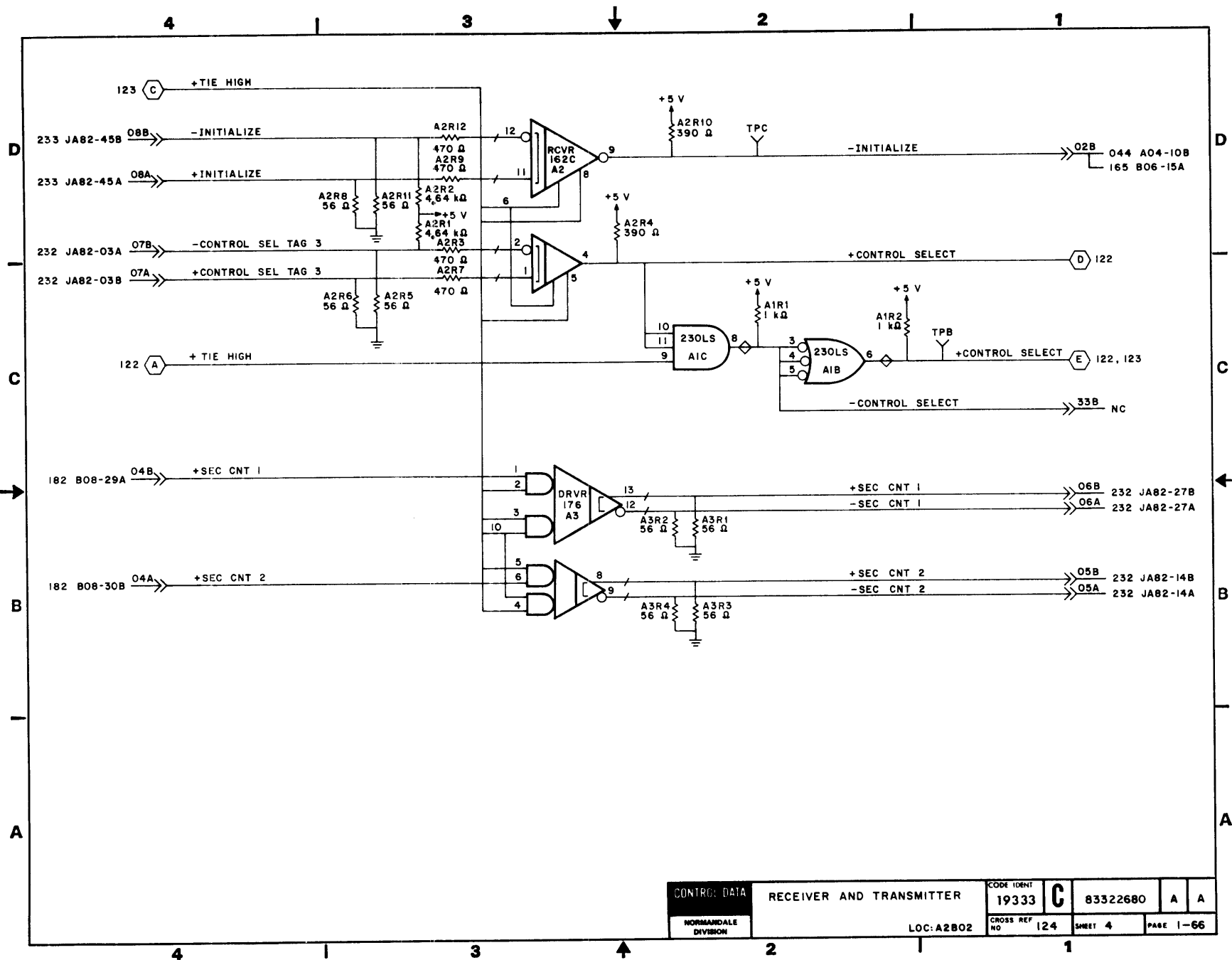
| | | | | | | | | | |
|----------------------|------------|---------------------------|--|--------------|---------|---------|--------------|---|---|
| CONTROL DATA | | RECEIVERS AND HD REGISTER | | CODE IDENT | 19333 C | | 83322680 | B | A |
| NORMANDEALE DIVISION | LOC: A2B01 | | | CROSS REF NO | 113 | SHEET 3 | PAGE 1-61/62 | | |



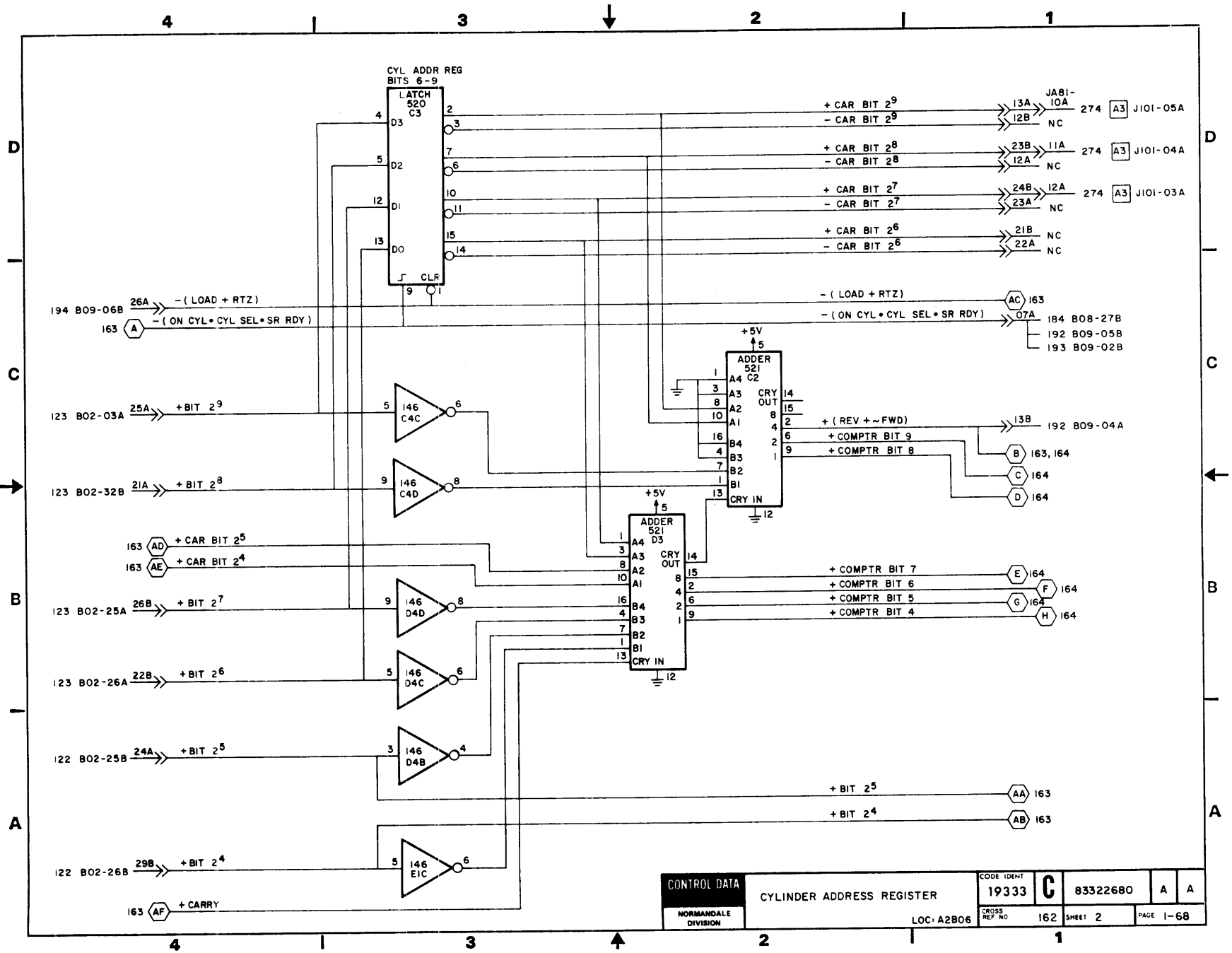
| | | | | | | |
|---|------------|---------------------|---|----------|---|---|
| CONTROL DATA NORMANDEALE DIVISION | RECEIVERS | CODE IDENT 19333 | C | 83322680 | A | A |
| | LOC: A2B02 | CROSS REF NO 122 | | | | |



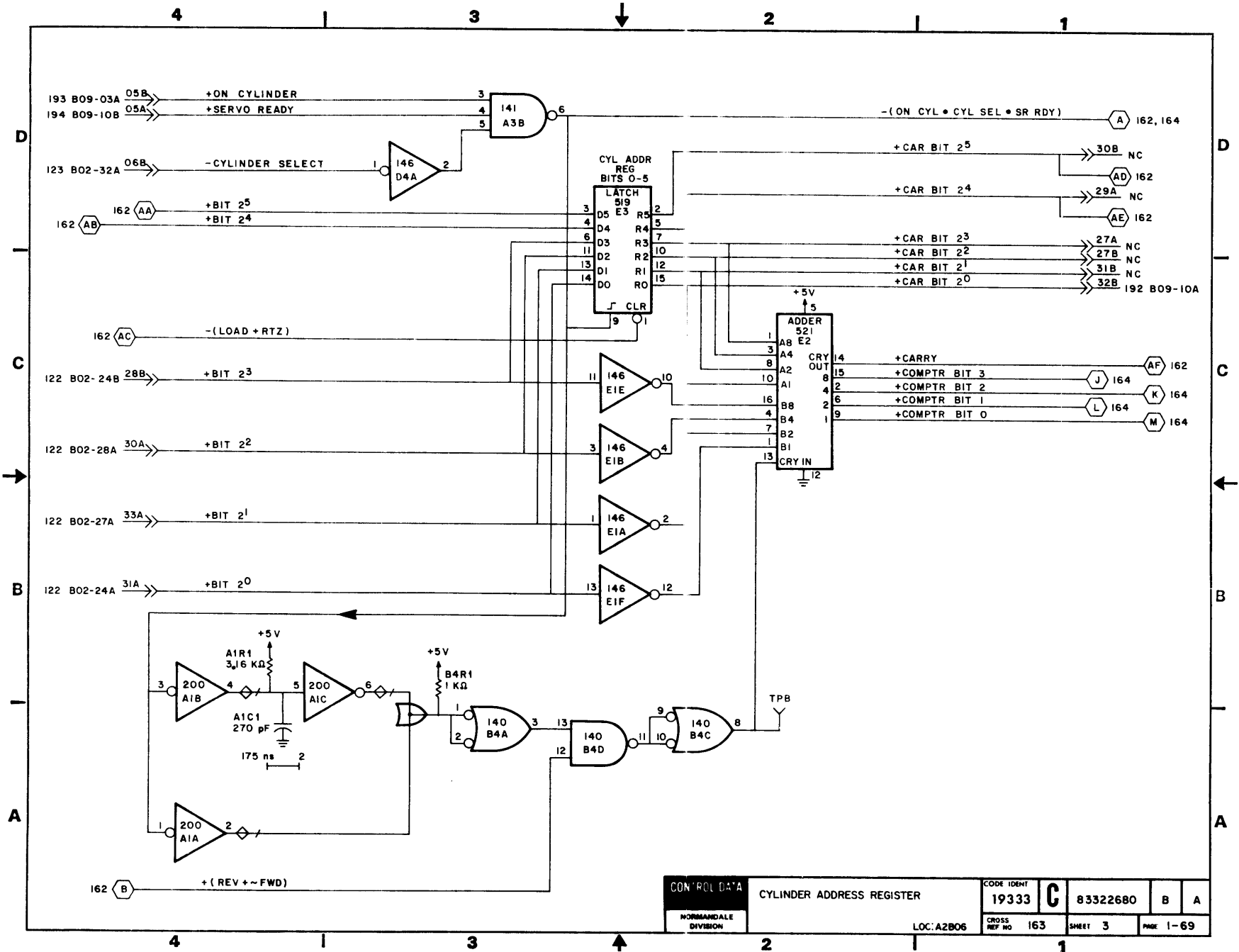
| | | | | | | | |
|---|------------|--|---------------------|---------|-----------|---|---|
| CONTROL DATA NORMANDEALE DIVISION | RECEIVERS | | CODE IDENT 19333 | C | 83322680 | B | A |
| | LOC: A2B02 | | CROSS REF NO 123 | SHEET 3 | PAGE 1-65 | | |



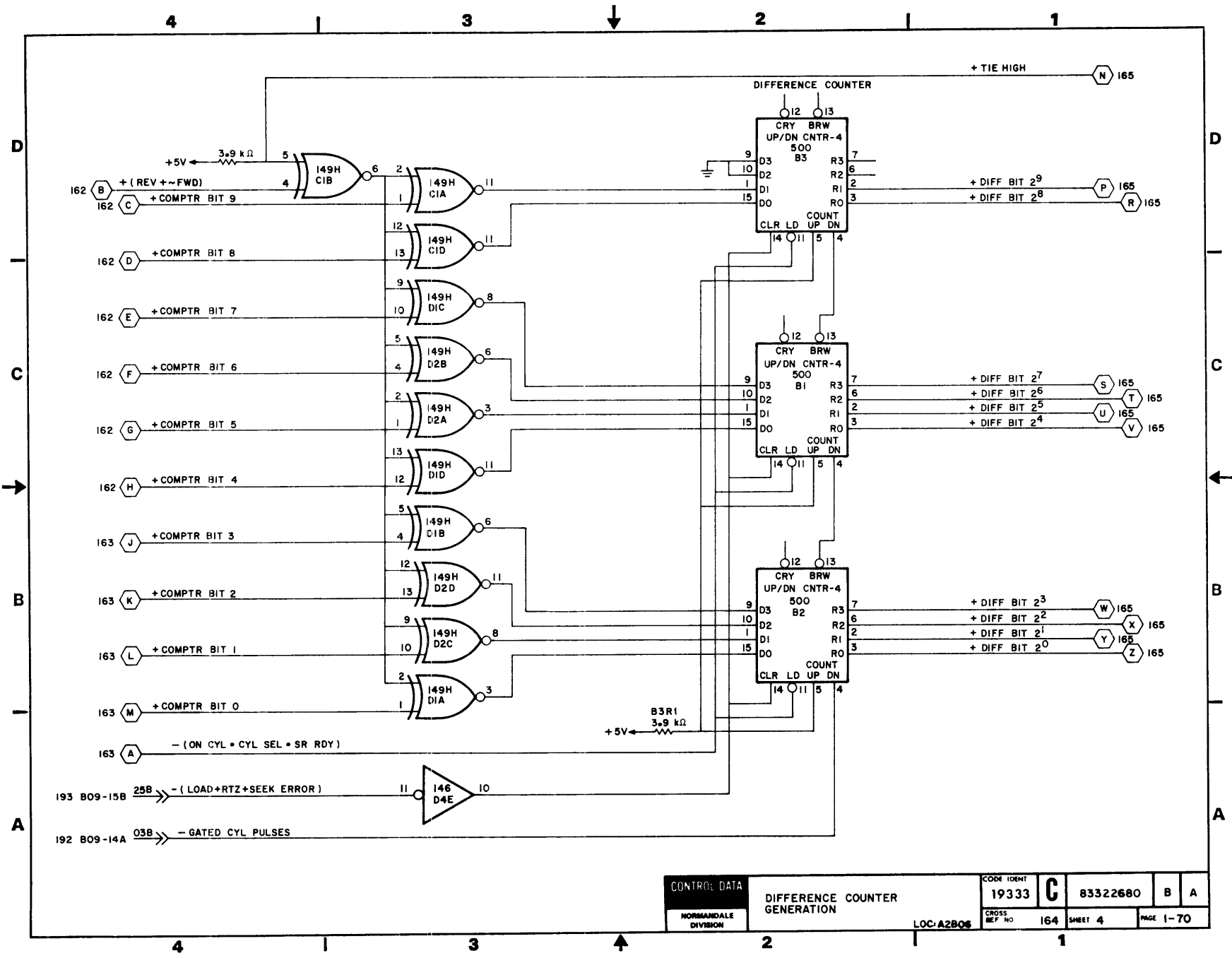
| | | | | | | | |
|----------------------|--------------------------|--------------|-------|-------|----------|------|------|
| CONTROL DATA | RECEIVER AND TRANSMITTER | CODE IDENT | 19333 | C | 83322680 | A | A |
| NORMANDEALE DIVISION | LOC: A2B02 | CROSS REF NO | 124 | SHEET | 4 | PAGE | 1-66 |

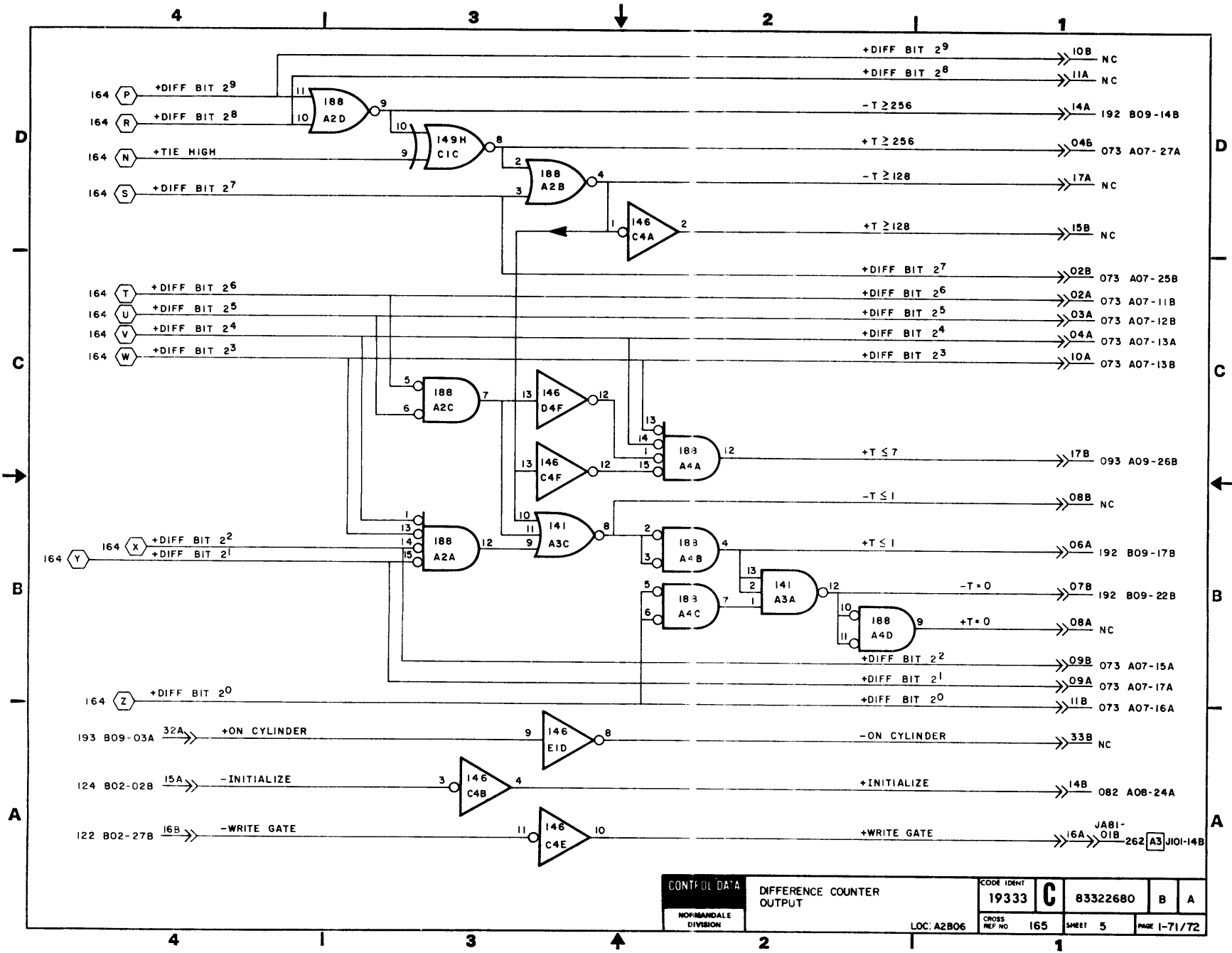


| | | | | | | | |
|--------------|---------------------------|------------|------------|---|----------|---|---|
| CONTROL DATA | CYLINDER ADDRESS REGISTER | | CODE IDENT | C | 83322680 | A | A |
| | NORMANDEALE DIVISION | LOC: A2B06 | 19333 | | | | |

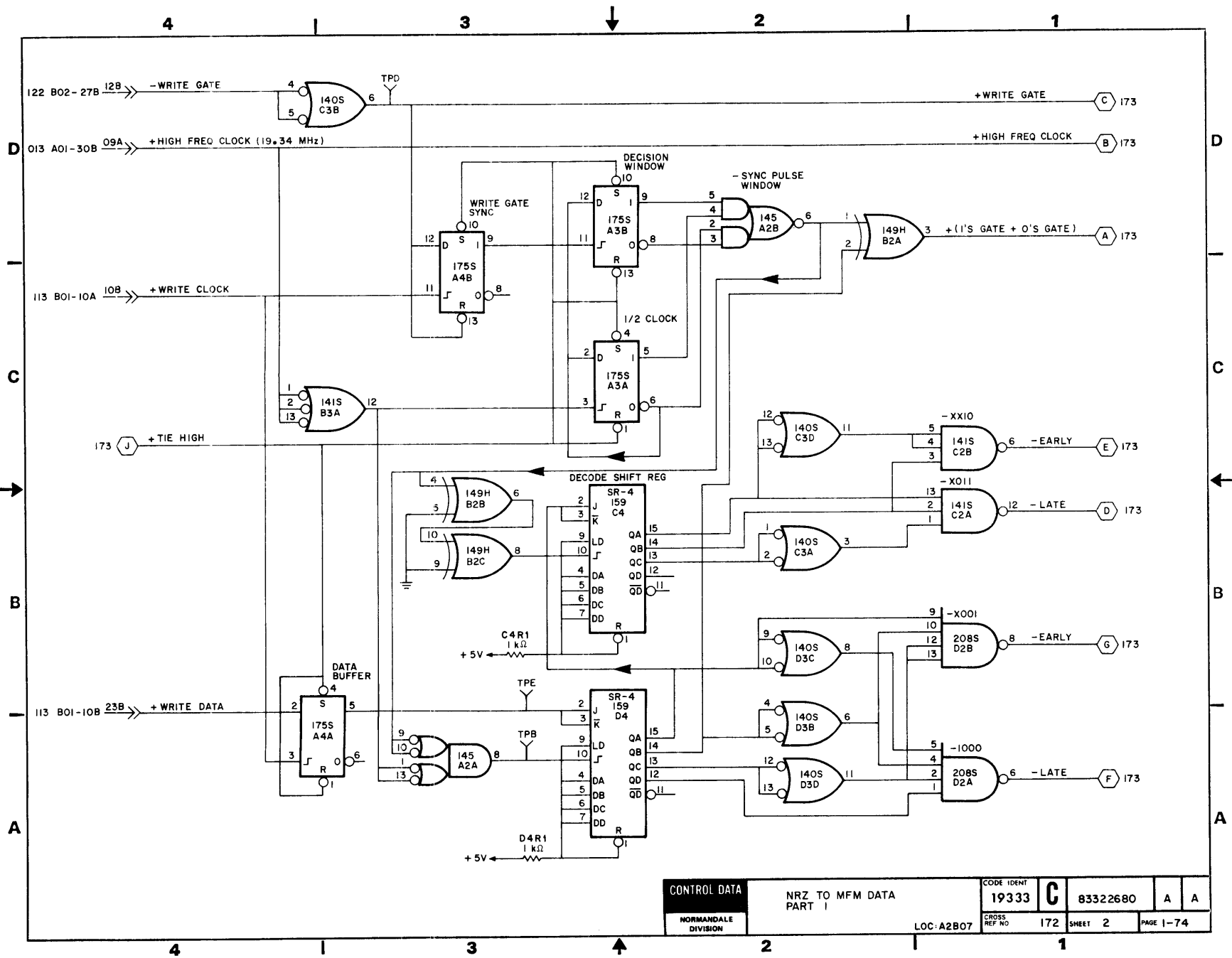


| | | | | | | | |
|--------------|---------------------------|------------|------------------|----------|----------|---|---|
| CONTROL DATA | CYLINDER ADDRESS REGISTER | | CODE IDENT | C | 83322680 | B | A |
| | NORMANDEALE DIVISION | LOC: A2B06 | CROSS REF NO 163 | | | | |

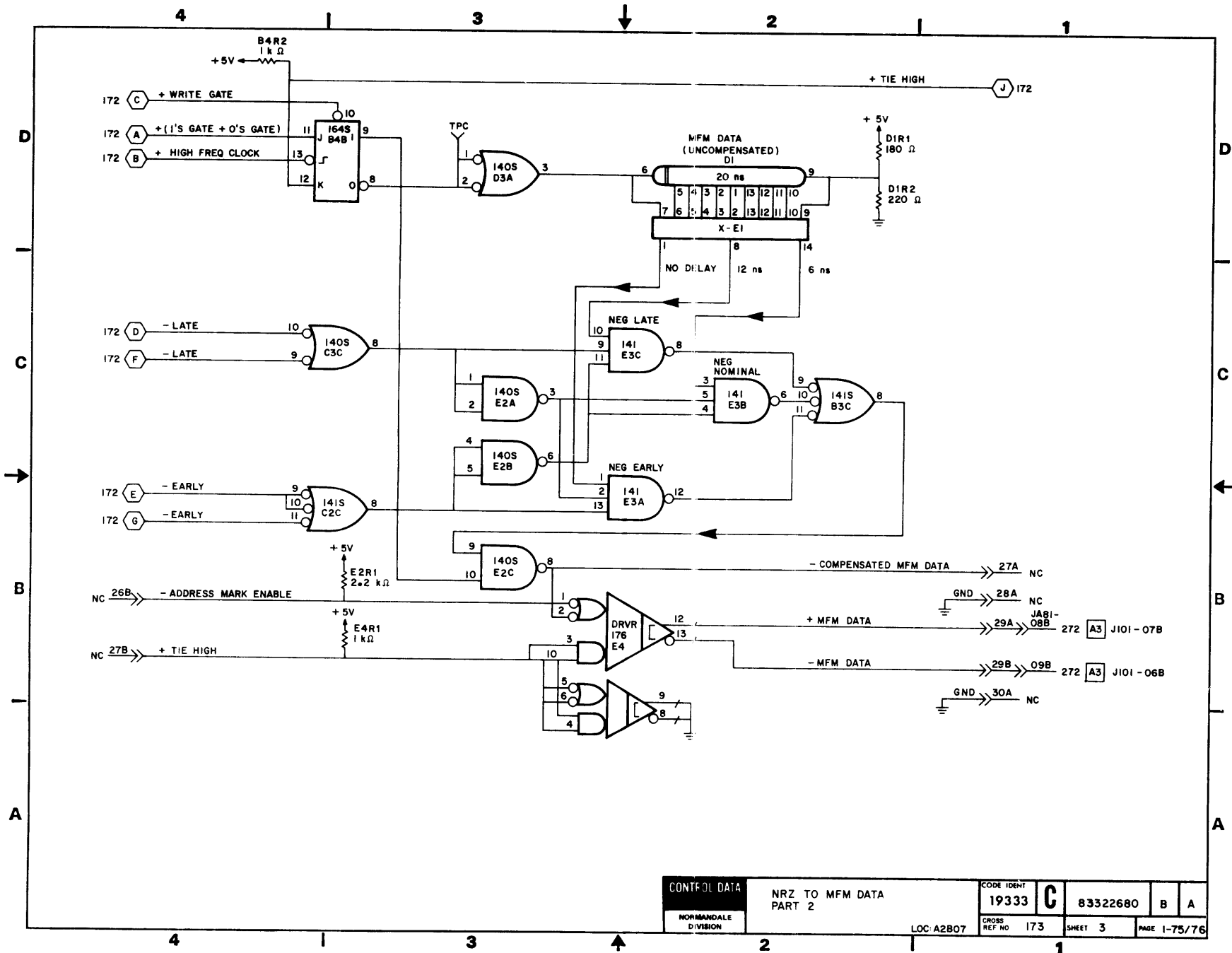




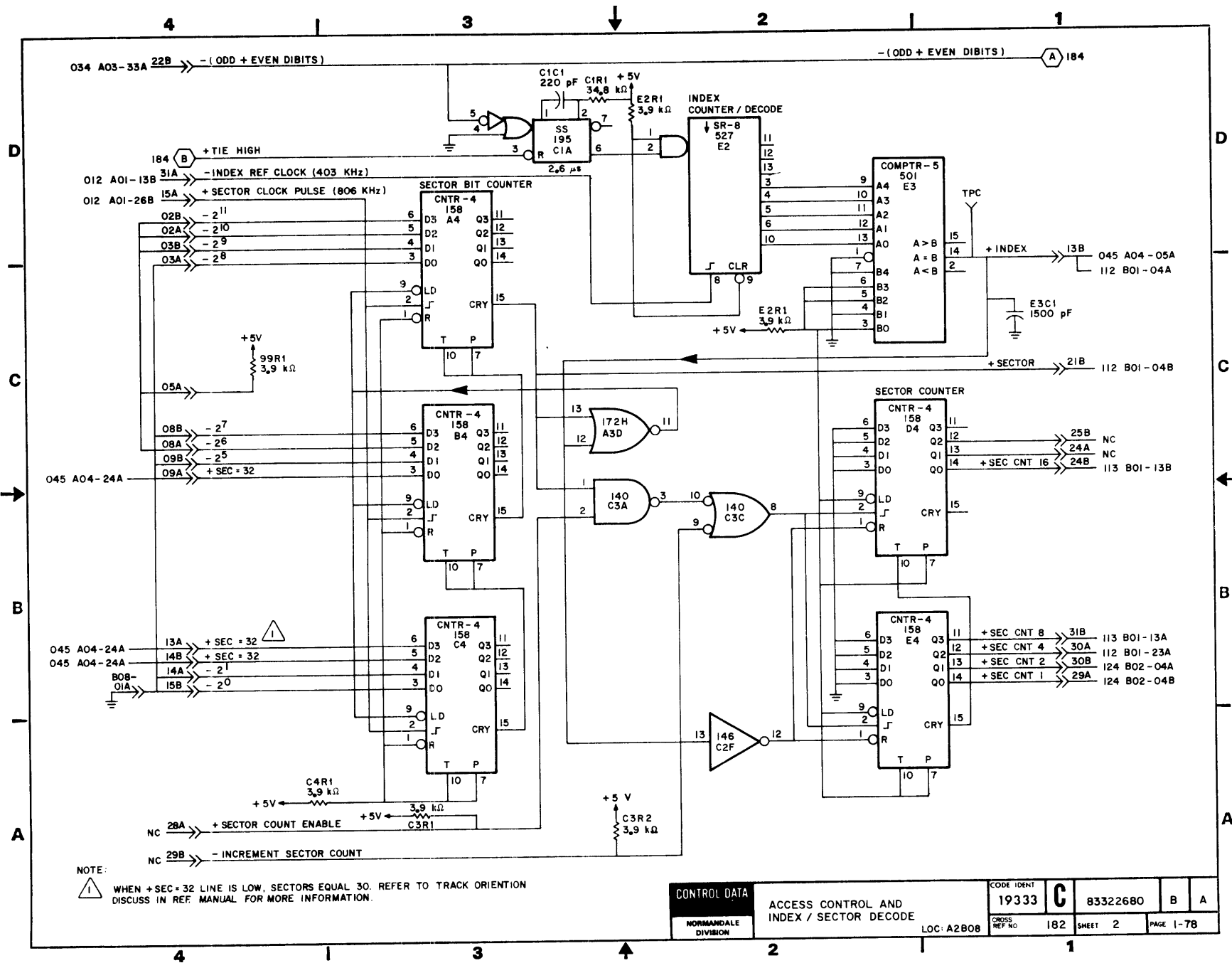
| | | | | | | | | | |
|---------------------|--|---------------------------|--|--------------|---|----------------------------|---|---|-----|
| CONTROL DATA | | DIFFERENCE COUNTER OUTPUT | | CODE IDENT | C | 83322680 | B | A | |
| NORMANDALE DIVISION | | LOC: A2B06 | | CROSS REF NO | | | | | 165 |
| | | | | 19333 | | JA81-01B 262 [A3] J101-14B | | | |
| | | | | | | PAGE 1-71/72 | | | |

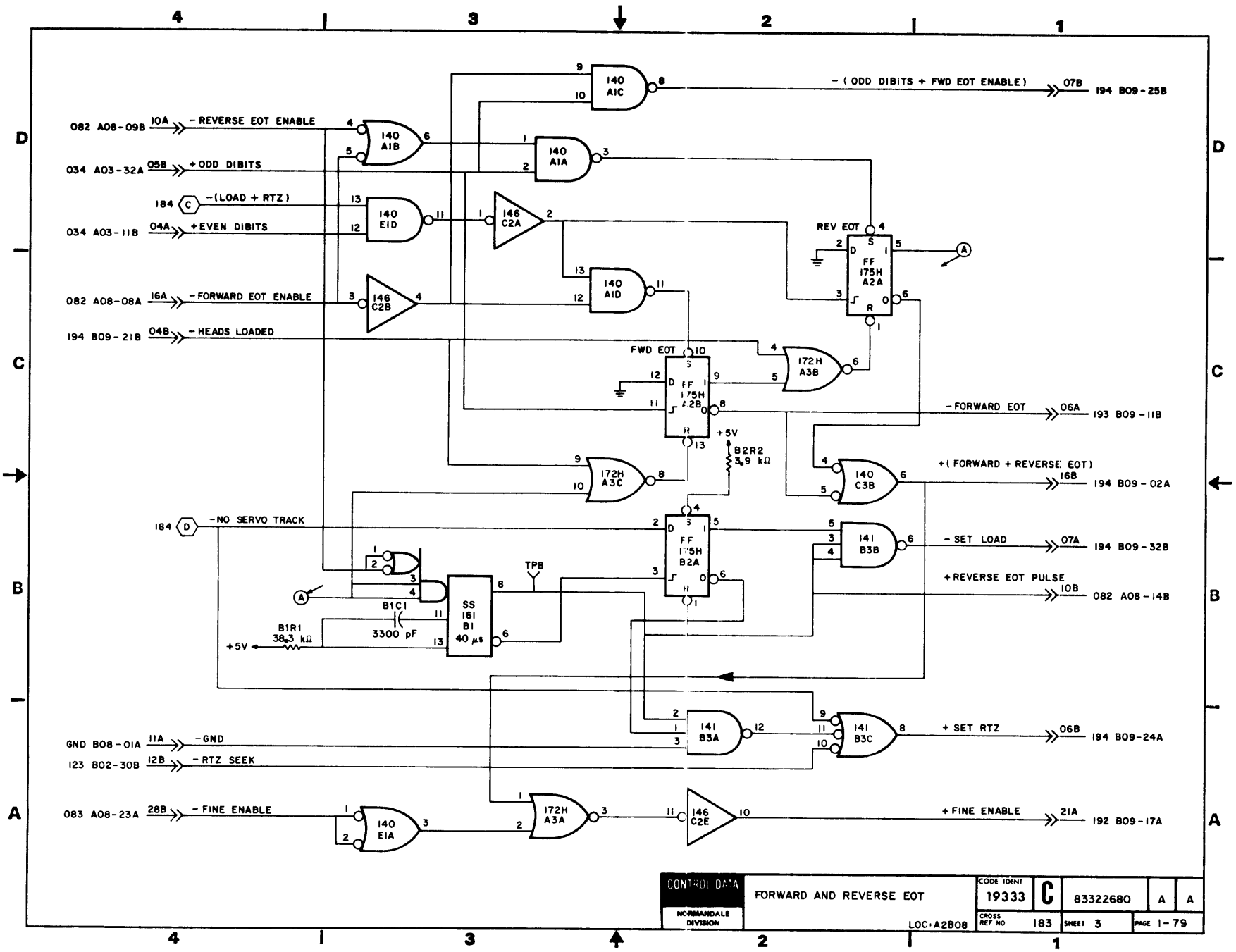


| | | | | | | | |
|-------------------------|---------------------------|--------------|-------|-------|----------|-----------|---|
| CONTROL DATA | NRZ TO MFM DATA PART 1 | CODE IDENT | 19333 | C | 83322680 | A | A |
| | | CROSS REF NO | 172 | SHEET | 2 | PAGE 1-74 | |
| NORMANDEALE DIVISION | LOC: A2B07 | | | | | | |

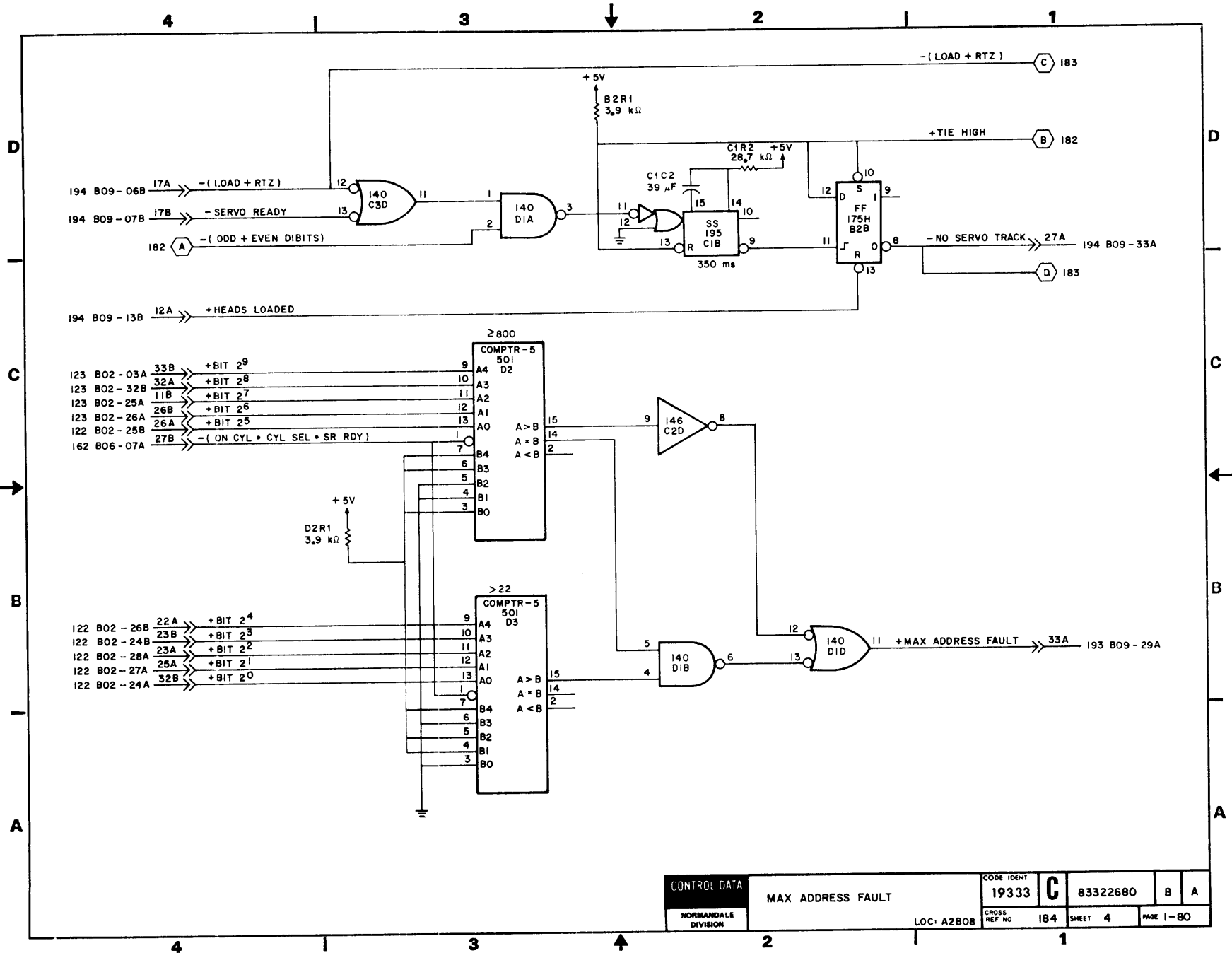


| | | | | | | | | |
|-------------------------|--|---------------------------|--|----------------------------|----------|----------|--------------|---|
| CONTROL DATA | | NRZ TO MFM DATA PART 2 | | CODE IDENT 19333 | C | 83322680 | B | A |
| NORMANDEALE DIVISION | | LOC: A2B07 | | CROSS REF NO 173 | SHEET 3 | | PAGE 1-75/76 | |





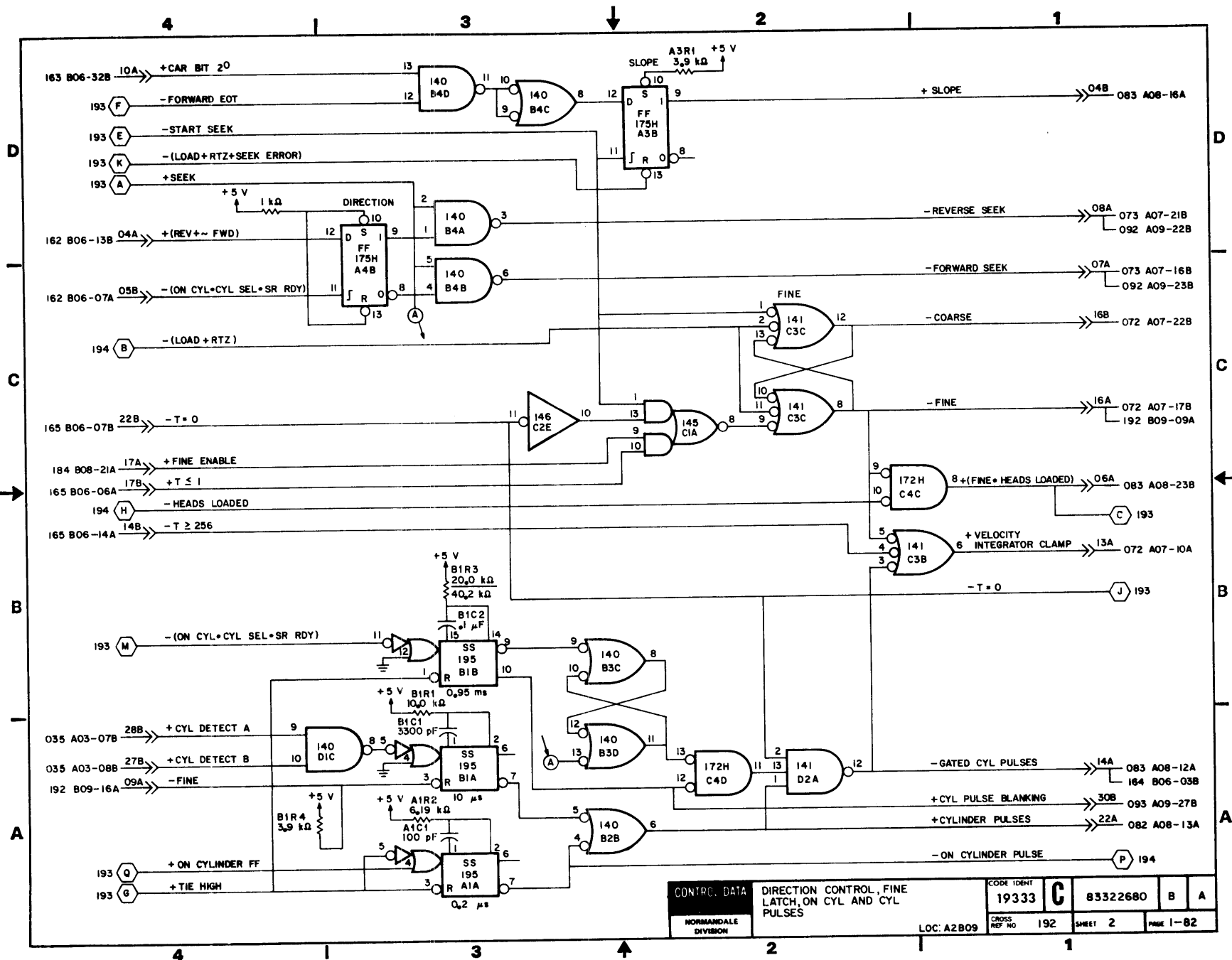
| | | | | | | |
|--|-------------------------|---------------------|---|----------|---|---|
| CONTROL DATA NORMANDALE DIVISION | FORWARD AND REVERSE EOT | CODE IDENT 19333 | C | 83322680 | A | A |
| | LOC: A2B08 | CROSS REF NO 183 | | | | |



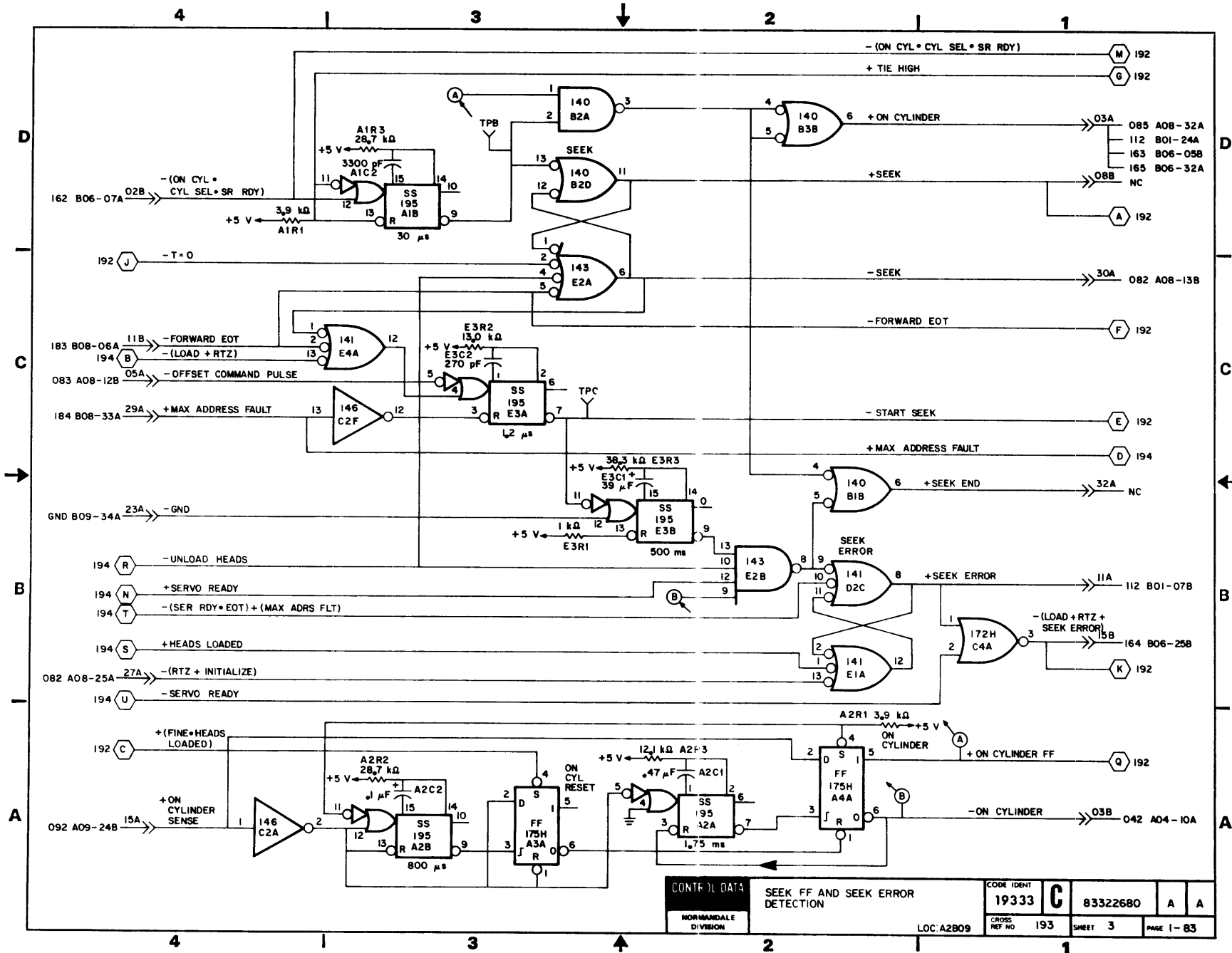
| | | | | | | | |
|----------------------|--|--------------|---------|-------|----------|-----------|---|
| CONTROL DATA | | CODE IDENT | 19333 C | | 83322680 | B | A |
| NORMANDEALE DIVISION | | CROSS REF NO | 184 | SHEET | 4 | PAGE 1-80 | |

MAX ADDRESS FAULT

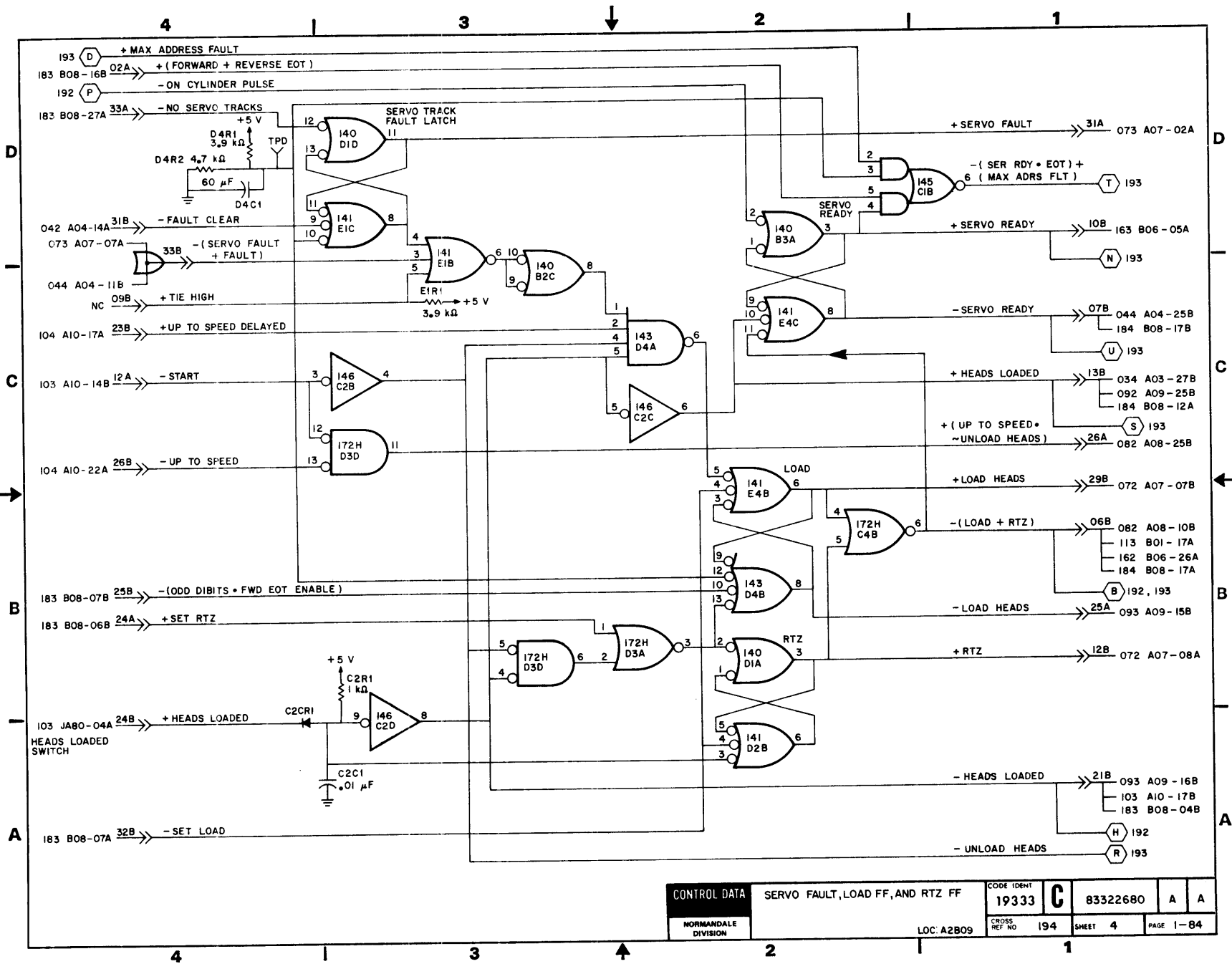
LOC: A2B08



| | | | | | |
|----------------------|--|--------------|----------|-------|------|
| CONTROL DATA | DIRECTION CONTROL, FINE LATCH, ON CYL AND CYL PULSES | CODE IDENT | 83322680 | B | A |
| | | 19333 | | | |
| NORMANDEALE DIVISION | LOC: A2B09 | CROSS REF NO | 192 | SHEET | 2 |
| | | | | PAGE | 1-82 |



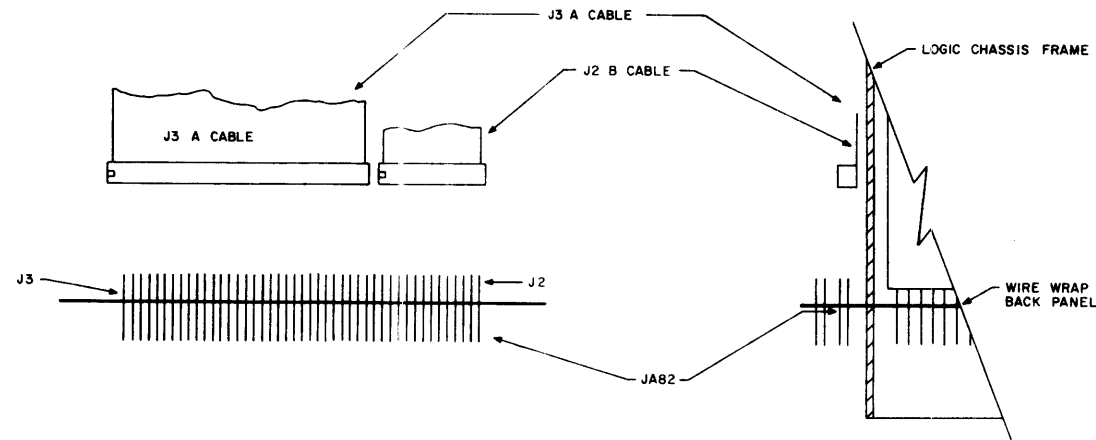
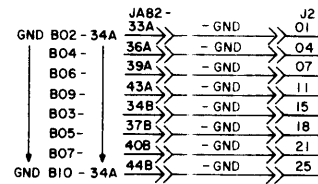
| | | | | | | | | | |
|---------------------|--|----------------------------------|--|--------------|-------|-------|----------|-----------|---|
| CONTROL DATA | | SEEK FF AND SEEK ERROR DETECTION | | CODE IDENT | 19333 | C | 83322680 | A | A |
| NORMANDALE DIVISION | | LOC: A2B09 | | CROSS REF NO | 193 | SHEET | 3 | PAGE 1-83 | |



| | | | | | | | |
|--|----------------------------------|-----|---------------------|---|----------|---|---|
| CONTROL DATA NORMANDALE DIVISION | SERVO FAULT, LOAD FF, AND RTZ FF | | CODE IDENT 19333 | C | 83322680 | A | A |
| | CROSS REF NO | 194 | SHEET | | | | |
| LOC: A2B09 | | | | | | | |

| REVISION STATUS OF SHEETS | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| A | A | A | | | | | | | | | | | | | | | | | |

| REVISIONS | | | | | |
|-----------|---------|-------------|------|------|-------|
| REV | ECO | DESCRIPTION | DRFT | DATE | CHK'D |
| A | PE23000 | RELEASED | | | |



| | | | | | | | | | | |
|----------|---------|---------|---------------------|----------|--------------|-------|-------|----------|------|------|
| DRAWN | G RAJWE | 3-24-77 | CON'ROL DATA | I/O | CODE IDENT | 19333 | C | 83322680 | A | A |
| CHECKED | | | | DIAGRAMS | CROSS REF NO | 231 | SHEET | 1 OF 3 | PAGE | 1-85 |
| ENGINEER | | | WORMANDALE DIVISION | TYPE | LOC | A2C1 | | | | |
| APPROVED | | | | AXYV | | | | | | |

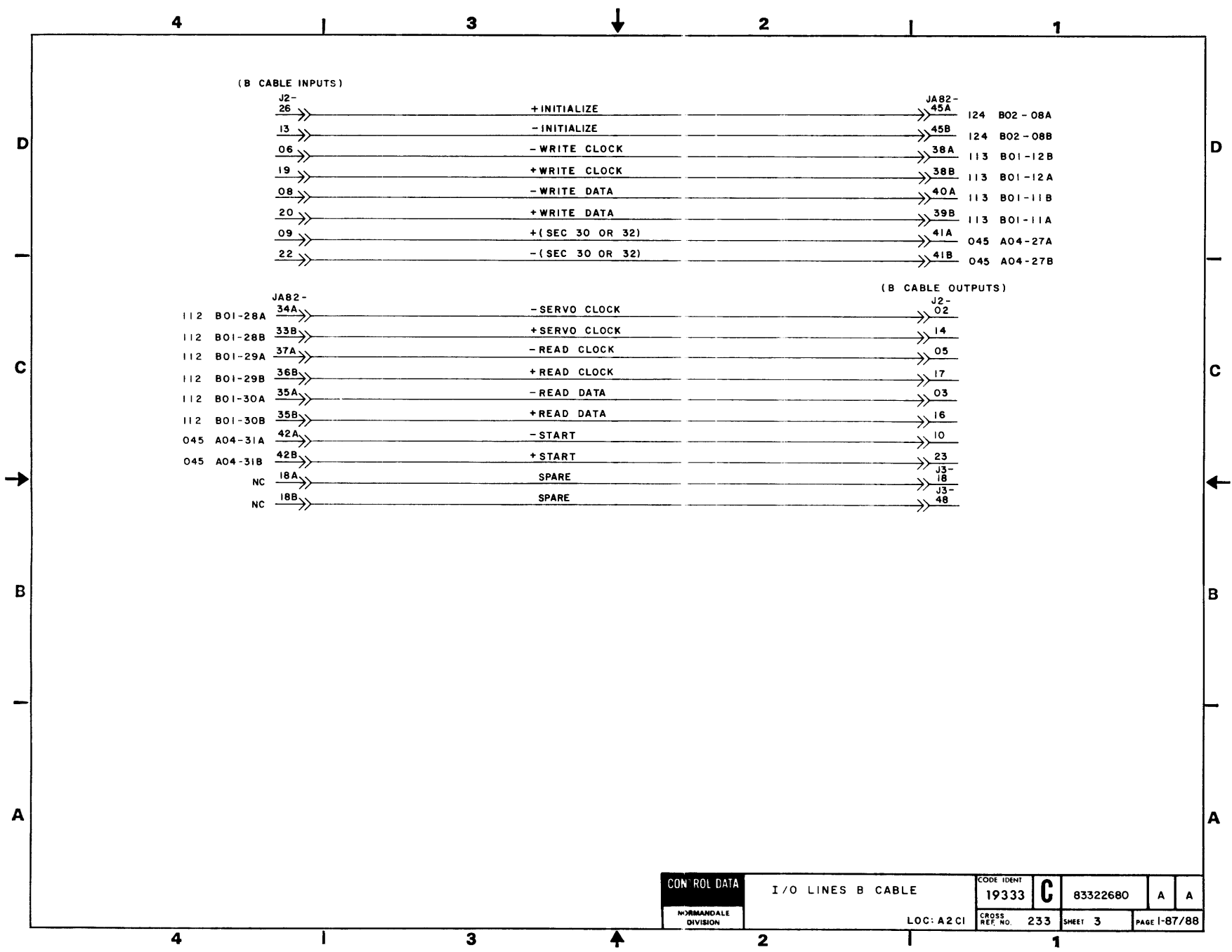
(A CABLE INPUTS)

| | | | | |
|----|---------------|---------------------|-----|---------|
| 01 | J3- JAB2- 01A | - CYL ADRS TAG 1 | 123 | B02-12B |
| 31 | 01B | + CYL ADRS TAG 1 | 123 | B02-12A |
| 02 | 02A | - HEAD SEL TAG 2 | 123 | B02-11B |
| 32 | 02B | + HEAD SEL TAG 2 | 123 | B02-11A |
| 03 | 03A | - CONTROL SEL TAG 3 | 124 | B02-07B |
| 33 | 03B | + CONTROL SEL TAG 3 | 124 | B02-07A |
| 04 | 04A | - BIT 0 | 122 | B02-23B |
| 34 | 04B | + BIT 0 | 122 | B02-23A |
| 05 | 05A | - BIT 1 | 122 | B02-22B |
| 35 | 05B | + BIT 1 | 122 | B02-22A |
| 06 | 06A | - BIT 2 | 122 | B02-21B |
| 36 | 06B | + BIT 2 | 122 | B02-21A |
| 07 | 07A | - BIT 3 | 122 | B02-17B |
| 37 | 07B | + BIT 3 | 122 | B02-17A |
| 08 | 08A | - BIT 4 | 122 | B02-16B |
| 38 | 08B | + BIT 4 | 122 | B02-16A |
| 09 | 09A | - BIT 5 | 122 | B02-15B |
| 39 | 09B | + BIT 5 | 122 | B02-15A |
| 10 | 10A | - BIT 6 | 123 | B02-14B |
| 40 | 10B | + BIT 6 | 123 | B02-14A |
| 11 | 11A | - BIT 7 | 123 | B02-13B |
| 41 | 11B | + BIT 7 | 123 | B02-13A |
| 12 | 12A | - BIT 8 | 123 | B02-09B |
| 42 | 12B | + BIT 8 | 123 | B02-09A |
| 13 | 13A | - BIT 9 | 123 | B02-10B |
| 43 | 13B | + BIT 9 | 123 | B02-10A |
| 29 | 29A | - POWER SEQ PICK | 102 | A10-04B |
| 59 | 29B | - POWER SEQ PICK | 102 | A10-03A |
| | | | | |
| | | | | |

(A CABLE OUTPUTS)

| | | | | |
|-----|---------|-------------------|-----------|--------|
| 112 | B01-09A | - FAULT | JAB2- 15A | J3- 15 |
| 112 | B01-09B | + FAULT | 15B | 45 |
| 112 | B01-08A | - SEEK ERROR | 16A | 16 |
| 112 | B01-08B | + SEEK ERROR | 16B | 46 |
| 112 | B01-26A | - ON CYLINDER | 17A | 17 |
| 112 | B01-26B | + ON CYLINDER | 17B | 47 |
| 112 | B01-25A | - UNIT READY | 19A | 19 |
| 112 | B01-25B | + UNIT READY | 19B | 49 |
| 112 | B01-06A | - INDEX | 18A | 18 |
| 112 | B01-06B | + INDEX | 18B | 48 |
| 112 | B01-05A | - SECTOR | 25A | 25 |
| 112 | B01-05B | + SECTOR | 25B | 55 |
| 045 | A04-23A | - PLUG VALID | 22A | 22 |
| 045 | A04-23B | + PLUG VALID | 22B | 52 |
| 045 | A04-32A | - WRITE PROTECTED | 28A | 28 |
| 045 | A04-33A | + WRITE PROTECTED | 28B | 58 |
| 045 | A04-29A | - SEL ADD 1 | 23A | 23 |
| 045 | A04-29B | + SEL ADD 1 | 23B | 53 |
| 045 | A04-30A | - SEL ADD 2 | 24A | 24 |
| 045 | A04-30B | + SEL ADD 2 | 24B | 54 |
| 045 | A04-21A | - SEL ADD 4 | 26A | 26 |
| 045 | A04-21B | + SEL ADD 4 | 26B | 56 |
| 124 | B02-06A | - SEC CNT 1 | 27A | 27 |
| 124 | B02-06B | + SEC CNT 1 | 27B | 57 |
| 124 | B02-05A | - SEC CNT 2 | 14A | 14 |
| 124 | B02-05B | + SEC CNT 2 | 14B | 44 |
| 112 | B01-27A | - SEC CNT 4 | 20A | 20 |
| 112 | B01-27B | + SEC CNT 4 | 20B | 50 |
| 113 | B01-14A | - SEC CNT 8 | 21A | 21 |
| 113 | B01-14B | + SEC CNT 8 | 21B | 51 |
| 113 | B01-15A | - SEC CNT 16 | 30A | 30 |
| 113 | B01-15B | + SEC CNT 16 | 30B | 60 |

| | | | | | | | | | |
|----------------------|--|-------------------|--|----------------|-------|-------|----------|-----------|---|
| CONTROL DATA | | I/O LINES A CABLE | | CODE IDENT | 19333 | C | 83322680 | B | A |
| NORMANDEALE DIVISION | | LOC: A2CI | | CROSS REF. NO. | 232 | SHEET | 2 | PAGE 1-86 | |



| | | | | | | |
|----------------------|-------------------|--------------------|----------|--------------|---|---|
| CONTROL DATA | I/O LINES B CABLE | CODE IDENT | C | 83322680 | A | A |
| | | 19333 | | | | |
| WORMANDEALE DIVISION | LOC: A2 CI | CROSS REF. NO. 233 | SHEET 3 | PAGE 1-87/88 | | |

4

3

2

1

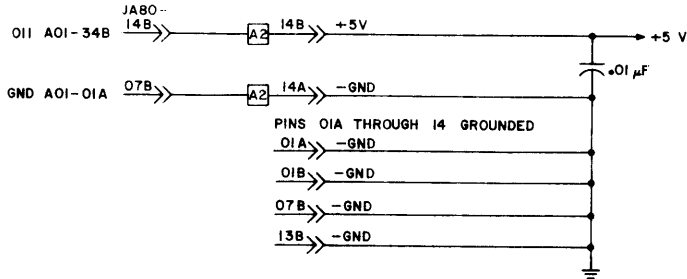
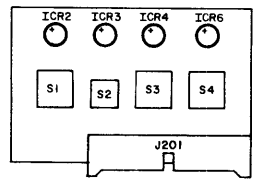
| REVISION STATUS OF SHEETS | | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| A | A | | | | | | | | | | | | | | | | | | | |

| REVISIONS | | | | | |
|-----------|----------|-------------|-------|------|-------|
| REV. | ECO. | DESCRIPTION | DRFT. | DATE | CHK'D |
| A | PE 23000 | RELEASED | | | |

D
C
B
A

D
C
B
A

CONTROL PANEL
(COMPONENT LAYOUT)



| | | | | | | | | |
|----------|--|----------------------|--------------|------------|--------------|----------|------|--------|
| DRAWN | | CONTROL DATA | CODE IDENT | 19333 | C | 83322680 | A | A |
| CHECKED | | | CROSS REF NO | 251 | SHEET | 1 of 2 | PAGE | 1 - 89 |
| ENGINEER | | NORMAN DALE DIVISION | TYPE: HZYN | LOC: A3AOI | REF 83215718 | | | |
| APPROVED | | | | | | | | |

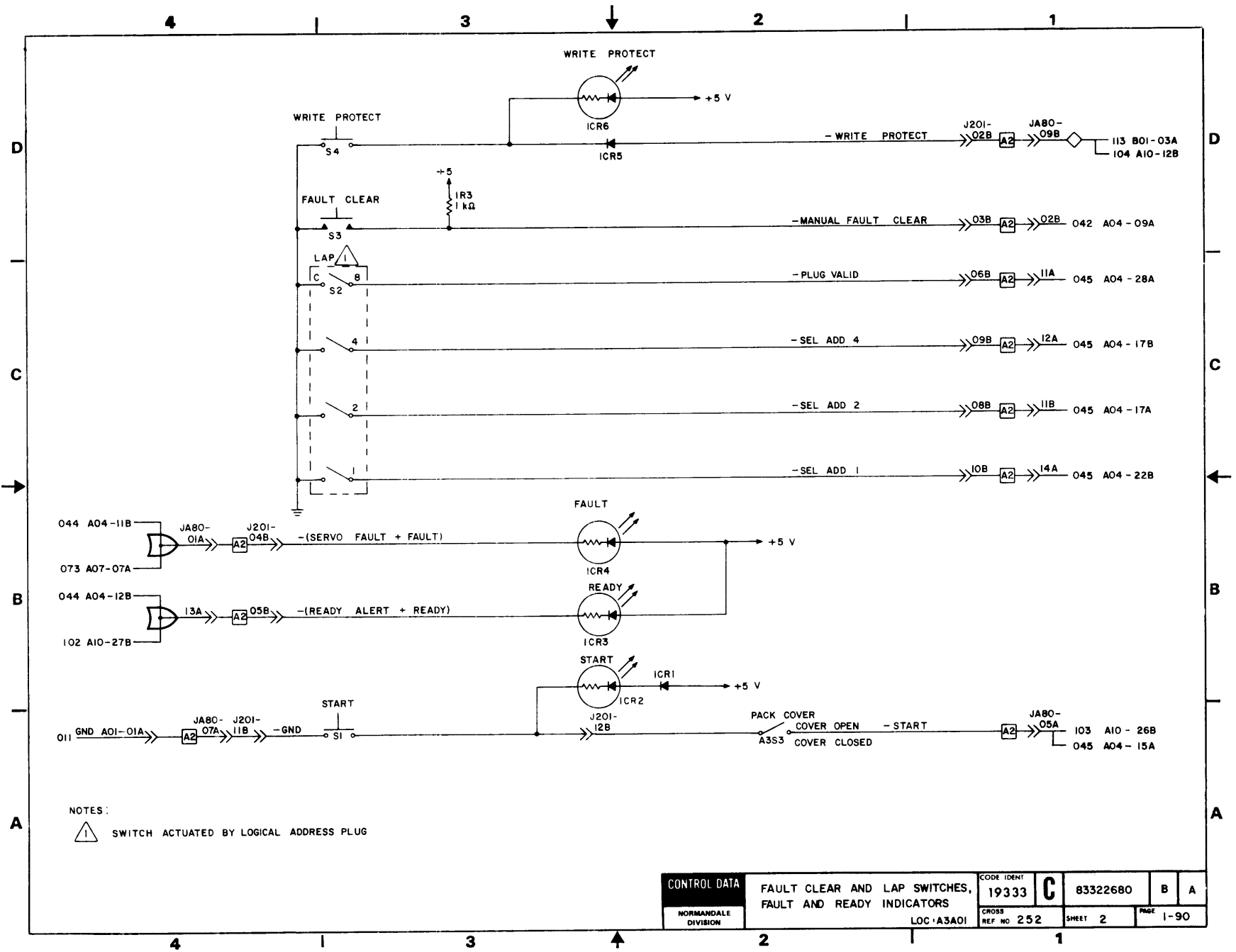
4

1

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NOTES:
 △ SWITCH ACTUATED BY LOGICAL ADDRESS PLUG

| | | | | | | |
|--------------------------------------|---|---------------------|---|----------|---|---|
| CONTROL DATA NORMANDEALE DIVISION | FAULT CLEAR AND LAP SWITCHES, FAULT AND READY INDICATORS | CODE IDENT 19333 | C | 83322680 | B | A |
| | LOC: A3A01 | CROSS REF NO 252 | | | | |

4

3

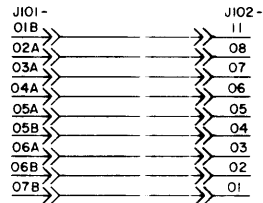
2

1

REVISION STATUS OF SHEETS

| | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| A | A | A | | | | | | | | | | | | | | | | | | |

| REVISIONS | | | | | |
|-----------|---------|-------------|------|------|-------|
| REV | ECO | DESCRIPTION | DRFT | DATE | CHK'D |
| A | PE23000 | RELEASED | | | |



D

D

C

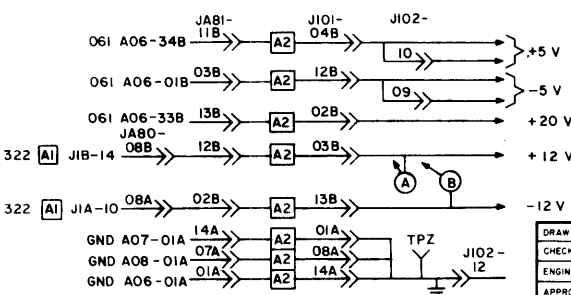
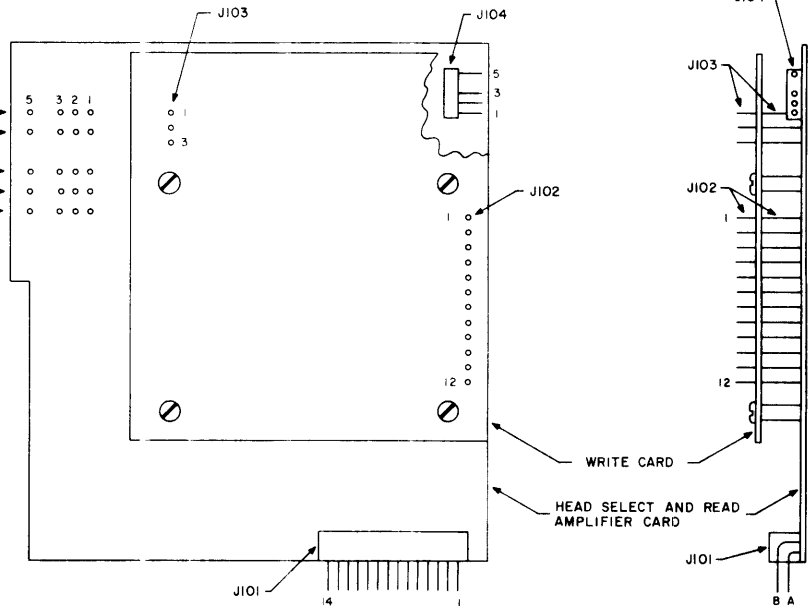
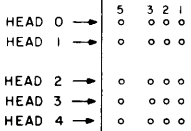
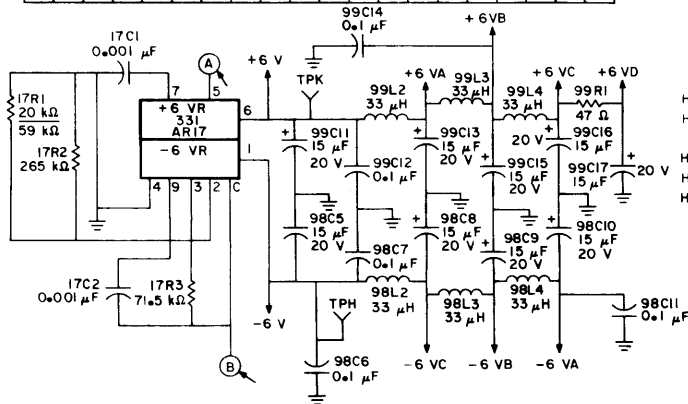
C

B

B

A

A



| | | |
|----------|-------------|---------|
| DRAWN | Allyn Smith | 3/10/77 |
| CHECKED | | |
| ENGINEER | | |
| APPROVED | | |

| | | | | | |
|----------------------|---|-----------------------|-----------------|--------------|-----------------|
| CON RC ATA | HEAD SELECT AND READ AMPLIFIER DIAGRAMS | CODE IDENT 19333 C | 83322680 | A | A |
| NORMANDEALE DIVISION | TYPE NZJN | CROSS REF NO 261 | SHEET 1 OF 3 | PAGE 1-91 | REF 83215719 |

4

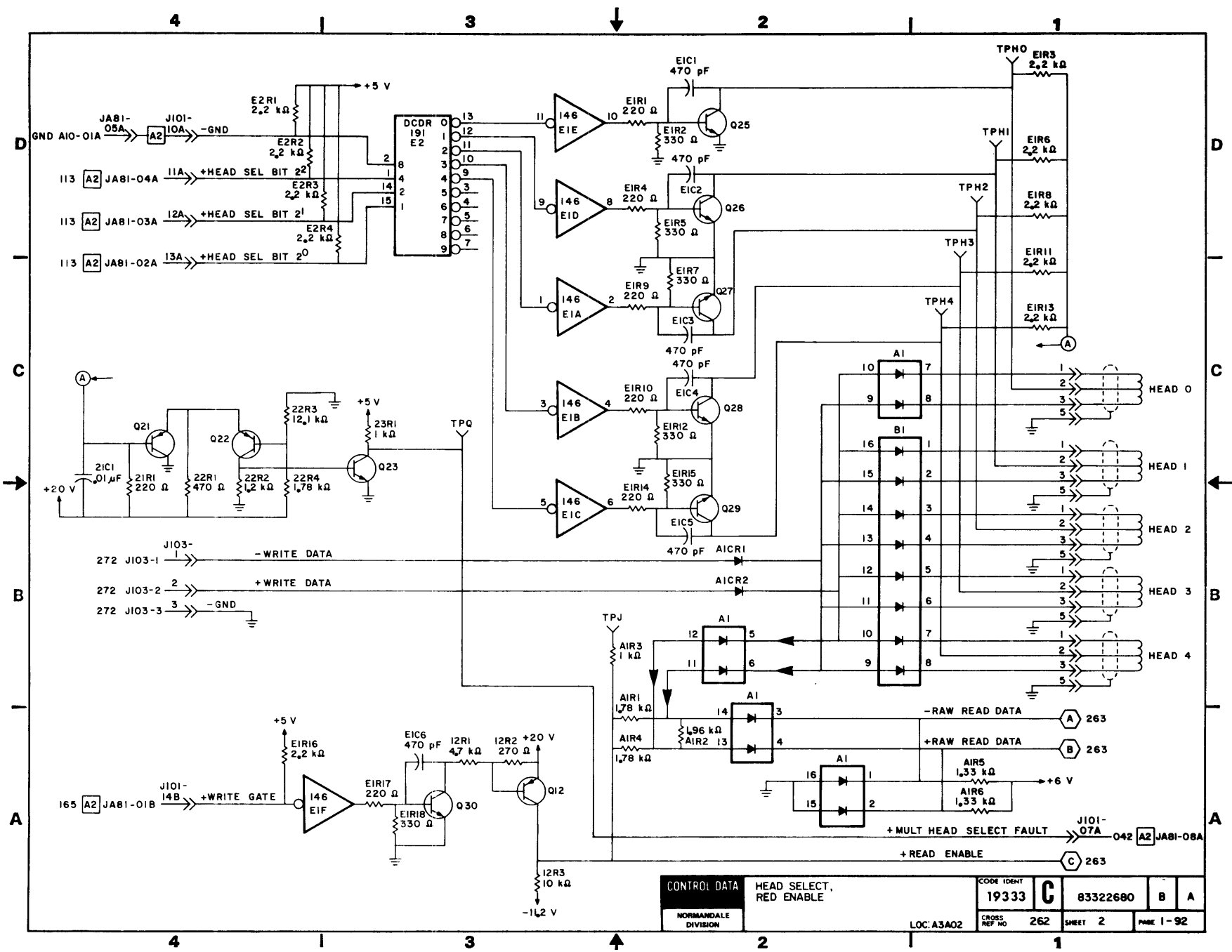
1

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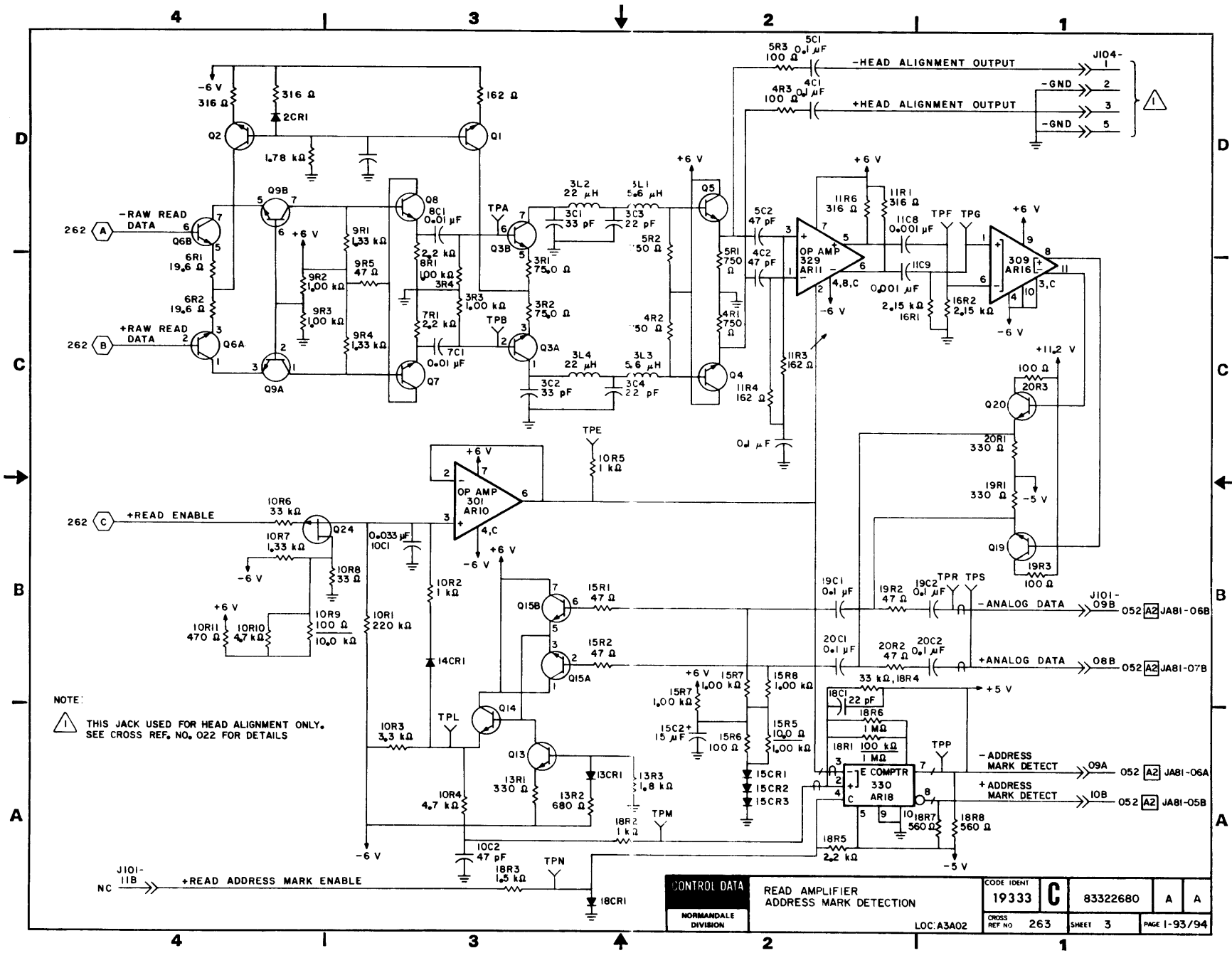


CONTROL DATA
NORMANDALE DIVISION

HEAD SELECT,
RED ENABLE

LOC: A3A02

| | | | | |
|--------------|----------|----------|-----------|---|
| CODE IDENT | C | 83322680 | B | A |
| 19333 | | | | |
| CROSS REF NO | 262 | SHEET 2 | PAGE 1-92 | |



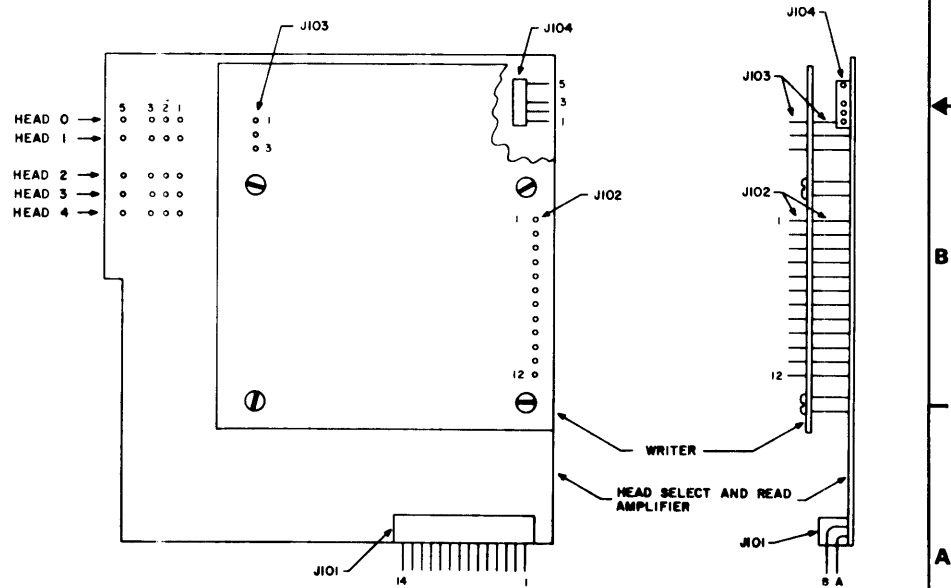
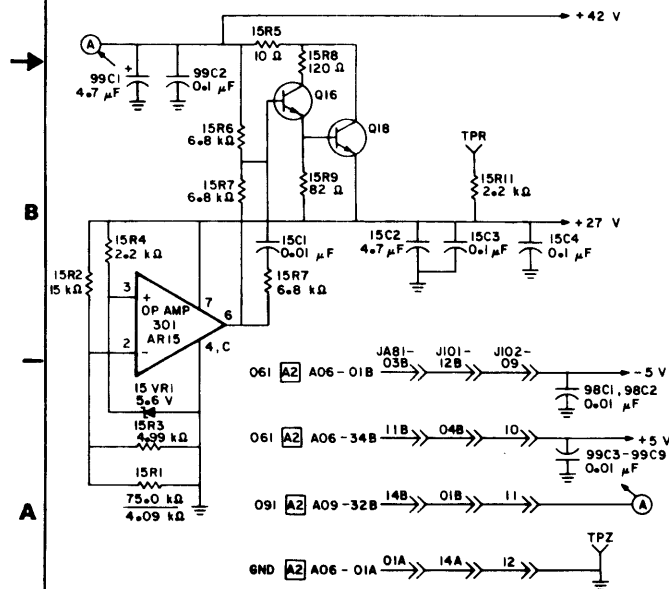
| | | | | | | | |
|---|--|-------------------|---------------------|---|----------|---|---|
| CONTROL DATA NORMANDEALE DIVISION | READ AMPLIFIER ADDRESS MARK DETECTION | | CODE IDENT 19333 | C | 83322680 | A | A |
| | LOC: A3A02 | CROSS REF NO: 263 | SHEET 3 | | | | |

| REVISION STATUS OF SHEETS | | | | | | | | | | | | | | | | | | | | |
|---------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
| A | A | A | A | | | | | | | | | | | | | | | | | |
| B | B | A | A | | | | | | | | | | | | | | | | | |

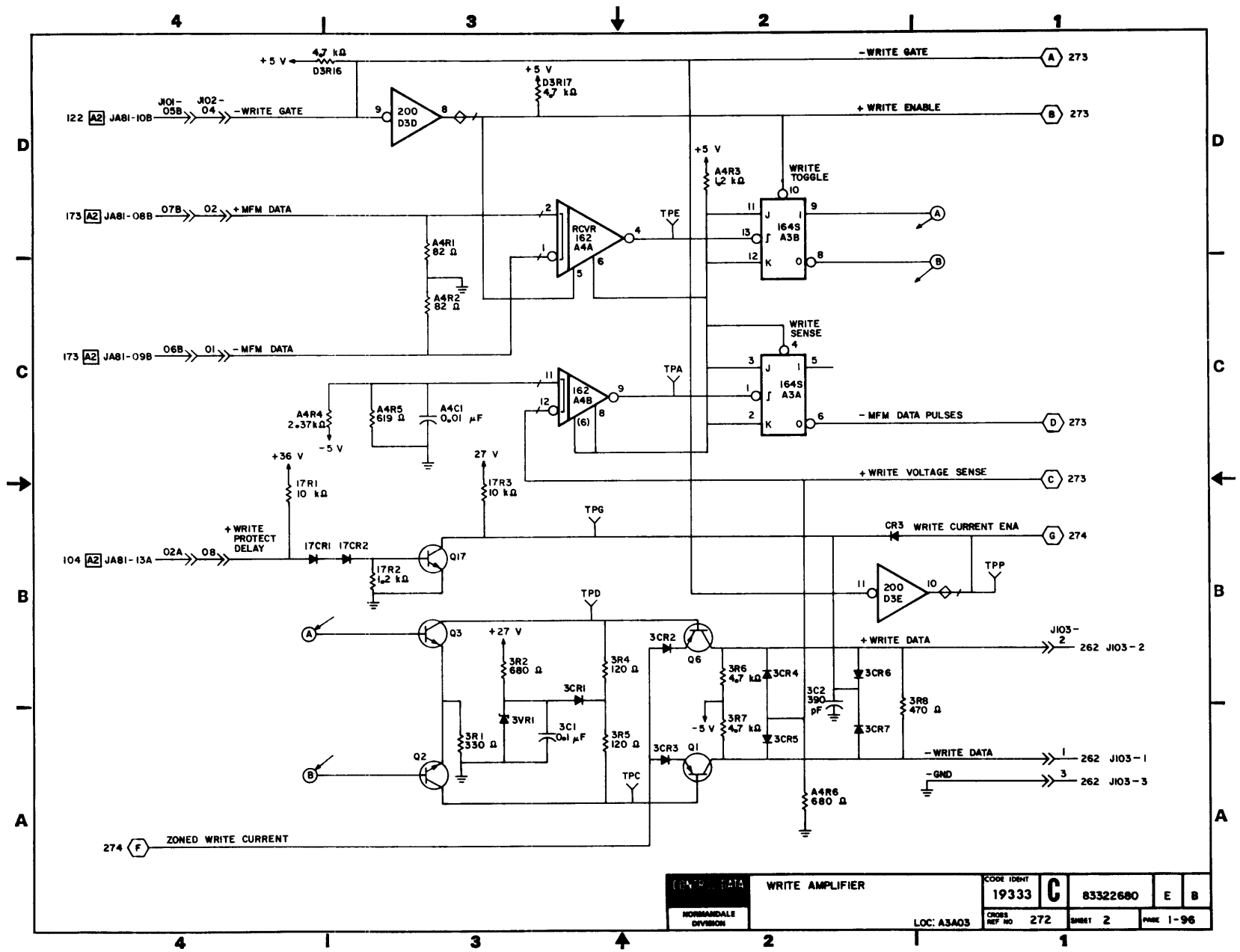
| REVISIONS | | | | | |
|-----------|--------|--------------------|-------|-------|--------|
| REV. | ECO. | DESCRIPTION | DRFT. | DATE | CHK'D |
| A | PEZ300 | RELEASED | | | |
| B | | DIAGRAM CORRECTION | | A A D | BES-76 |

UNUSED LOGIC ELEMENTS

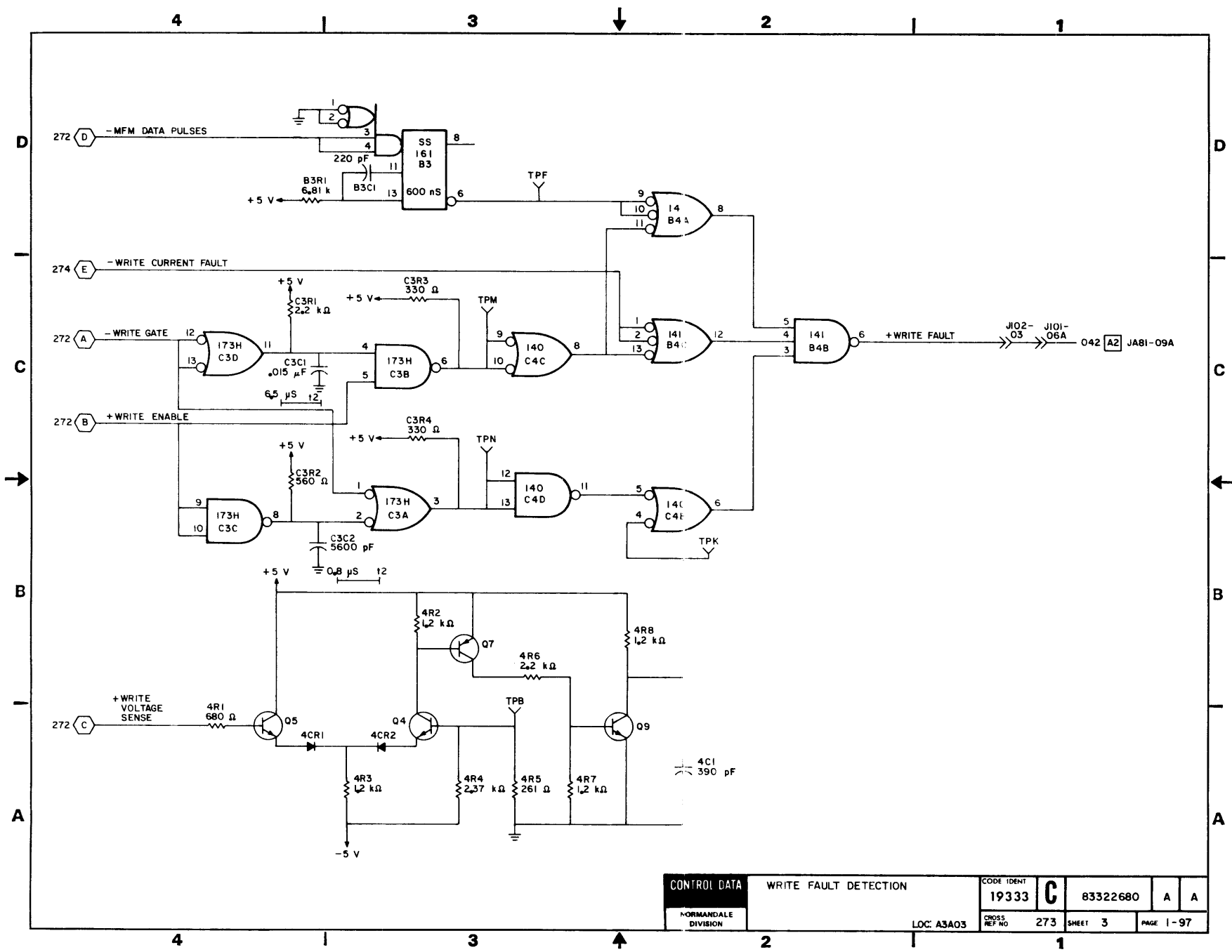
| TYPE | LOCATION | OUTPUT PIN(S) |
|------|----------|---------------|
| 200 | C 3 | 12 |
| 140 | C 4 | 3 |



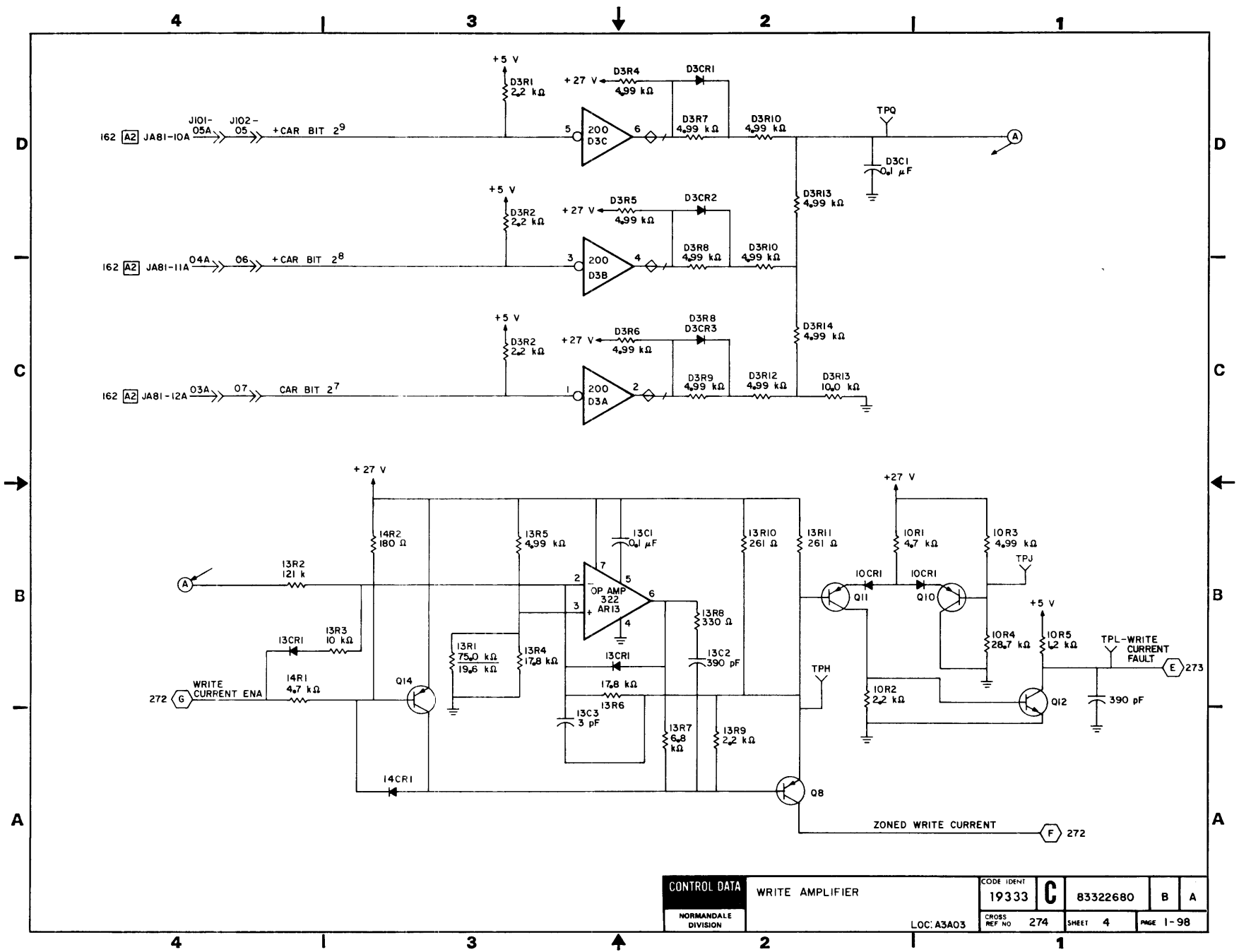
| | | | | | | | | | | |
|----------|----------------|---------|----------------------|--|-------------|-------|-------|----------|----------|------|
| DESIGNED | W. J. Anderson | 2-13-76 | WRITER DIAGRAMS | | CODE 1000 | 19333 | C | 83322680 | E | B |
| CHECKED | | | TYPE: EZKN | | ORDR REF NO | 271 | SHEET | 1 of 4 | PAGE | 1-96 |
| ENGINEER | | | NORMAN DALE DIVISION | | LOC | A3A03 | REF | | 68216720 | |
| APPROVED | | | | | | | | | | |



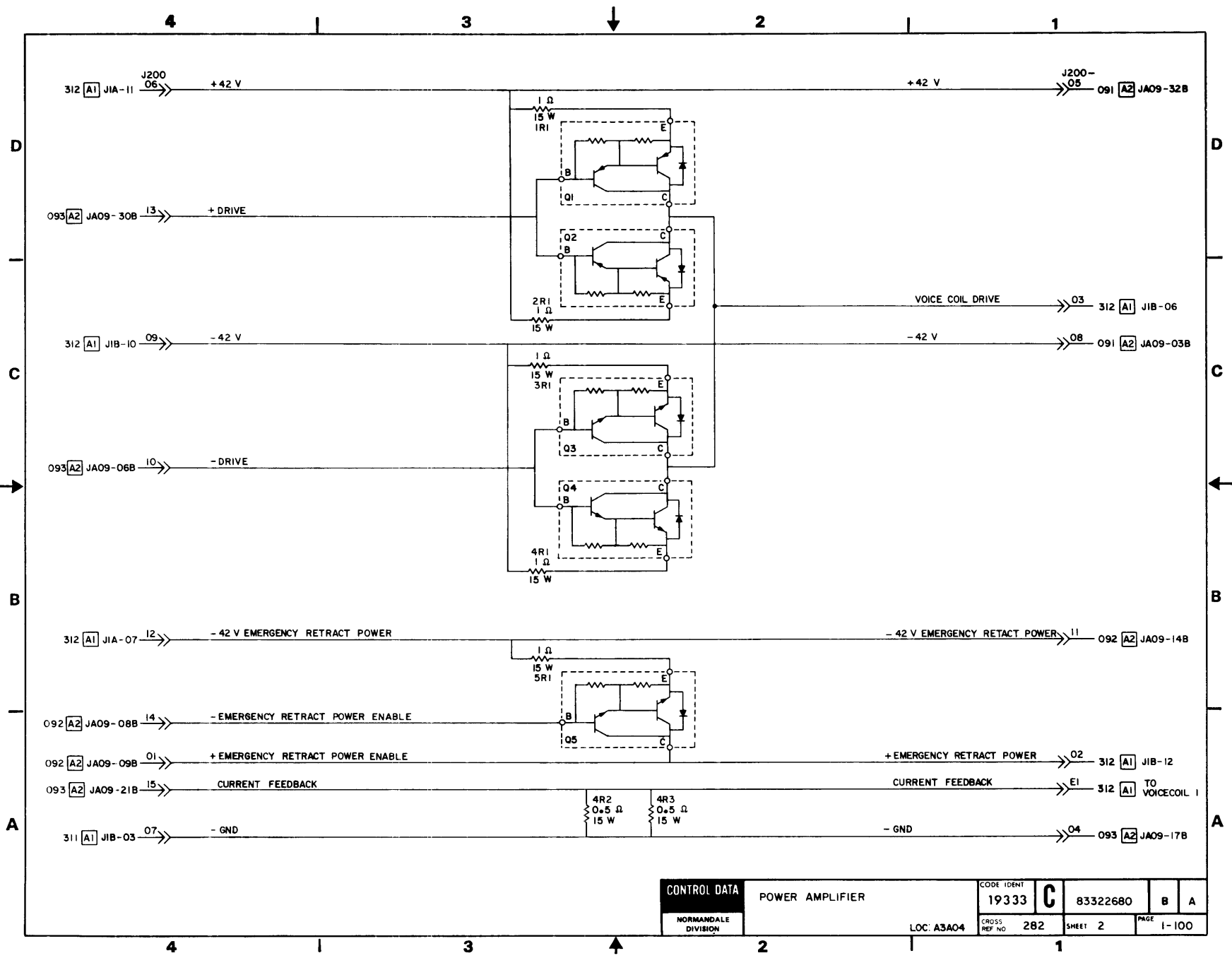
| | | | | | | | |
|------------------------------------|-----------------|--|-------------|---|----------|---|---|
| GEN DATA NORMANDALE DIVISION | WRITE AMPLIFIER | | CODE IDENT | C | 83322680 | E | B |
| | 19333 | | ORDS REF NO | | | | |
| LOC: A3A03 | | | | | | | |



| | | | | | | | | | |
|----------------------|--|-----------------------|--|----------------|-------|-------|----------|-----------|---|
| CONTROL DATA | | WRITE FAULT DETECTION | | CODE IDENT | 19333 | C | 83322680 | A | A |
| NORMANDEALE DIVISION | | LOC: A3A03 | | CROSS REF. NO. | 273 | SHEET | 3 | PAGE 1-97 | |



| | | | | | | | |
|--------------|---------------------|------------|--------------|-----|----------|------|------|
| CONTROL DATA | WRITE AMPLIFIER | | CODE IDENT | C | 83322680 | B | A |
| | NORMANDALE DIVISION | LOC: A3A03 | 19333 | | | | |
| | | | CROSS REF NO | 274 | SHEET | 4 | PAGE |
| | | | | | | 1-98 | |



| | | | | | | |
|---|-----------------|---------------------|---------|------------|---|---|
| CONTROL DATA NORMANDEALE DIVISION | POWER AMPLIFIER | CODE IDENT 19333 | C | 83322680 | B | A |
| | LOC: A3A04 | CROSS REF NO 282 | SHEET 2 | PAGE 1-100 | | |

4

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2

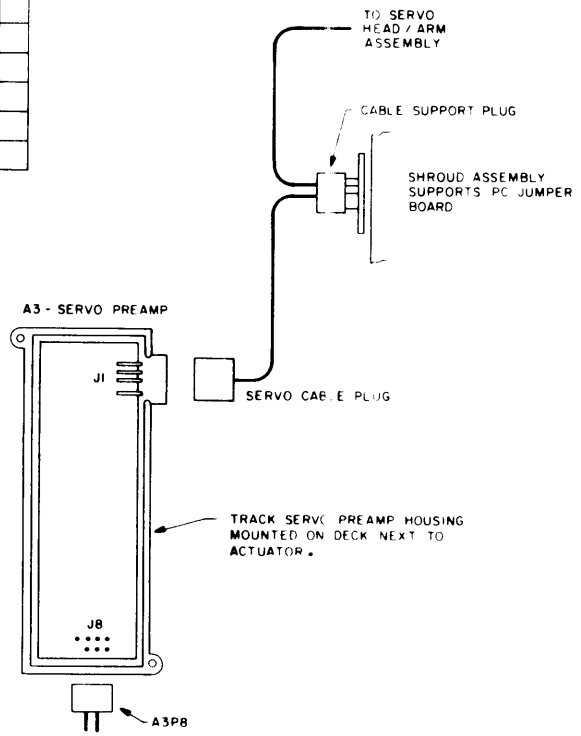
1

REVISION STATUS OF SHEETS

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|--|
| A | A | | | | | | | | | | | | | | | | | | | |

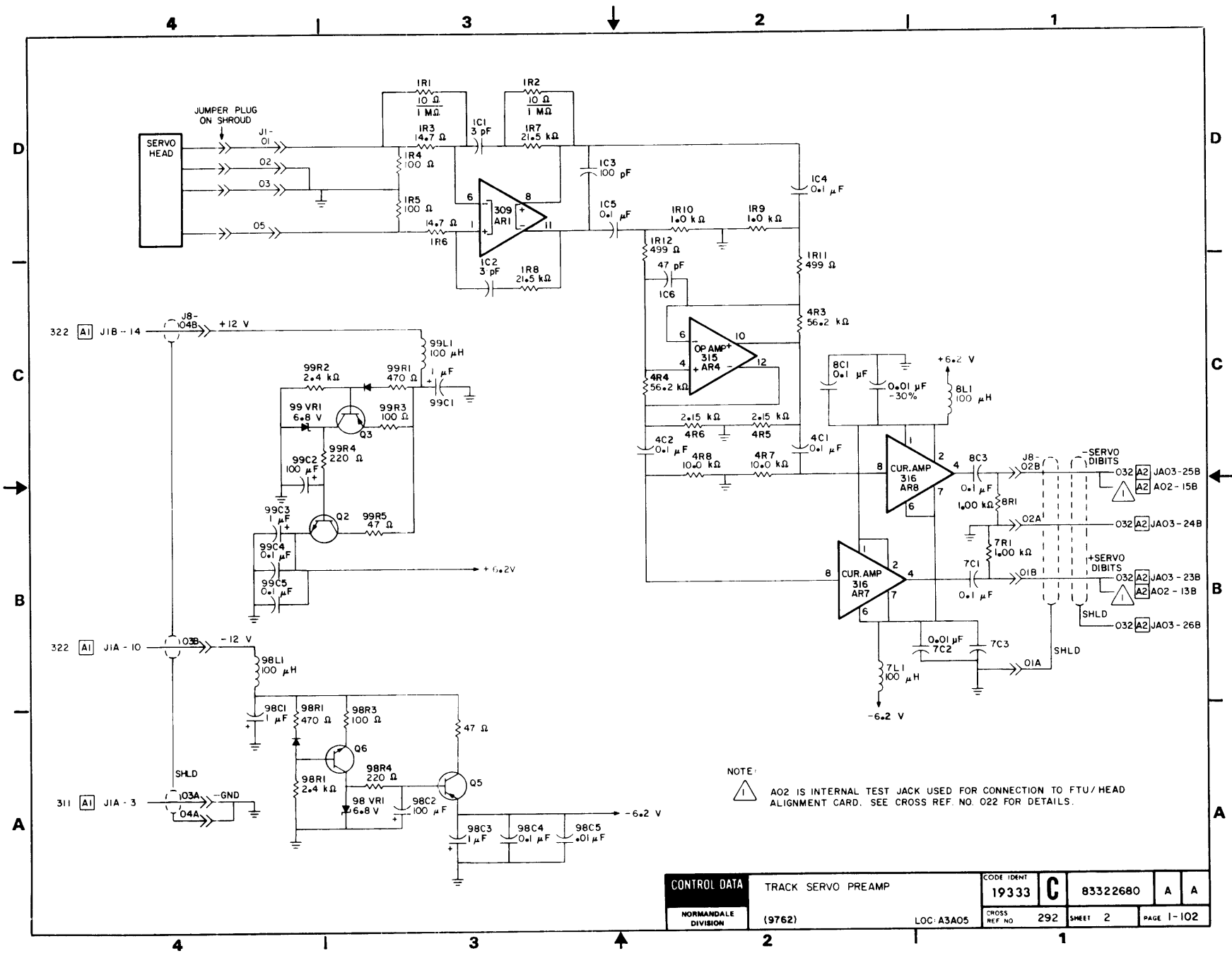
REVISIONS

| REV | ECO | DESCRIPTION | DFT | DATE | CHK'D |
|-----|---------|-------------|-----|------|-------|
| A | PE23000 | RELEASED | | | |



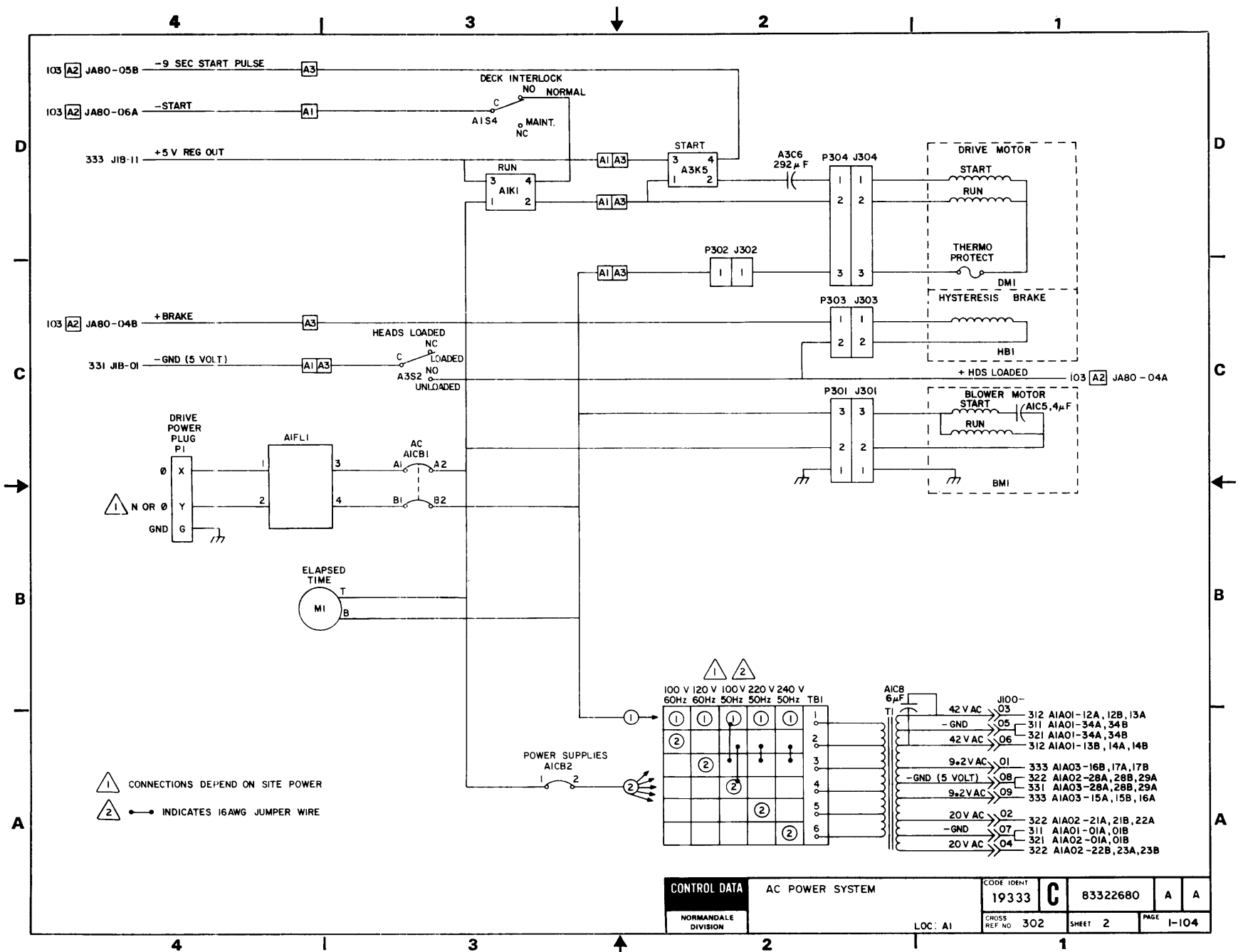
| | | | | | | | |
|-------------------------|----------------------|--------------|-----------|-------|----------|------|-------|
| DRAWN: <i>G. Rabine</i> | CONTROL DATA | CODE IDENT | 19333 | C | 83322680 | A | A |
| CHECKED: | | CROSS REF No | 291 | SHEET | 1 of 2 | PAGE | 1-101 |
| ENGINEER: | NORMAN DALE INVISION | TYPE: FZQN | LOC A3A05 | | | | |
| APPROVED: | | | | | | | |

REF 83215721



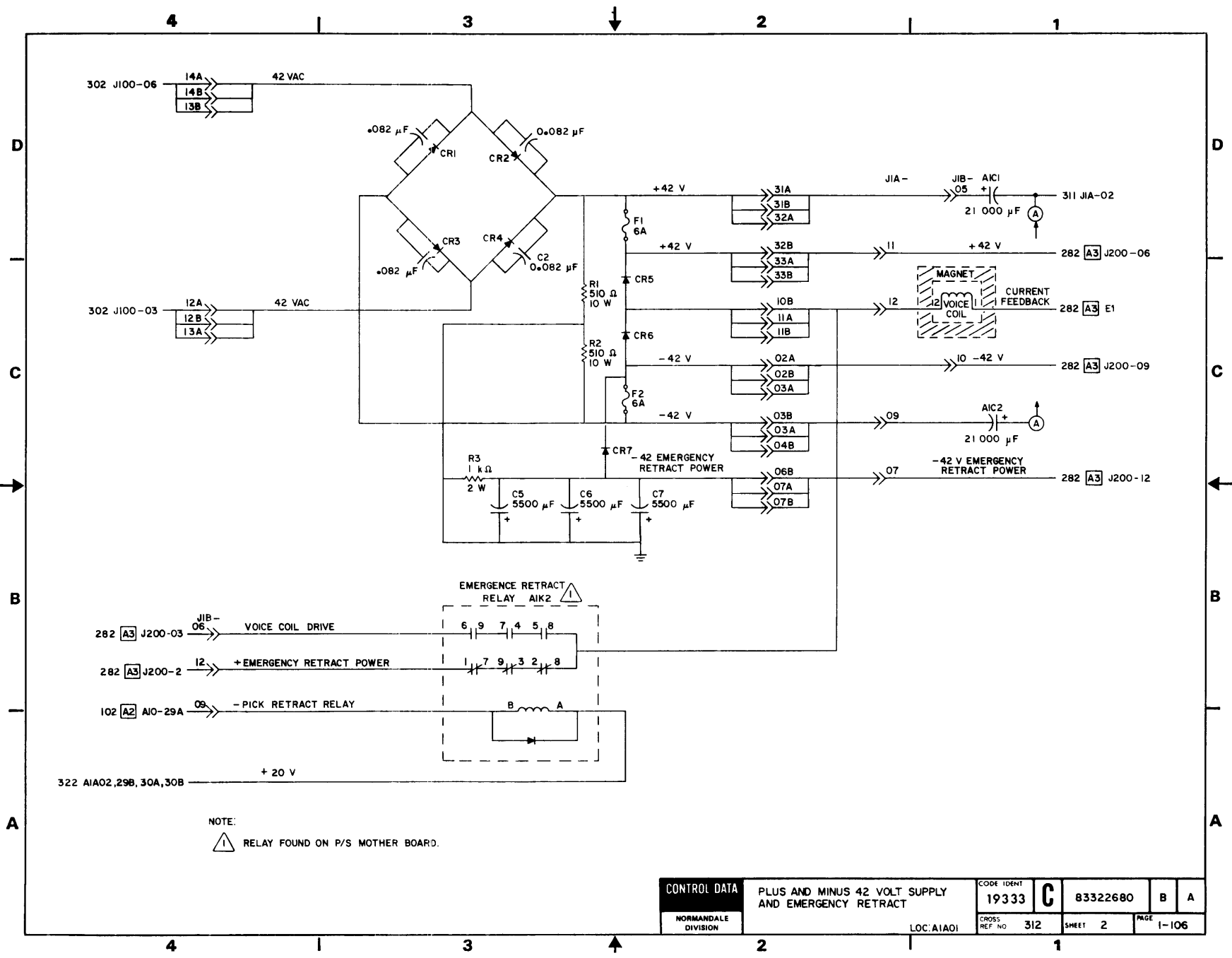
NOTE:
 1 AO2 IS INTERNAL TEST JACK USED FOR CONNECTION TO FTU/ HEAD ALIGNMENT CARD. SEE CROSS REF. NO. 022 FOR DETAILS.

| | | | | | | | | | |
|-------------------|--------|--------------------|--|---------------|-------|-------|----------|------------|---|
| CONTROL DATA | | TRACK SERVO PREAMP | | CODE IDENT | 19333 | C | 83322680 | A | A |
| NORMANDE DIVISION | (9762) | LOC: A3A05 | | CROSS REF. NO | 292 | SHEET | 2 | PAGE 1-102 | |



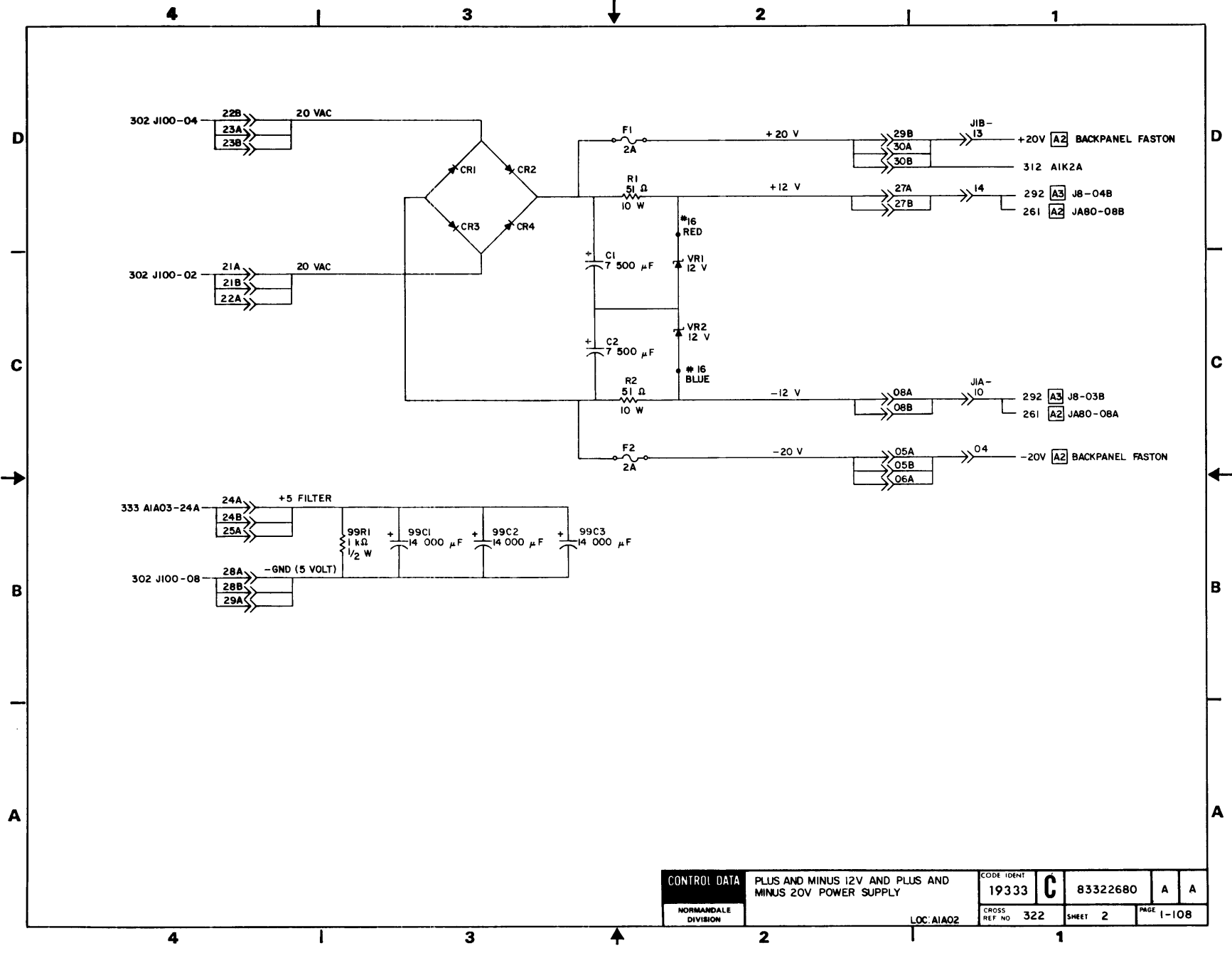
① CONNECTIONS DEPEND ON SITE POWER
 ② → INDICATES 16AWG JUMPER WIRE

| | | | | | | | | | |
|---------------------|--|-----------------|--|--------------|-------|-------|----------|------------|---|
| CONTROL DATA | | AC POWER SYSTEM | | CODE IDENT | 19333 | C | 83322680 | A | A |
| NORMANDELE DIVISION | | LOC: A1 | | CROSS REF NO | 302 | SHEET | 2 | PAGE I-104 | |

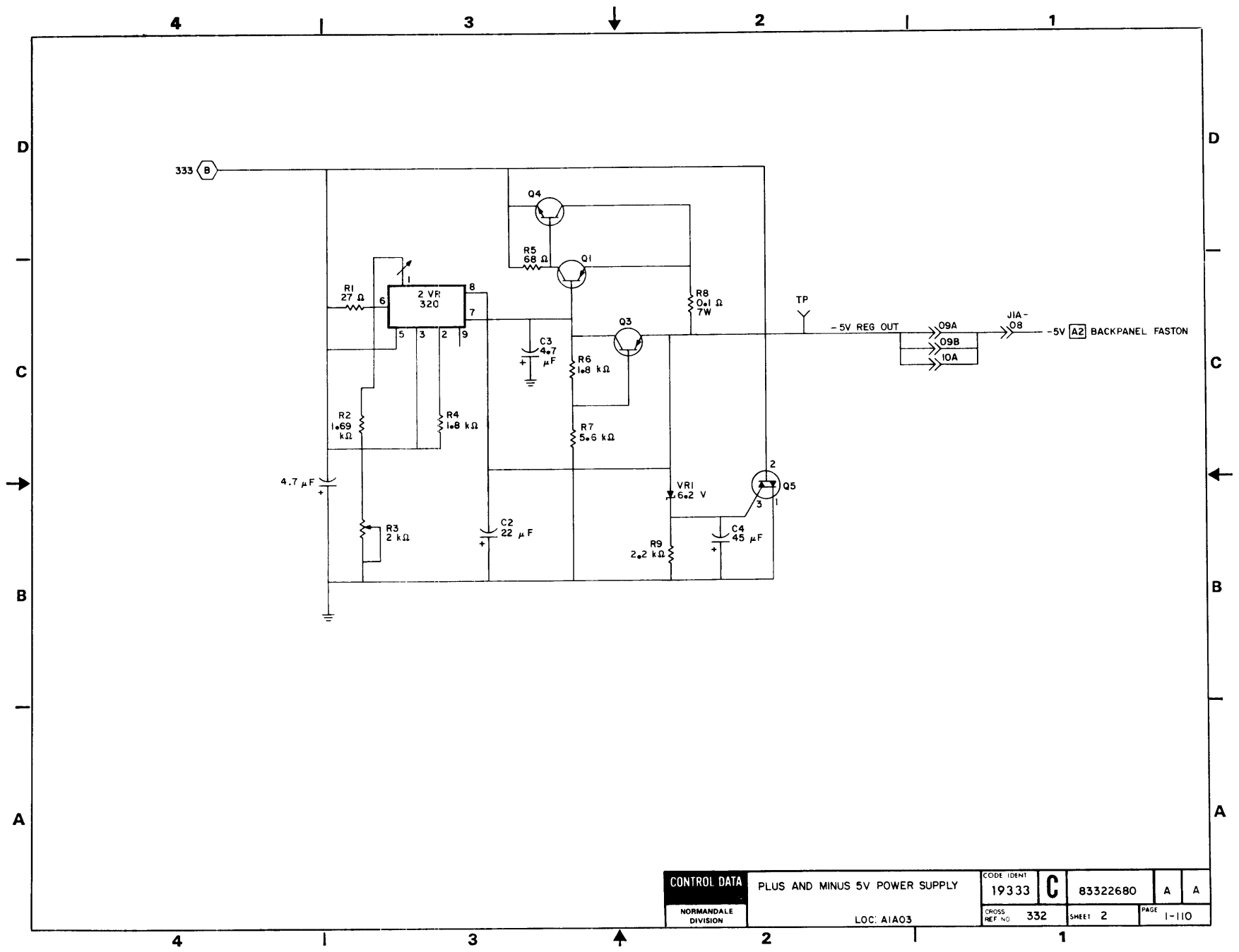


NOTE:
 RELAY FOUND ON P/S MOTHER BOARD.

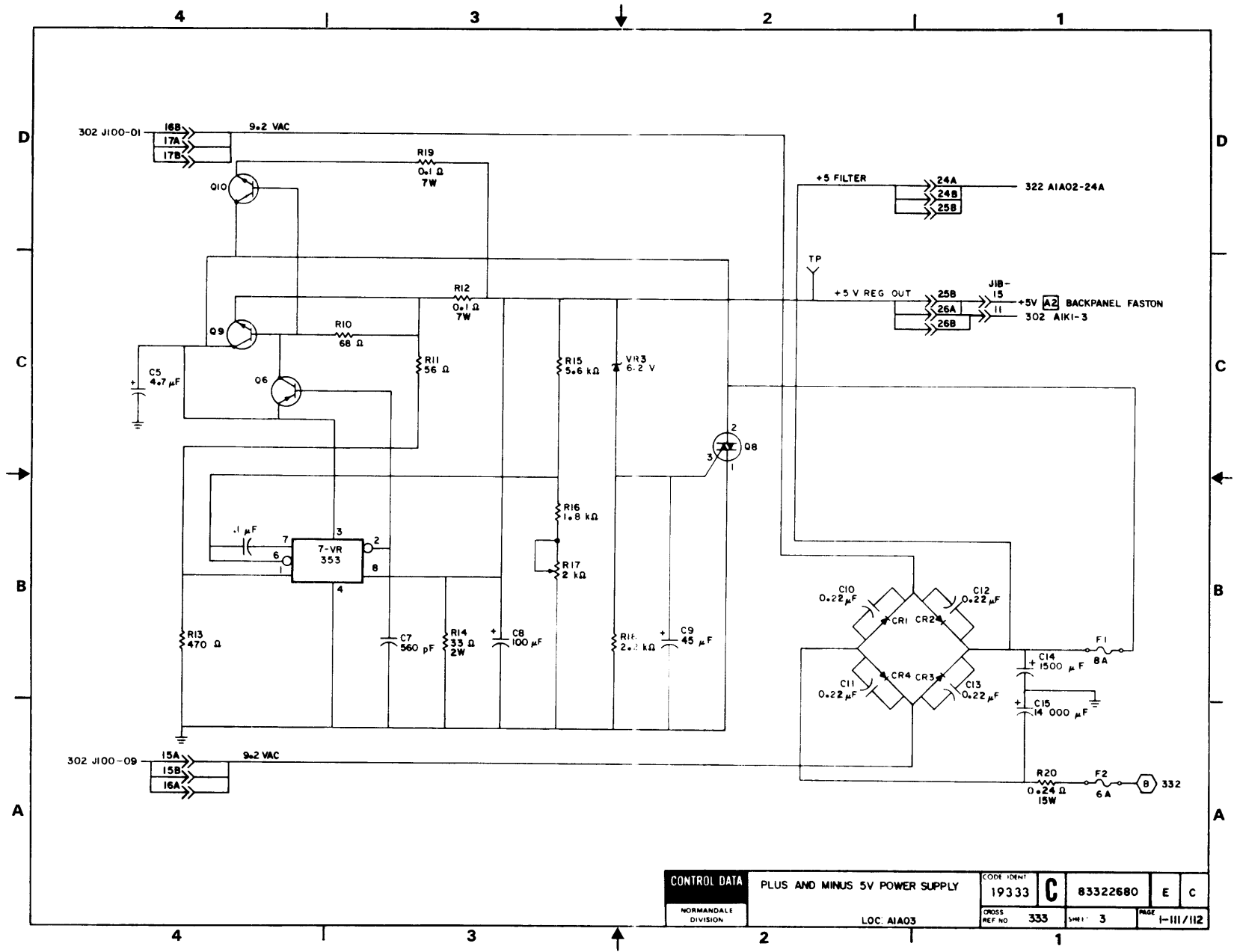
| | | | | | | | |
|--------------|---|------------|--------------|---|----------|---|---|
| CONTROL DATA | PLUS AND MINUS 42 VOLT SUPPLY AND EMERGENCY RETRACT | | CODE IDENT | C | 83322680 | B | A |
| | NORMANDEALE DIVISION | LOC: AIAOI | CROSS REF NO | | | | |



| | | | | | | |
|----------------------|--|--------------|-----|----------|---|-------|
| CONTROL DATA | PLUS AND MINUS 12V AND PLUS AND MINUS 20V POWER SUPPLY | CODE IDENT | C | 83322680 | A | A |
| | | 19333 | | | | |
| NORMANDEALE DIVISION | LOC: AIA02 | CROSS REF NO | 322 | SHEET | 2 | PAGE |
| | | | | | | 1-108 |

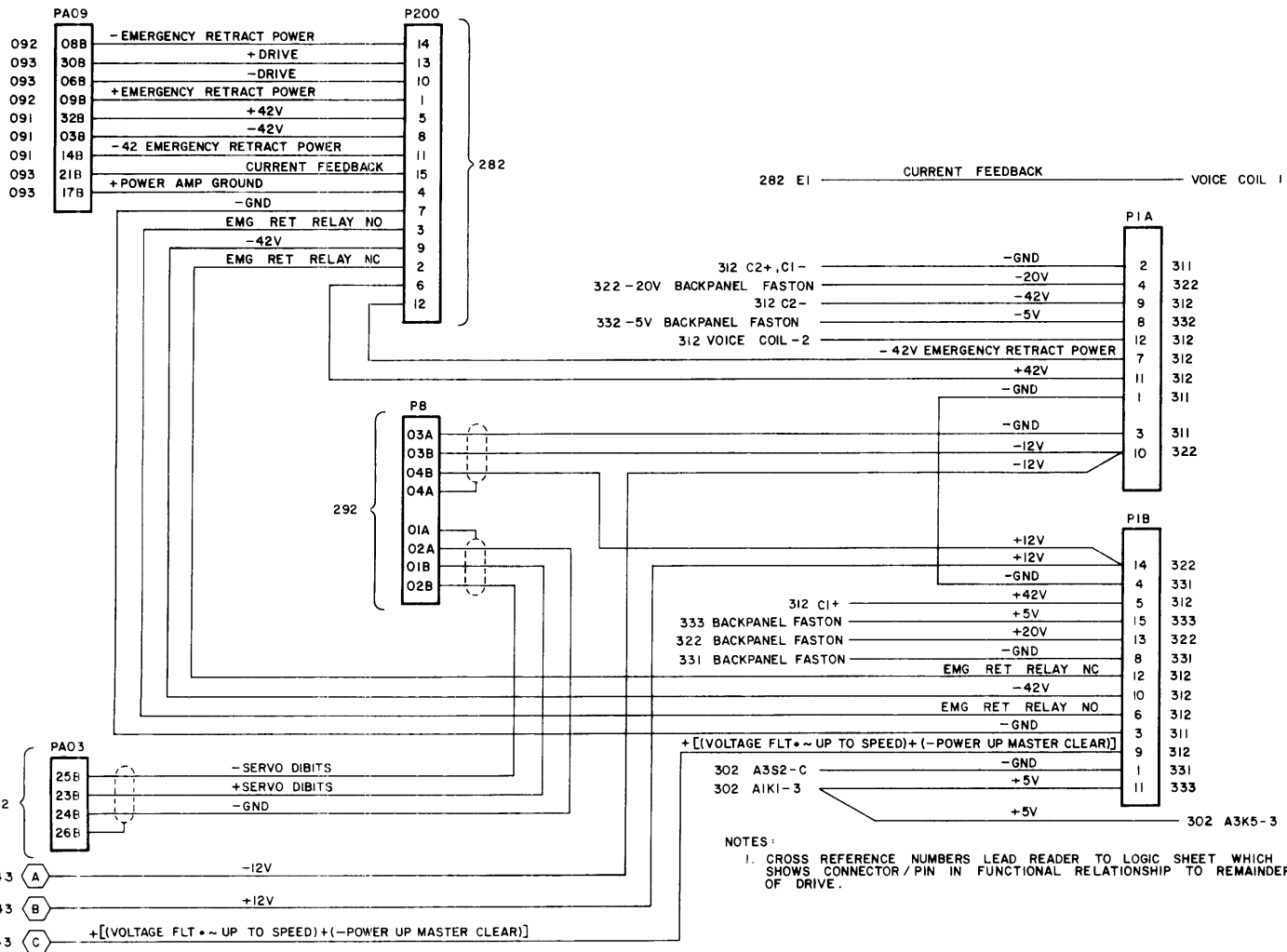


| | | | | | | | |
|--------------|--------------------------------|------------|--------------|-----|----------|------|-------|
| CONTROL DATA | PLUS AND MINUS 5V POWER SUPPLY | CODE IDENT | 19333 | C | 83322680 | A | A |
| | NORMANDEALE DIVISION | LOC: AIA03 | CROSS REF NO | 332 | SHEET 2 | PAGE | 1-110 |



| | | | | | | | |
|--------------|--------------------------------|------------|--------------|-----|----------|---|------|
| CONTROL DATA | PLUS AND MINUS 5V POWER SUPPLY | COD. IDENT | 19333 | C | 83322680 | E | C |
| | NORMANDEALE DIVISION | LOC. A1A03 | CROSS REF NO | 333 | SHEET | 3 | PAGE |

W3



CONTROL DATA

MAIN HARNESS (W3)
PART 1

CODE IDENT
19333

C

83322680

A

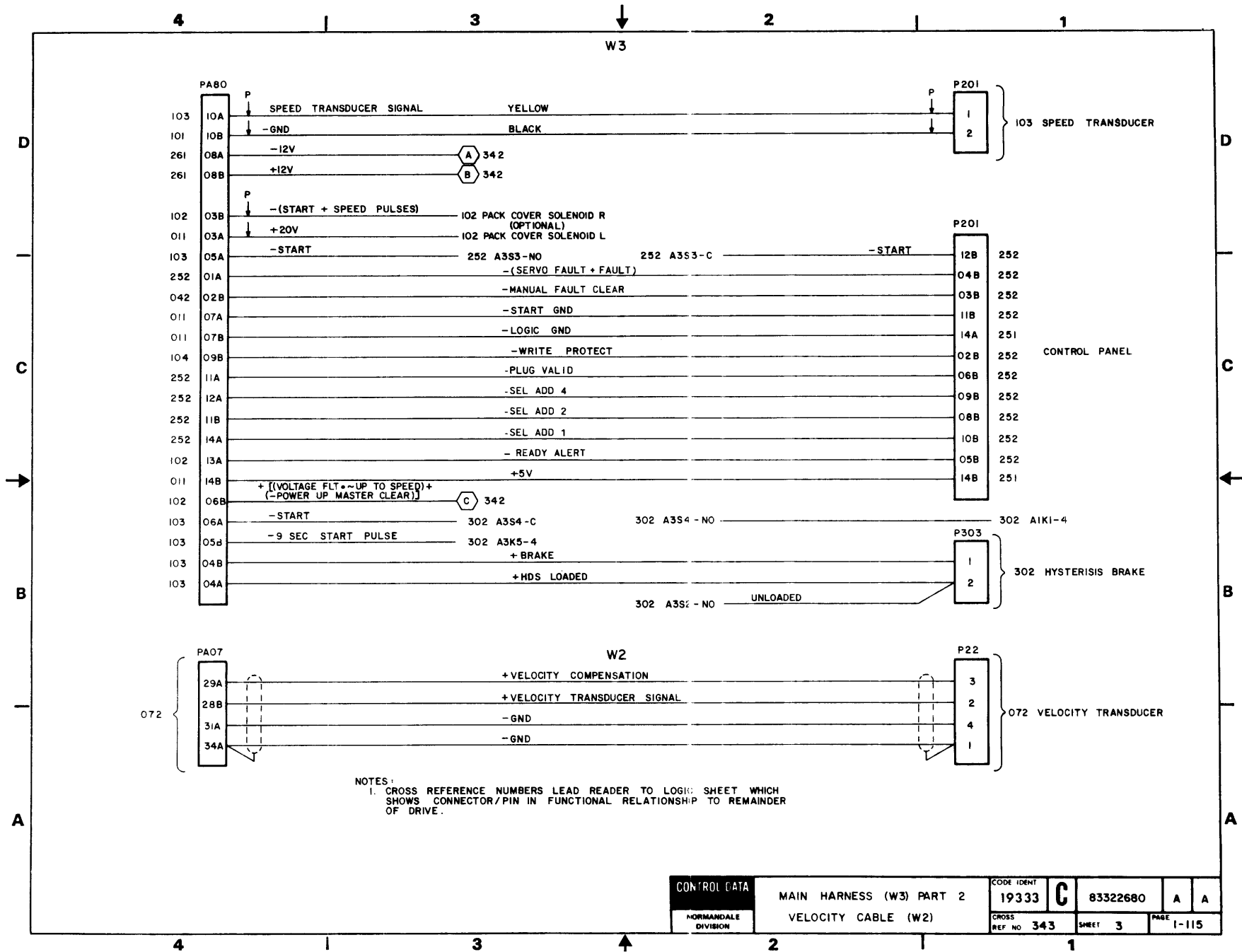
A

NORMANDALE
DIVISION

CROSS
REF 342

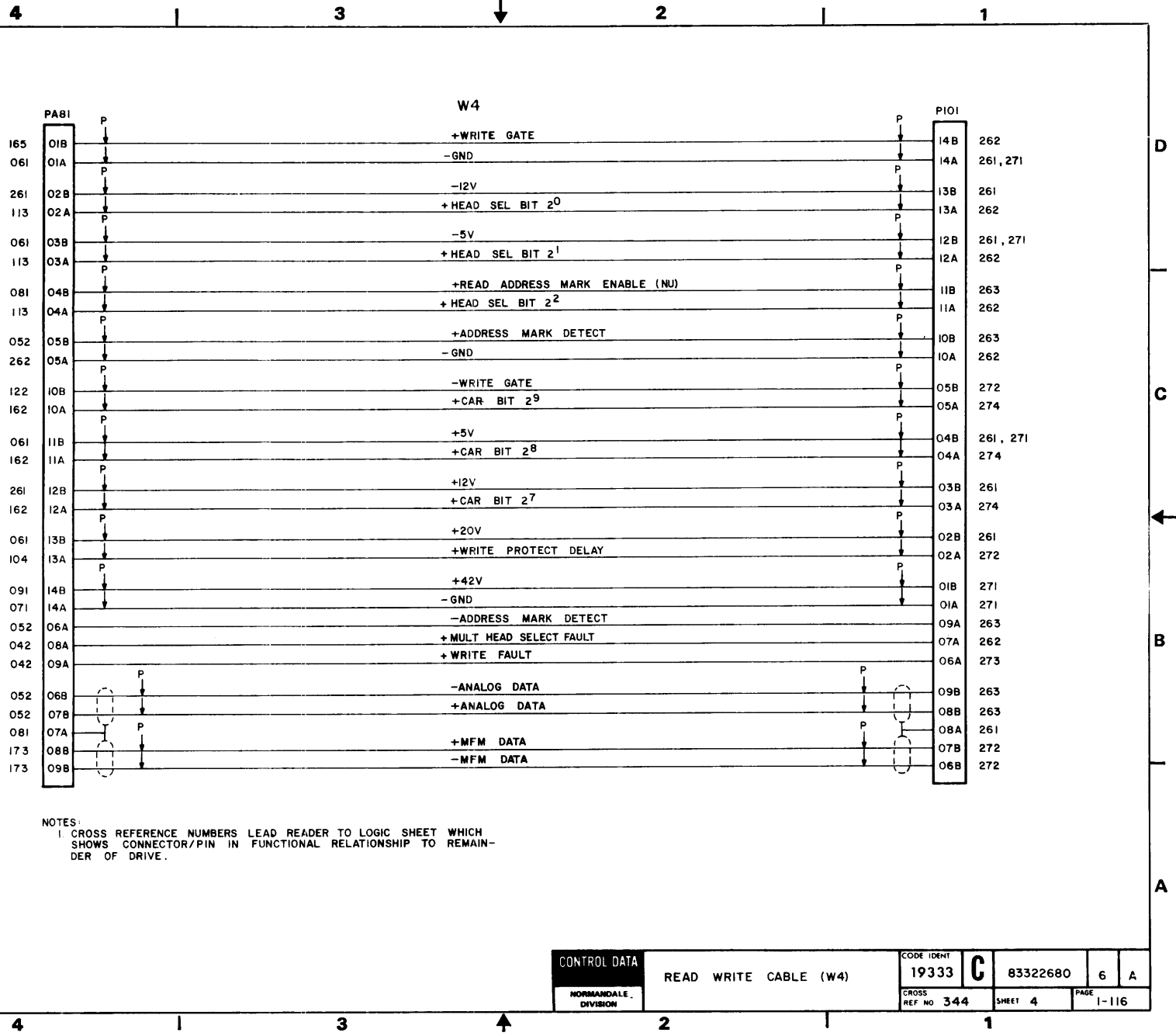
SHEET 2

PAGE 1-114



NOTES:
 1. CROSS REFERENCE NUMBERS LEAD READER TO LOGIC SHEET WHICH SHOWS CONNECTOR/PIN IN FUNCTIONAL RELATIONSHIP TO REMAINDER OF DRIVE.

| | | | | | | | |
|---|--------------------------|--|---------------------|---|----------|---|---|
| CONTROL DATA NORMANDEALE DIVISION | MAIN HARNESS (W3) PART 2 | | CODE IDENT 19333 | C | 83322680 | A | A |
| | VELOCITY CABLE (W2) | | CROSS REF NO 343 | | | | |



NOTES:
 1. CROSS REFERENCE NUMBERS LEAD READER TO LOGIC SHEET WHICH SHOWS CONNECTOR/PIN IN FUNCTIONAL RELATIONSHIP TO REMAINDER OF DRIVE.

SECTION 2

WIRE LISTS

INTRODUCTION

Section 2 contains the wiring for the backpanels. The first part of section 2 explains how to use the list and identifies the columns shown on the lists. Only the wiring for the backpanel is shown on the wire lists. All other wiring is shown on the cabling diagrams.

READING WIRE LISTS

Wire lists show the origin, destination, and Z level of all wirewrap connections on the logic chassis backpanel. The wires are listed in order of card location and pin number. The lowest numbered card location and pin number are listed first and the highest numbered card location and pin number are listed last. The wire list is a double ended list. This means that all wires will be listed twice: first as the origin, then as the destination. Following is an explanation of all the columns used on the wire list (refer to figure 2-1).

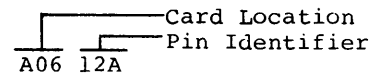
SIGNAL NAME OR NUMBER IDENTIFICATION

The signal name or number identification column is the first column on the wire list. The number shown in this column is for factory use only.

ORIGIN/DESTINATION

The origin column identifies the card location and pin number on which the wire begins. The destination column identifies the opposite end of the wire. Both columns contain a six character number that identifies the exact location of the wire. The first three characters represent the card location. The second three characters represent the pin number on which the wire is attached. Following is a typical example of the number that appears in the Origin/Destination column.

Example:



| TITLE | | | | WL | DOCUMENT NO. | SHEET NO. | REV. |
|--------------------------------------|--------|-------------|---------|-------|--------------|-----------|------|
| WIREWRAP LIST | | | | | LOGIC W/W | 1 of 12 | A |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTINATION | Z LEVEL | NOTES | | | |
| 102111 | A0101B | A0102A | 1 | | | | |
| 102111 | A0102A | A0101B | 1 | | | | |
| 100108 | A0102B | A1708A | 1 | | | | |
| 100211 | A0103A | A0231A | 1 | | | | |
| 100206 | A0230A | A1712A | 1 | | | | |
| 100205 | A0230B | A0612B | 1 | | | | |
| 100203 | A0231A | A1326B | 2 | | | | |
| 100211 | A0231A | A0103A | 1 | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Figure 2-1. Example of Logic Wirewrap List

Z LEVEL

The Z level refers to the position of the wire located on the pin. There are two Z levels on all pins (refer to figure 2-2). Z level 1 identifies the wirewrap connection closer to the surface of the wirewrap panel. Z level 2 identifies the wirewrap connection farthest from the surface of the wirewrap panel. All pins may contain two wires. However, if the pin contains only one wire, that wire will be connected on Z level 1. The same Z level is maintained at both ends of all wirewrap connections.

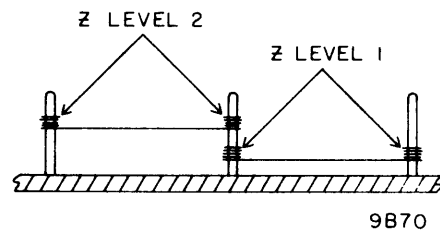


Figure 2-2. Z Levels

NOTES

The notes column is the last column on the wire list. Signal names, history, or other pertinent information is shown in the notes column.

| TITLE | | WL | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|------------------|--------------|-----------|------|
| Logic Wirewrap | | | 77568131 | 1 of 15 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | |
| 100416 | A0101A | JA8007A | 1 | | |
| 100416 | A0101A | JA8007B | 2 | | |
| 300023 | A0101B | A0121B | 1 | | |
| 100305 | A0104B | A0333A | 1 | | |
| 100101 | A0112B | A0221A | 1 | | |
| 100101 | A0112B | A0127B | 2 | | |
| 100105 | A0113B | B0831A | 1 | | |
| 300022 | A0114B | A0234B | 1 | | |
| 300023 | A0121B | A0101B | 1 | | |
| 100304 | A0122B | A0312B | 1 | | |
| 100103 | A0123B | A0623B | 1 | | |
| 100102 | A0124B | A0624B | 1 | | |
| 100104 | A0126B | B0815A | 1 | | |
| 100101 | A0127B | A0112B | 2 | | |
| 100107 | A0130B | B0709A | 1 | | |
| 101020 | A0133B | JA8003A | 1 | | |
| 100417 | A0134B | JA8014B | 1 | | |
| 100309 | A0213B | A0323B | 1 | | |
| 100409 | A0214B | B0103A | 2 | | |
| 100409 | A0214B | A1012B | 2 | | |
| 100308 | A0215B | A0325B | 1 | | |
| 300024 | A0216B | A0231A | 2 | | |
| 200621 | A0217A | B0633B | 1 | | |
| 100101 | A0221A | B0123B | 2 | | |
| 100101 | A0221A | A0112B | 1 | | |
| 300024 | A0222B | A0234A | 2 | | |
| 200221 | A0223A | B0117B | 1 | | |
| 200217 | A0223B | B0203A | 1 | | |
| 200217 | A0223B | H0625A | 2 | | |
| 200208 | A0224A | B0224B | 2 | | |
| 200218 | A0224B | B0232B | 1 | | |
| 200206 | A0225A | B0122B | 1 | | |
| 200204 | A0225B | B0116A | 1 | | |
| 200216 | A0226A | B0225A | 2 | | |
| 200202 | A0226B | B0631A | 1 | | |
| 200214 | A0227A | B0226A | 2 | | |
| 200210 | A0228A | B0226B | 2 | | |
| 100406 | A0228B | A0426B | 2 | | |
| 200212 | A0229A | B0225B | 2 | | |
| 200915 | A0230B | B0107B | 1 | | |
| 300024 | A0231A | A0234A | 1 | | |
| 300024 | A0231A | A0216B | 2 | | |
| 200220 | A0232A | B0232A | 2 | | |
| 300024 | A0234A | A0231A | 1 | | |
| 300024 | A0234A | A0222B | 2 | | |
| 300022 | A0234B | A0114B | 1 | | |
| 100301 | A0307B | B0928B | 1 | | |
| 100302 | A0308B | B0927B | 1 | | |
| 100303 | A0309B | A0826B | 1 | | |
| 100307 | A0311B | B0804A | 1 | | |
| 100304 | A0312B | A0122B | 1 | | |

| TITLE | | WL | DOCUMENT NO. | SHEET NO. | REV. |
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| Logic Wirewrap | | | 77568131 | 2 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | |
| 100309 | A0323B | A0213B | 1 | | |
| 100308 | A0325B | A0215B | 1 | | |
| 200926 | A0327B | B0913B | 2 | | |
| 100306 | A0332A | B0805B | 1 | | |
| 100305 | A0333A | A0104B | 1 | | |
| 100305 | A0333A | B0822B | 2 | | |
| 100418 | A0403B | A0903B | 1 | | |
| 200802 | A0405A | B0104A | 2 | | |
| 100403 | A0407A | A1015B | 2 | | |
| 100403 | A0407A | A0528B | 1 | | |
| 300007 | A0408A | A0409B | 2 | | |
| 100401 | A0408B | B0107A | 1 | | |
| 100410 | A0409A | JA8002B | 1 | | |
| 300007 | A0409B | A0408A | 2 | | |
| 300007 | A0409B | JA8109A | 1 | | |
| 200904 | A0410A | B0903B | 1 | | |
| 200222 | A0410B | B0202B | 2 | | |
| 100404 | A0411B | A0707A | 1 | | |
| 100404 | A0411B | JA8001A | 2 | | |
| 200209 | A0412A | B0230A | 1 | | |
| 100405 | A0412B | A1027B | 2 | | |
| 100405 | A0412B | JA8013A | 1 | | |
| 200201 | A0413A | JA8110B | 1 | | |
| 200201 | A0413A | B0227B | 2 | | |
| 200203 | A0413B | A0531B | 2 | | |
| 200203 | A0413B | B0229A | 1 | | |
| 100402 | A0414A | B0931B | 1 | | |
| 300001 | A0414B | JA8108A | 1 | | |
| 200914 | A0415A | JA8005A | 2 | | |
| 100407 | A0415B | A1023B | 1 | | |
| 200914 | A0416A | A0428B | 1 | | |
| 101010 | A0416B | A1021A | 1 | | |
| 100414 | A0417A | JA8011B | 1 | | |
| 100413 | A0417B | JA8012A | 1 | | |
| 100419 | A0421A | JA8226A | 1 | | |
| 100420 | A0421B | JA8226B | 1 | | |
| 100415 | A0422B | JA8014A | 1 | | |
| 100421 | A0423A | JA8222A | 1 | | |
| 100422 | A0423B | JA8222B | 1 | | |
| 200814 | A0424A | B0809A | 1 | | |
| 101002 | A0424B | A1021B | 1 | | |
| 200919 | A0425B | B0817B | 2 | | |
| 300025 | A0426A | A1013A | 2 | | |
| 100406 | A0426B | B0124B | 1 | | |
| 100406 | A0426B | A0228B | 2 | | |
| 100423 | A0427A | JA8241A | 1 | | |
| 100424 | A0427B | JA8241B | 1 | | |
| 100412 | A0428A | JA8011A | 1 | | |
| 200914 | A0428B | A0416A | 1 | | |
| 100425 | A0429A | JA8223A | 1 | | |
| 100426 | A0429B | JA8223B | 1 | | |
| 100427 | A0430A | JA8224A | 1 | | |

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|--|--------|------------------|------------|--------------------------|----------------|------------|
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | | |
| 100428 | A0430B | JA8224B | 1 | | | |
| 100429 | A0431A | JA8242A | 1 | | | |
| 100430 | A0431B | JA8242B | 1 | | | |
| 100432 | A0432A | JA8228A | 1 | | | |
| 100417 | A0432B | A0932B | 1 | | | |
| 100432 | A0433A | JA8228B | 1 | | | |
| 200222 | A0501A | A0524B | 1 | | | |
| 100502 | A0503B | A0610B | 1 | | | |
| 100501 | A0504B | A0609B | 1 | | | |
| 300003 | A0507B | JA8107B | 1 | | | |
| 300002 | A0508B | JA8106B | 1 | | | |
| 300004 | A0521B | JA8105B | 1 | | | |
| 300005 | A0522B | JA8106A | 1 | | | |
| 200222 | A0524B | A0501A | 1 | | | |
| 200211 | A0527B | B0121B | 1 | | | |
| 100403 | A0528B | A0407A | 1 | | | |
| 100503 | A0530B | A0622B | 1 | | | |
| 200203 | A0531B | A0612B | 1 | | | |
| 200203 | A0531B | A0413B | 2 | | | |
| 300013 | A0601A | JA8101A | 1 | | | |
| 300019 | A0601B | JA8103B | 1 | | | |
| 200219 | A0603B | B0233A | 1 | | | |
| 200215 | A0604B | B0231B | 1 | | | |
| 100501 | A0609B | A0504B | 1 | | | |
| 100502 | A0610B | A0503B | 1 | | | |
| 200203 | A0612B | A0531B | 1 | | | |
| 100503 | A0622B | A0530B | 1 | | | |
| 100103 | A0623B | A0123B | 1 | | | |
| 100102 | A0624B | A0124B | 1 | | | |
| 200325 | A0626B | B0131B | 1 | | | |
| 100601 | A0627B | B0131A | 1 | | | |
| 300021 | A0633B | JA8113B | 1 | | | |
| 300020 | A0634B | JA8111B | 1 | | | |
| 300014 | A0701A | JA8114A | 1 | | | |
| 200918 | A0702A | B0931A | 1 | | | |
| 100404 | A0707A | A0411B | 1 | | | |
| 100404 | A0707A | B0933B | 2 | | | |
| 200922 | A0707B | B0929B | 1 | | | |
| 200923 | A0708A | B0912B | 1 | | | |
| 200911 | A0710A | B0913A | 1 | | | |
| 200610 | A0711B | B0602A | 1 | | | |
| 200612 | A0712B | B0603A | 1 | | | |
| 200613 | A0713A | B0604A | 1 | | | |
| 200616 | A0713B | B0610A | 1 | | | |
| 200617 | A0715A | B0609B | 1 | | | |
| 100809 | A0715B | A0826A | 2 | | | |
| 200619 | A0716A | B0611B | 1 | | | |
| 200902 | A0716B | A0923B | 2 | | | |
| 200618 | A0717A | B0609A | 1 | | | |
| 200907 | A0717B | B0916A | 1 | | | |
| 200901 | A0721B | A0922B | 2 | | | |
| 200905 | A0722B | B0916B | 1 | | | |

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| Logic Wirewrap | | | | 77568131 | 4 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | | |
| 100808 | A0723B | A0809A | 1 | | | |
| 200611 | A0725B | B0602B | 1 | | | |
| 100701 | A0726B | A0928B | 1 | | | |
| 200608 | A0727A | B0604B | 1 | | | |
| 100703 | A0727B | A0808B | 1 | | | |
| 100902 | A0728B | A0912B | 1 | | | |
| 100702 | A0730B | A0802A | 1 | | | |
| 300015 | A0801A | JA8107A | 1 | | | |
| 100702 | A0802A | A0730B | 1 | | | |
| 100801 | A0808A | B0816A | 1 | | | |
| 100703 | A0808B | A0727B | 1 | | | |
| 100808 | A0809A | A0723B | 1 | | | |
| 100802 | A0809B | B0810A | 1 | | | |
| 200924 | A0810B | B0906B | 2 | | | |
| 200924 | A0810B | B0117A | 1 | | | |
| 100804 | A0811A | A0824B | 2 | | | |
| 300804 | A0811B | B0230B | 2 | | | |
| 200908 | A0812A | B0914A | 2 | | | |
| 100807 | A0812B | B0905A | 1 | | | |
| 200910 | A0813A | B0922A | 1 | | | |
| 200913 | A0813B | B0930A | 1 | | | |
| 200804 | A0814B | B0810B | 1 | | | |
| 200903 | A0816A | B0904B | 1 | | | |
| 200207 | A0821A | B0229B | 1 | | | |
| 100306 | A0822A | A0927A | 1 | | | |
| 200205 | A0822B | B0228B | 1 | | | |
| 100805 | A0823A | B0828B | 1 | | | |
| 200906 | A0823B | B0906A | 1 | | | |
| 200211 | A0824A | B0614B | 1 | | | |
| 100804 | A0824B | A0811A | 2 | | | |
| 100803 | A0825A | B0927A | 1 | | | |
| 200925 | A0825B | B0926A | 1 | | | |
| 100809 | A0826A | A0906A | 1 | | | |
| 100809 | A0826A | A0715B | 2 | | | |
| 100303 | A0826B | A0309B | 1 | | | |
| 200912 | A0832A | B0903A | 2 | | | |
| 100901 | A0833A | A0924B | 1 | | | |
| 101011 | A0902A | A1002B | 2 | | | |
| 101011 | A0902B | A1002B | 1 | | | |
| 100418 | A0903A | A0903B | 2 | | | |
| 100418 | A0903A | A0904A | 1 | | | |
| 100418 | A0903B | A0903A | 2 | | | |
| 100418 | A0903B | A0403B | 1 | | | |
| 100418 | A0904A | A0903A | 1 | | | |
| 100418 | A0904A | A0904B | 2 | | | |
| 100418 | A0904B | A0904A | 2 | | | |
| 100809 | A0906A | A0826A | 1 | | | |
| 100902 | A0912B | A0728B | 1 | | | |
| 200922 | A0915B | B0925A | 1 | | | |
| 200926 | A0916B | A1017B | 1 | | | |
| 200921 | A0916B | B0921B | 2 | | | |
| 200901 | A0922B | B0908A | 1 | | | |

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|--|--------|------------------|------------|--------------------------|----------------|------------|
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | | |
| 200901 | A0922B | A0721B | 2 | | | |
| 200902 | A0923B | B0907A | 1 | | | |
| 200902 | A0923B | A0716B | 2 | | | |
| 100901 | A0924B | B0915A | 2 | | | |
| 100901 | A0924B | A0833A | 1 | | | |
| 200926 | A0925B | B0812A | 2 | | | |
| 200926 | A0925B | B0913B | 1 | | | |
| 200609 | A0926B | B0617B | 1 | | | |
| 100806 | A0927A | A0822A | 1 | | | |
| 200909 | A0927B | B0930B | 1 | | | |
| 100701 | A0928B | A0726B | 1 | | | |
| 300018 | A0931A | A0932A | 1 | | | |
| 300018 | A0931A | A0931B | 2 | | | |
| 300018 | A0931B | A0931A | 2 | | | |
| 300018 | A0932A | A1032B | 2 | | | |
| 300018 | A0932A | A0931A | 1 | | | |
| 100417 | A0932B | A0432B | 1 | | | |
| 300018 | A0932B | JA8114B | 2 | | | |
| 101012 | A0933A | A1033B | 2 | | | |
| 101012 | A0933B | A1033B | 1 | | | |
| 300006 | A1001A | JA8105A | 1 | | | |
| 101005 | A1002A | JA8113A | 1 | | | |
| 101011 | A1002B | A0902A | 2 | | | |
| 101011 | A1002B | A0902B | 1 | | | |
| 101009 | A1003A | JA8229B | 1 | | | |
| 101007 | A1004B | JA8229A | 1 | | | |
| 100407 | A1005B | A1023B | 2 | | | |
| 100404 | A1012A | JA8001A | 1 | | | |
| 100409 | A1012B | B0102A | 1 | | | |
| 100409 | A1012B | A0214B | 2 | | | |
| 100409 | A1012B | JA8009B | 1 | | | |
| 300025 | A1013A | A0426A | 2 | | | |
| 101004 | A1014B | B0912A | 1 | | | |
| 100403 | A1015B | A0407A | 2 | | | |
| 101003 | A1017A | B0923B | 1 | | | |
| 200926 | A1017B | A0916B | 1 | | | |
| 101010 | A1021A | A0416B | 1 | | | |
| 101002 | A1021B | A0424B | 1 | | | |
| 101001 | A1022A | B0926B | 1 | | | |
| 100407 | A1023B | A0415B | 1 | | | |
| 100407 | A1023B | A1005B | 2 | | | |
| 101015 | A1026A | JA8006A | 1 | | | |
| 100408 | A1026B | JA8005A | 1 | | | |
| 101018 | A1027A | JA8010A | 1 | | | |
| 100405 | A1027B | A0412B | 2 | | | |
| 101013 | A1028A | JA8005B | 1 | | | |
| 101017 | A1028B | JA8003B | 1 | | | |
| 101014 | A1029A | JA8006B | 1 | | | |
| 101016 | A1029B | JA8004B | 1 | | | |
| 200810 | A1030B | JA8004A | 2 | | | |
| 300018 | A1032B | A0932A | 2 | | | |
| 300018 | A1032B | JA8114B | 1 | | | |

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| Logic Wirewrap | | | 77568131 | 6 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | |
| 101012 | A1033B | A0933A | 2 | | |
| 101012 | A1033B | A0933B | 1 | | |
| 101019 | A1034A | JA8010B | 1 | | |
| 100409 | R0102A | A1012B | 1 | | |
| 100409 | R0102B | B0712B | 1 | | |
| 100409 | R0103A | A0214B | 2 | | |
| 100409 | R0103A | JA8009B | 1 | | |
| 200802 | R0104A | A0405A | 2 | | |
| 200802 | R0104A | B0813B | 1 | | |
| 200801 | R0104B | B0821B | 1 | | |
| 200114 | R0105A | JA8225A | 1 | | |
| 200113 | R0105B | JA8225B | 1 | | |
| 200112 | R0106A | JA8218A | 1 | | |
| 200111 | R0106B | JA8218B | 1 | | |
| 100401 | R0107A | A0408B | 1 | | |
| 200915 | R0107B | B0911A | 2 | | |
| 200915 | R0107B | A0230B | 1 | | |
| 200118 | R0108A | JA8216A | 1 | | |
| 200117 | R0108B | JA8216B | 1 | | |
| 200116 | R0109A | JA8215A | 1 | | |
| 200115 | R0109B | JA8215B | 1 | | |
| 200102 | R0110A | B0710B | 1 | | |
| 200101 | R0110B | B0723B | 1 | | |
| 200132 | R0111A | JA8239B | 1 | | |
| 200131 | R0111B | JA8240A | 1 | | |
| 200134 | R0112A | JA8238B | 1 | | |
| 200133 | R0112B | JA8238A | 1 | | |
| 200814 | R0113A | B0831B | 1 | | |
| 200818 | R0113B | B0824B | 1 | | |
| 200140 | R0114A | JA8221A | 1 | | |
| 200139 | R0114B | JA8221B | 1 | | |
| 200141 | R0115A | JA8230A | 1 | | |
| 200142 | R0115B | JA8230B | 1 | | |
| 200204 | R0116A | A0225B | 1 | | |
| 200204 | R0116A | B0227A | 2 | | |
| 200202 | R0116B | B0121A | 2 | | |
| 200202 | R0116B | B0832B | 1 | | |
| 200924 | R0117A | A0810B | 1 | | |
| 200221 | R0117B | B0202A | 2 | | |
| 200221 | R0117B | A0223A | 1 | | |
| 200202 | R0121A | B0224A | 1 | | |
| 200202 | R0121A | B0116B | 2 | | |
| 200211 | R0121B | A0527B | 1 | | |
| 200110 | R0122A | R0134A | 1 | | |
| 200206 | R0122B | B0228A | 2 | | |
| 200206 | R0122B | A0225A | 1 | | |
| 200815 | R0123A | B0830A | 1 | | |
| 100101 | R0123B | A0221A | 2 | | |
| 200912 | R0124A | B0605B | 2 | | |
| 200912 | R0124A | B0632A | 1 | | |
| 100406 | R0124B | A0426B | 1 | | |
| 200132 | R0125A | JA8219A | 1 | | |

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|--|--------|------------------|------------|-------|--------------------------|----------------|------------|
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | | | |
| 200121 | R0125B | JA8219B | 1 | | | | |
| 200120 | R0126A | JA8217A | 1 | | | | |
| 200119 | R0126B | JA8217B | 1 | | | | |
| 200124 | R0127A | JA8220A | 1 | | | | |
| 200123 | R0127B | JA8220B | 1 | | | | |
| 200126 | R0128A | JA8234A | 1 | | | | |
| 200125 | R0128B | JA8233B | 1 | | | | |
| 200130 | R0129A | JA8237A | 1 | | | | |
| 200129 | R0129B | JA8236B | 1 | | | | |
| 200128 | R0130A | JA8235A | 1 | | | | |
| 200127 | R0130B | JA8235B | 1 | | | | |
| 100601 | R0131A | A0627B | 1 | | | | |
| 200325 | R0131B | A0626B | 1 | | | | |
| 200105 | R0132A | JA8102A | 1 | | | | |
| 200107 | R0132B | JA8104A | 1 | | | | |
| 200106 | R0133B | JA8103A | 1 | | | | |
| 200110 | R0134A | B0122A | 1 | | | | |
| 300012 | R0134A | JA8201B | 2 | | | | |
| 200221 | R0202A | B0117B | 2 | | | | |
| 100404 | R0202B | B0615A | 1 | | | | |
| 200222 | R0202B | A0410B | 2 | | | | |
| 200217 | R0203A | A0223B | 1 | | | | |
| 200258 | R0203B | B0722B | 1 | | | | |
| 200816 | R0204A | B0830B | 1 | | | | |
| 200817 | R0204B | B0829A | 1 | | | | |
| 200261 | R0205A | JA8214A | 1 | | | | |
| 200262 | R0205B | JA8214B | 1 | | | | |
| 200261 | R0206A | JA8227A | 1 | | | | |
| 200264 | R0206B | JA8227B | 1 | | | | |
| 200253 | R0207A | JA8203B | 1 | | | | |
| 200252 | R0207B | JA8203A | 1 | | | | |
| 200259 | R0208A | JA8245A | 1 | | | | |
| 200260 | R0208B | JA8245B | 1 | | | | |
| 200245 | R0209A | JA8212B | 1 | | | | |
| 200244 | R0209B | JA8212A | 1 | | | | |
| 200243 | R0210A | JA8213B | 1 | | | | |
| 200242 | R0210B | JA8213A | 1 | | | | |
| 200249 | R0211A | JA8202B | 1 | | | | |
| 200248 | R0211B | JA8202A | 1 | | | | |
| 200247 | R0212A | JA8201B | 1 | | | | |
| 200246 | R0212B | JA8201A | 1 | | | | |
| 200241 | R0213A | JA8211B | 1 | | | | |
| 200240 | R0213B | JA8211A | 1 | | | | |
| 200239 | R0214A | JA8210B | 1 | | | | |
| 200238 | R0214B | JA8210A | 1 | | | | |
| 200237 | R0215A | JA8209B | 1 | | | | |
| 200236 | R0215B | JA8209A | 1 | | | | |
| 200235 | R0216A | JA8208B | 1 | | | | |
| 200234 | R0216B | JA8208A | 1 | | | | |
| 200233 | R0217A | JA8207B | 1 | | | | |
| 200232 | R0217B | JA8207A | 1 | | | | |
| 200231 | R0221A | JA8206B | 1 | | | | |

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| Logic Wirewrap | | | 77568131 | 8 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | |
| 200230 | R0221B | JA8206A | 1 | | |
| 200229 | B0222A | JA8205B | 1 | | |
| 200228 | B0222B | JA8205A | 1 | | |
| 200227 | B0223A | JA8204B | 1 | | |
| 200226 | B0223B | JA8204A | 1 | | |
| 200202 | B0224A | B0121A | 1 | | |
| 200208 | B0224B | A0224A | 2 | | |
| 200208 | B0224B | B0628B | 1 | | |
| 200216 | B0225A | B0626B | 1 | | |
| 200216 | B0225A | A0226A | 2 | | |
| 200212 | B0225B | B0624A | 1 | | |
| 200212 | B0225B | A0229A | 2 | | |
| 200214 | B0226A | A0227A | 2 | | |
| 200214 | B0226A | B0622B | 1 | | |
| 200210 | B0226B | A0228A | 2 | | |
| 200210 | B0226B | B0629B | 1 | | |
| 200204 | B0227A | B0116A | 2 | | |
| 200204 | B0227A | B0633A | 1 | | |
| 200201 | B0227B | B0616B | 1 | | |
| 200201 | B0227B | A0413A | 2 | | |
| 200206 | B0228A | B0630A | 1 | | |
| 200206 | B0228A | B0122B | 2 | | |
| 200205 | B0228B | A0822B | 1 | | |
| 200203 | B0229A | A0413B | 1 | | |
| 200207 | B0229B | A0821A | 1 | | |
| 200209 | B0230A | A0412A | 1 | | |
| 200213 | B0230B | B0812B | 1 | | |
| 300804 | B0230B | A0811B | 2 | | |
| 200215 | B0231B | A0604B | 1 | | |
| 200220 | B0232A | A0232A | 2 | | |
| 200220 | B0232A | B0606B | 1 | | |
| 200218 | B0232B | A0224B | 1 | | |
| 200218 | B0232B | B0621A | 2 | | |
| 200219 | B0233A | A0603B | 1 | | |
| 200223 | B0233B | B0502A | 1 | | |
| 300012 | B0334A | JA8234B | 1 | | |
| 300012 | B0334A | JA8240B | 2 | | |
| 300012 | B0434A | JA8239A | 1 | | |
| 300012 | B0434A | JA8243A | 2 | | |
| 200223 | B0502A | B0233B | 1 | | |
| 300012 | B0534A | JA8236A | 2 | | |
| 300012 | B0534A | JA8233A | 1 | | |
| 200610 | B0602A | A0711B | 1 | | |
| 200611 | B0602B | A0725B | 1 | | |
| 200612 | B0603A | A0712B | 1 | | |
| 200908 | B0603B | B0914A | 1 | | |
| 200613 | B0604A | A0713A | 1 | | |
| 200608 | B0604B | A0727A | 1 | | |
| 200920 | B0605A | B0910B | 1 | | |
| 200912 | B0605B | B0903A | 1 | | |
| 200912 | B0605B | B0124A | 2 | | |
| 200614 | B0606A | B0917B | 1 | | |

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| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | |
| 200220 | R0606H | B0232A | 1 | | |
| 200606 | R0607A | B0827B | 1 | | |
| 200615 | B0607B | B0922B | 1 | | |
| 200618 | R0609A | A0717A | 1 | | |
| 200617 | R0609B | A0715A | 1 | | |
| 200616 | R0610A | A0713B | 1 | | |
| 200619 | R0611B | A0716A | 1 | | |
| 200601 | R0613A | JAB110A | 1 | | |
| 200604 | R0613B | B0904A | 1 | | |
| 200607 | R0614A | B0914B | 1 | | |
| 200211 | R0614B | A0824A | 1 | | |
| 100404 | R0615A | B0202B | 1 | | |
| 200620 | R0616A | JAB101B | 1 | | |
| 200201 | R0616B | B0712B | 2 | | |
| 200201 | R0616B | B0227B | 1 | | |
| 200609 | R0617B | A0926B | 1 | | |
| 200218 | R0621A | B0232B | 2 | | |
| 200218 | R0621A | B0832A | 1 | | |
| 200214 | R0622B | B0826B | 2 | | |
| 200214 | R0622B | B0226A | 1 | | |
| 200602 | R0623B | JAB111A | 1 | | |
| 200212 | R0624A | B0826A | 2 | | |
| 200212 | R0624A | B0225B | 1 | | |
| 200603 | R0624B | JAB112A | 1 | | |
| 200217 | R0625A | B0833B | 1 | | |
| 200217 | R0625A | A0223B | 2 | | |
| 200916 | R0625B | B0915B | 1 | | |
| 200924 | R0626A | B0817A | 2 | | |
| 200216 | R0626B | B0811B | 2 | | |
| 200216 | R0626B | B0225A | 1 | | |
| 200208 | R0628B | B0224B | 1 | | |
| 200208 | R0628B | B0823B | 2 | | |
| 200210 | R0629B | B0226B | 1 | | |
| 200210 | R0629B | B0822A | 2 | | |
| 200206 | R0630A | B0228A | 1 | | |
| 200206 | R0630A | B0823A | 2 | | |
| 200202 | R0631A | B0832B | 2 | | |
| 200202 | R0631A | A0226B | 1 | | |
| 200912 | R0632A | B0124A | 1 | | |
| 200605 | R0632B | B0910A | 1 | | |
| 200204 | R0633A | B0227A | 1 | | |
| 200204 | R0633A | B0825A | 2 | | |
| 200621 | R0633B | A0217A | 1 | | |
| 200704 | R0701A | B0707B | 1 | | |
| 200704 | R0707B | B0701A | 1 | | |
| 100107 | R0709A | A0130B | 1 | | |
| 200102 | R0710B | B0110A | 1 | | |
| 100409 | R0712B | B0102B | 1 | | |
| 200201 | R0712B | B0616B | 2 | | |
| 200258 | R0722B | B0203B | 1 | | |
| 200101 | R0723B | B0110B | 1 | | |
| 200701 | R0729A | JAB108B | 1 | | |

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| Logic Wirewrap | | | | 77568131 | 10 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | | |
| 200702 | B0729B | JA8109B | 1 | | | |
| 200705 | B0732A | JA8104B | 2 | | | |
| 200705 | B0732B | B0734A | 1 | | | |
| 200705 | B0734A | B0732B | 1 | | | |
| 200812 | B0801A | B0811A | 1 | | | |
| 200819 | B0801A | B0815B | 2 | | | |
| 200820 | B0802A | B0802B | 2 | | | |
| 200820 | B0802A | B0803B | 1 | | | |
| 200820 | B0802B | B0802A | 2 | | | |
| 200820 | B0803A | B0808B | 2 | | | |
| 200820 | B0803B | B0802A | 1 | | | |
| 200820 | B0803B | B0808A | 2 | | | |
| 100307 | B0804A | A0311B | 1 | | | |
| 200921 | B0804B | B0921B | 1 | | | |
| 200820 | B0805A | B0808A | 1 | | | |
| 100306 | B0805B | A0332A | 1 | | | |
| 200807 | B0806A | B0911B | 1 | | | |
| 200808 | B0806B | B0924A | 1 | | | |
| 200805 | B0807A | B0932B | 1 | | | |
| 200810 | B0807B | B0925B | 1 | | | |
| 200820 | B0808A | B0803B | 2 | | | |
| 200820 | B0808A | B0805A | 1 | | | |
| 200820 | B0808B | B0803A | 2 | | | |
| 200819 | B0808B | B0809B | 1 | | | |
| 200814 | B0809A | A0424A | 1 | | | |
| 200814 | B0809A | B0813A | 2 | | | |
| 200819 | B0809B | B0808B | 1 | | | |
| 200819 | B0809B | B0814A | 2 | | | |
| 100802 | B0810A | A0809B | 1 | | | |
| 200804 | B0810B | A0814B | 1 | | | |
| 200812 | B0811A | B0801A | 1 | | | |
| 200216 | B0811B | B0626B | 2 | | | |
| 200926 | B0812A | A0925B | 2 | | | |
| 200213 | B0812B | B0230B | 1 | | | |
| 200814 | B0813A | B0809A | 2 | | | |
| 200814 | B0813A | B0814B | 1 | | | |
| 200802 | B0813B | B0104A | 1 | | | |
| 200819 | B0814A | B0809B | 2 | | | |
| 200819 | B0814A | B0815B | 1 | | | |
| 200814 | B0814B | B0813A | 1 | | | |
| 100104 | B0815A | A0126B | 1 | | | |
| 200819 | B0815B | B0801A | 2 | | | |
| 200819 | B0815B | B0814A | 1 | | | |
| 100801 | B0816A | A0808A | 1 | | | |
| 200806 | B0816B | B0902A | 1 | | | |
| 200924 | B0817A | B0906B | 1 | | | |
| 200924 | B0817A | B0626A | 2 | | | |
| 200919 | B0817B | A0425B | 2 | | | |
| 200919 | B0817B | B0907B | 1 | | | |
| 200809 | B0821A | B0917A | 1 | | | |
| 200801 | B0821B | B0104B | 1 | | | |
| 200210 | B0822A | B0629B | 2 | | | |

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|--|-------------------|-------------------|--------------------------|-----------------|------------|
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | |
| 100305 | R0822B | A0333A | 2 | | |
| 200206 | R0823A | B0630A | 2 | | |
| 200208 | R0823B | B0628B | 2 | | |
| 200818 | R0824B | B0113B | 1 | | |
| 200204 | R0825A | B0633A | 2 | | |
| 200212 | R0826A | B0624A | 2 | | |
| 200214 | R0826B | B0622B | 2 | | |
| 200803 | R0827A | B0933A | 1 | | |
| 200606 | R0827B | B0902B | 2 | | |
| 200606 | R0827B | B0607A | 1 | | |
| 100805 | R0828B | A0823A | 1 | | |
| 200817 | R0829A | B0204B | 1 | | |
| 200815 | R0830A | B0123A | 1 | | |
| 200816 | R0830B | B0204A | 1 | | |
| 100105 | R0831A | A0113B | 1 | | |
| 200814 | R0831B | B0113A | 1 | | |
| 200218 | R0832A | B0621A | 1 | | |
| 200202 | R0832B | B0631A | 2 | | |
| 200202 | R0832B | B0116B | 1 | | |
| 200811 | R0833A | B0929A | 1 | | |
| 200217 | R0833B | B0625A | 1 | | |
| 300012 | R0834A | JA8244B | 1 | | |
| 200806 | R0902A | B0816B | 1 | | |
| 200606 | R0902B | B0905B | 1 | | |
| 200606 | R0902B | B0827B | 2 | | |
| 200912 | R0903A | A0832A | 2 | | |
| 200912 | R0903A | B0605B | 1 | | |
| 200904 | R0903B | A0410A | 1 | | |
| 200904 | R0904A | B0613B | 1 | | |
| 200903 | R0904B | A0816A | 1 | | |
| 100807 | R0905A | A0812B | 1 | | |
| 200606 | R0905B | B0902B | 1 | | |
| 200906 | R0906A | A0823B | 1 | | |
| 200924 | R0906B | B0817A | 1 | | |
| 200924 | R0906B | A0810B | 2 | | |
| 200902 | R0907A | A0923B | 1 | | |
| 200919 | R0907B | B0817B | 1 | | |
| 200901 | R0908A | A0922B | 1 | | |
| 200907 | R0909A | B0916A | 2 | | |
| 200605 | R0910A | B0632B | 1 | | |
| 200920 | R0910B | B0605A | 1 | | |
| 200915 | R0911A | B0107B | 2 | | |
| 200807 | R0911B | B0806A | 1 | | |
| 101004 | R0912A | A1014B | 1 | | |
| 200923 | R0912B | A0708A | 1 | | |
| 200911 | R0913A | A0710A | 1 | | |
| 200926 | R0913B | A0327B | 2 | | |
| 200926 | R0913B | A0925B | 1 | | |
| 200908 | R0914A | B0603B | 1 | | |
| 200908 | R0914A | A0812A | 2 | | |
| 200607 | R0914B | B0614A | 1 | | |
| 100901 | R0915A | A0924B | 2 | | |

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| Logic Wirewrap | | | | 77568131 | 12 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | | |
| 200916 | R0915B | B0625B | 1 | | | |
| 200907 | B0916A | A0717B | 1 | | | |
| 200907 | R0916A | B0909A | 2 | | | |
| 200905 | R0916B | A0722B | 1 | | | |
| 200809 | R0917A | B0821A | 1 | | | |
| 200614 | R0917B | B0606A | 1 | | | |
| 200921 | R0921B | A0916B | 2 | | | |
| 200921 | R0921B | B0804B | 1 | | | |
| 200910 | R0922A | A0813A | 1 | | | |
| 200615 | R0922B | B0607B | 1 | | | |
| 200917 | R0923A | B0934A | 1 | | | |
| 101003 | R0923B | A1017A | 1 | | | |
| 200808 | R0924A | B0806B | 1 | | | |
| 200927 | R0924B | JA8004A | 1 | | | |
| 200922 | R0925A | A0915B | 1 | | | |
| 200810 | R0925B | B0807B | 1 | | | |
| 200925 | R0926A | A0825B | 1 | | | |
| 101001 | R0926B | A1022A | 1 | | | |
| 100803 | R0927A | A0825A | 1 | | | |
| 100302 | R0927H | A0308B | 1 | | | |
| 100301 | R0928B | A0307B | 1 | | | |
| 200811 | R0929A | B0833A | 1 | | | |
| 200922 | R0929B | A0707B | 1 | | | |
| 200913 | R0930A | A0813B | 1 | | | |
| 200909 | R0930B | A0927B | 1 | | | |
| 200918 | R0931A | A0702A | 1 | | | |
| 100402 | R0931B | A0414A | 1 | | | |
| 200805 | R0932B | B0807A | 1 | | | |
| 200803 | R0933A | B0827A | 1 | | | |
| 100404 | R0933B | A0707A | 2 | | | |
| 200917 | R0934A | B0923A | 1 | | | |
| 100404 | JA8001A | A1012A | 1 | | | |
| 100404 | JA8001A | A0411B | 2 | | | |
| 100410 | JA8002B | A0409A | 1 | | | |
| 101020 | JA8003A | A0133B | 1 | | | |
| 101017 | JA8003B | A1028B | 1 | | | |
| 200810 | JA8004A | A1030B | 2 | | | |
| 200927 | JA8004A | B0924B | 1 | | | |
| 101016 | JA8004B | A1029B | 1 | | | |
| 100408 | JA8005A | A1026B | 1 | | | |
| 200914 | JA8005A | A0415A | 2 | | | |
| 101013 | JA8005B | A1028A | 1 | | | |
| 101015 | JA8006A | A1026A | 1 | | | |
| 101014 | JA8006B | A1029A | 1 | | | |
| 100416 | JA8007A | A0101A | 1 | | | |
| 100416 | JA8007B | A0101A | 2 | | | |
| 300016 | JA8008A | JA8102B | 1 | | | |
| 300017 | JA8008B | JA8112B | 1 | | | |
| 100409 | JA8009B | B0103A | 1 | | | |
| 100409 | JA8009B | A1012B | 1 | | | |
| 101018 | JA8010A | A1027A | 1 | | | |
| 101019 | JA8010B | A1034A | 1 | | | |

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| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | |
| 100412 | JA8011A | A0428A | 1 | | |
| 100414 | JA8011B | A0417A | 1 | | |
| 100413 | JA8012A | A0417B | 1 | | |
| 100405 | JA8013A | A0412B | 1 | | |
| 100415 | JA8014A | A0422B | 1 | | |
| 100417 | JA8014B | A0134B | 1 | | |
| 300013 | JA8101A | A0601A | 1 | | |
| 200620 | JA8101B | B0616A | 1 | | |
| 200105 | JA8102A | B0132A | 1 | | |
| 300016 | JA8102B | JA8008A | 1 | | |
| 200106 | JA8103A | B0133B | 1 | | |
| 300019 | JA8103B | A0601B | 1 | | |
| 200107 | JA8104A | B0132B | 1 | | |
| 200705 | JA8104B | B0732A | 2 | | |
| 300006 | JA8105A | A1001A | 1 | | |
| 300004 | JA8105B | A0521B | 1 | | |
| 300005 | JA8106A | A0522B | 1 | | |
| 300002 | JA8106B | A0508B | 1 | | |
| 300015 | JA8107A | A0801A | 1 | | |
| 300003 | JA8107B | A0507B | 1 | | |
| 300001 | JA8108A | A0414B | 1 | | |
| 200701 | JA8108B | B0729A | 1 | | |
| 300007 | JA8109A | A0409B | 1 | | |
| 200702 | JA8109B | B0729B | 1 | | |
| 200601 | JA8110A | B0613A | 1 | | |
| 200201 | JA8110B | A0413A | 1 | | |
| 200602 | JA8111A | B0623B | 1 | | |
| 300020 | JA8111B | A0634B | 1 | | |
| 200603 | JA8112A | B0624B | 1 | | |
| 300017 | JA8112B | JA8008B | 1 | | |
| 101005 | JA8113A | A1002A | 1 | | |
| 300021 | JA8113B | A0633B | 1 | | |
| 300014 | JA8114A | A0701A | 1 | | |
| 300018 | JA8114B | A0932B | 2 | | |
| 300018 | JA8114B | A1032B | 1 | | |
| 200246 | JA8201A | B0212B | 1 | | |
| 200247 | JA8201B | B0212A | 1 | | |
| 300012 | JA8201B | B0134A | 2 | | |
| 200248 | JA8202A | B0211B | 1 | | |
| 200249 | JA8202B | B0211A | 1 | | |
| 200252 | JA8203A | B0207B | 1 | | |
| 200253 | JA8203B | B0207A | 1 | | |
| 200226 | JA8204A | B0223B | 1 | | |
| 200227 | JA8204B | B0223A | 1 | | |
| 200228 | JA8205A | B0222B | 1 | | |
| 200229 | JA8205B | B0222A | 1 | | |
| 200230 | JA8206A | B0221B | 1 | | |
| 200231 | JA8206B | B0221A | 1 | | |
| 200232 | JA8207A | B0217B | 1 | | |
| 200233 | JA8207B | B0217A | 1 | | |
| 200234 | JA8208A | B0216B | 1 | | |
| 200235 | JA8208B | B0216A | 1 | | |

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| Logic Wirewrap | | | | 77568131 | 14 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | | |
| 200236 | JA8209A | B0215B | 1 | | | |
| 200237 | JA8209B | B0215A | 1 | | | |
| 200238 | JA8210A | B0214B | 1 | | | |
| 200239 | JA8210B | B0214A | 1 | | | |
| 200240 | JA8211A | B0213B | 1 | | | |
| 200241 | JA8211B | B0213A | 1 | | | |
| 200244 | JA8212A | B0209B | 1 | | | |
| 200245 | JA8212B | B0209A | 1 | | | |
| 200242 | JA8213A | B0210B | 1 | | | |
| 200243 | JA8213B | B0210A | 1 | | | |
| 200261 | JA8214A | B0205A | 1 | | | |
| 200262 | JA8214B | B0205B | 1 | | | |
| 200116 | JA8215A | B0109A | 1 | | | |
| 200115 | JA8215B | B0109B | 1 | | | |
| 200118 | JA8216A | B0108A | 1 | | | |
| 200117 | JA8216B | B0108B | 1 | | | |
| 200120 | JA8217A | B0126A | 1 | | | |
| 200119 | JA8217B | B0126B | 1 | | | |
| 200112 | JA8218A | B0106A | 1 | | | |
| 200111 | JA8218B | B0106B | 1 | | | |
| 200122 | JA8219A | B0125A | 1 | | | |
| 200121 | JA8219B | B0125B | 1 | | | |
| 200124 | JA8220A | B0127A | 1 | | | |
| 200123 | JA8220B | B0127B | 1 | | | |
| 200140 | JA8221A | B0114A | 1 | | | |
| 200139 | JA8221B | B0114B | 1 | | | |
| 100421 | JA8222A | A0423A | 1 | | | |
| 100422 | JA8222B | A0423B | 1 | | | |
| 100425 | JA8223A | A0429A | 1 | | | |
| 100426 | JA8223B | A0429B | 1 | | | |
| 100427 | JA8224A | A0430A | 1 | | | |
| 100428 | JA8224B | A0430B | 1 | | | |
| 200114 | JA8225A | B0105A | 1 | | | |
| 200113 | JA8225B | B0105B | 1 | | | |
| 100419 | JA8226A | A0421A | 1 | | | |
| 100420 | JA8226B | A0421B | 1 | | | |
| 200261 | JA8227A | B0206A | 1 | | | |
| 200264 | JA8227B | B0206B | 1 | | | |
| 100432 | JA8228A | A0432A | 1 | | | |
| 100432 | JA8228B | A0433A | 1 | | | |
| 101007 | JA8229A | A1004B | 1 | | | |
| 101009 | JA8229B | A1003A | 1 | | | |
| 200141 | JA8230A | B0115A | 1 | | | |
| 200142 | JA8230B | B0115B | 1 | | | |
| 300012 | JA8233A | B0534A | 1 | | | |
| 200125 | JA8233B | B0128B | 1 | | | |
| 200126 | JA8234A | B0128A | 1 | | | |
| 300012 | JA8234B | B0334A | 1 | | | |
| 200128 | JA8235A | B0130A | 1 | | | |
| 200127 | JA8235B | B0130B | 1 | | | |
| 300012 | JA8236A | B0534A | 2 | | | |
| 200129 | JA8236B | B0129B | 1 | | | |

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| Logic Wirewrap | | | | 77568131 | 15 | AC |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTI- NATION | Z LEVEL | NOTES | | |
| 200130 | JA8237A | B0129A | 1 | | | |
| 200133 | JA8238A | B0112B | 1 | | | |
| 200134 | JA8238B | B0112A | 1 | | | |
| 300012 | JA8239A | B0434A | 1 | | | |
| 200132 | JA8239B | B0111A | 1 | | | |
| 200131 | JA8240A | B0111B | 1 | | | |
| 300012 | JA8240B | B0334A | 2 | | | |
| 100423 | JA8241A | A0427A | 1 | | | |
| 100424 | JA8241B | A0427B | 1 | | | |
| 100429 | JA8242A | A0431A | 1 | | | |
| 100430 | JA8242B | A0431B | 1 | | | |
| 300012 | JA8243A | B0434A | 2 | | | |
| 300012 | JA8244B | B0834A | 1 | | | |
| 200259 | JA8245A | B0208A | 1 | | | |
| 200260 | JA8245H | B0208B | 1 | | | |

There is no Section 3

SECTION 4
COMPONENT LAYOUTS,
SMD LOGIC CARDS

The diagrams in this section show the physical placement of the components on each of the logic cards in the SMD. For purposes of this discussion, ICs and transistors are called major components, whereas the resistors, diodes and capacitors associated with those major components are called discrete components. The component identifiers match those shown in the logic diagram set for that card.

MAJOR-COMPONENT IDENTIFICATION

Dual-in-line IC packages (DIPs) are identified by their coordinate grid locations, A1 through E4, as defined in the diagrams section of volume 2 of the SMD hardware maintenance manual. Other major components, including transistors and non-DIP ICs, are identified by a number (which has no location significance), preceded by a mnemonic code such as Q (transistor), AR (amplifier), and so on.

In this scheme, the number in the major component identifier is unique. That is, the non-grid-oriented (non-DIP) major components on a card may be labelled

Q1, Q2, AR3, Q4, AR5, etc.,

but not

Q1, Q2, AR3, Q3...

since the number 3 would be used twice, and that is not allowed in this scheme.

DISCRETE-COMPONENT IDENTIFICATION

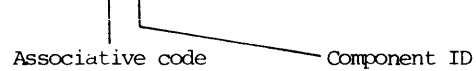
Discrete components, in addition to their normal identification such as R1, R2, C1, and so on, are prefixed by an associative code that reflects their application, as explained below.

POWER SUPPLY COMPONENTS

Discrete components (on a card) that are associated with the power supplies carry an

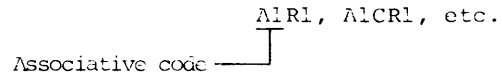
associative code of 98 or 99:

98C1, 98R1, etc: -V supply
 99R1, 99VR1, etc: +V supply



DIP COMPONENTS

Discrete components associated with the grid-oriented ICs carry the alphanumeric grid coordinates as their associative code. The first character, therefore, is always a letter:



Usually the associative code also implies the approximate physical location of the discrete component, but this is not a hard and fast rule.

NON-DIP COMPONENTS

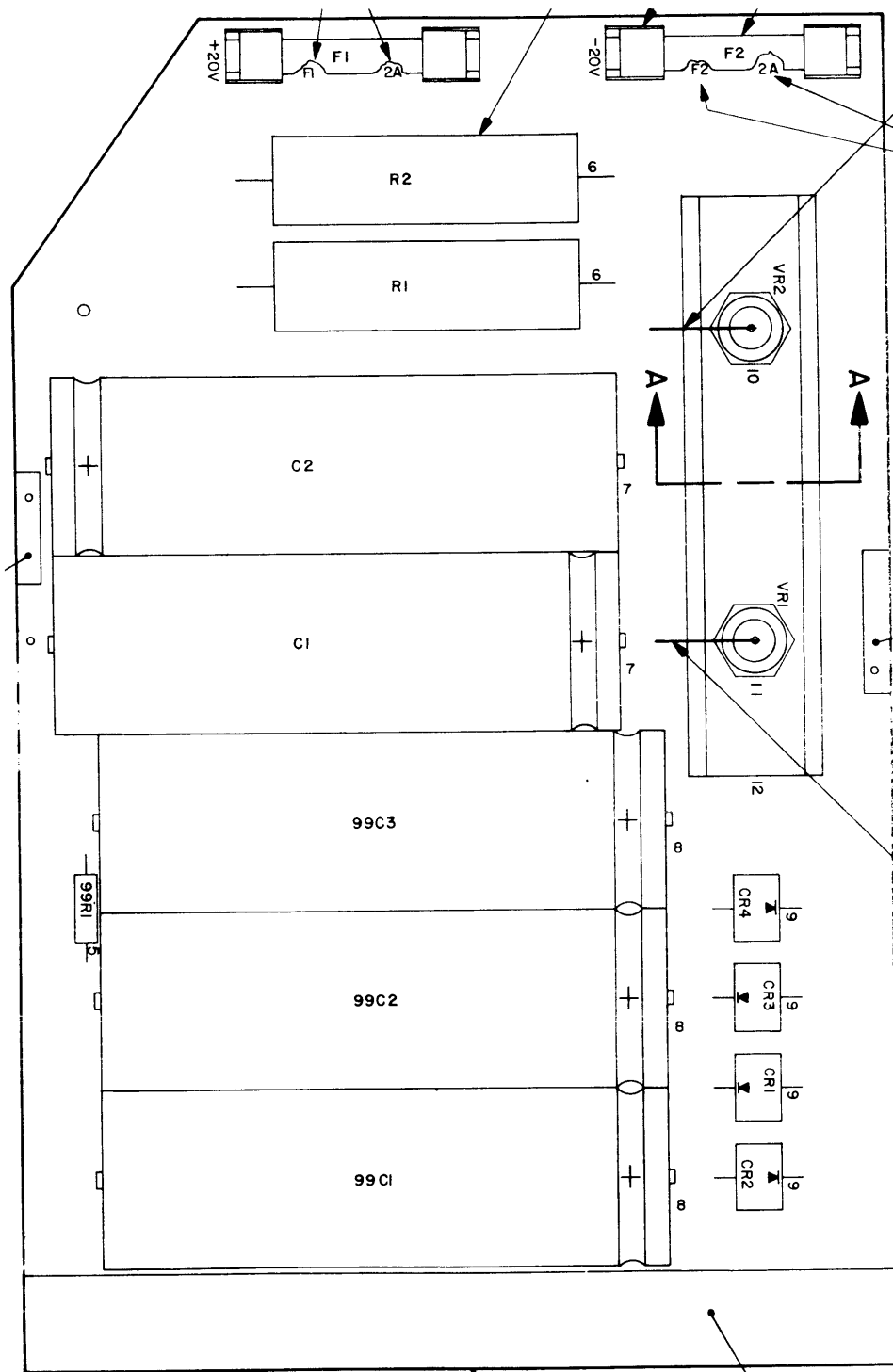
Discrete components associated with transistors or other non-grid-oriented major components carry the "uniqueness" number of that major component as their associative code:



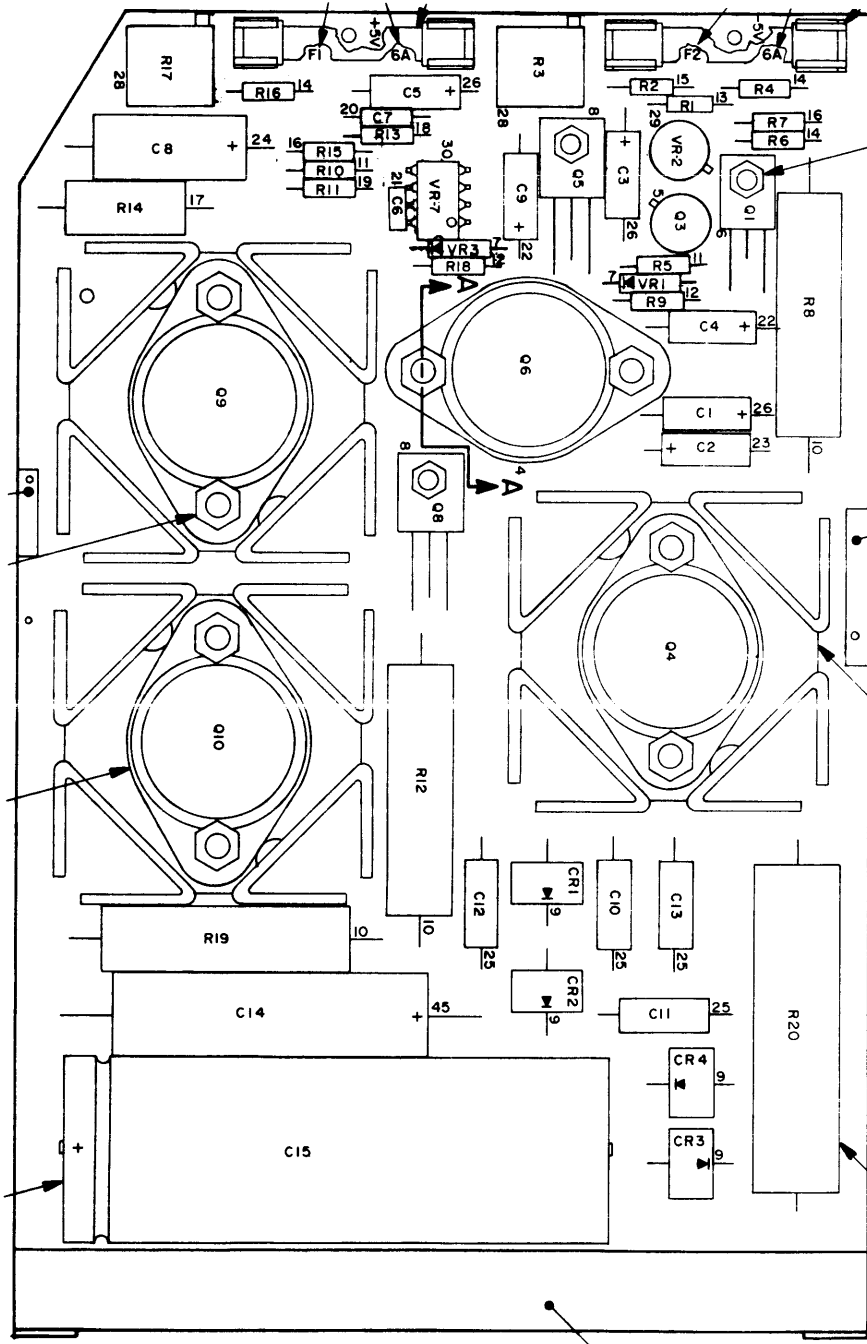
Again, the associative code does not necessarily mean that the discrete components will be physically clustered around the corresponding major component.

NOTE

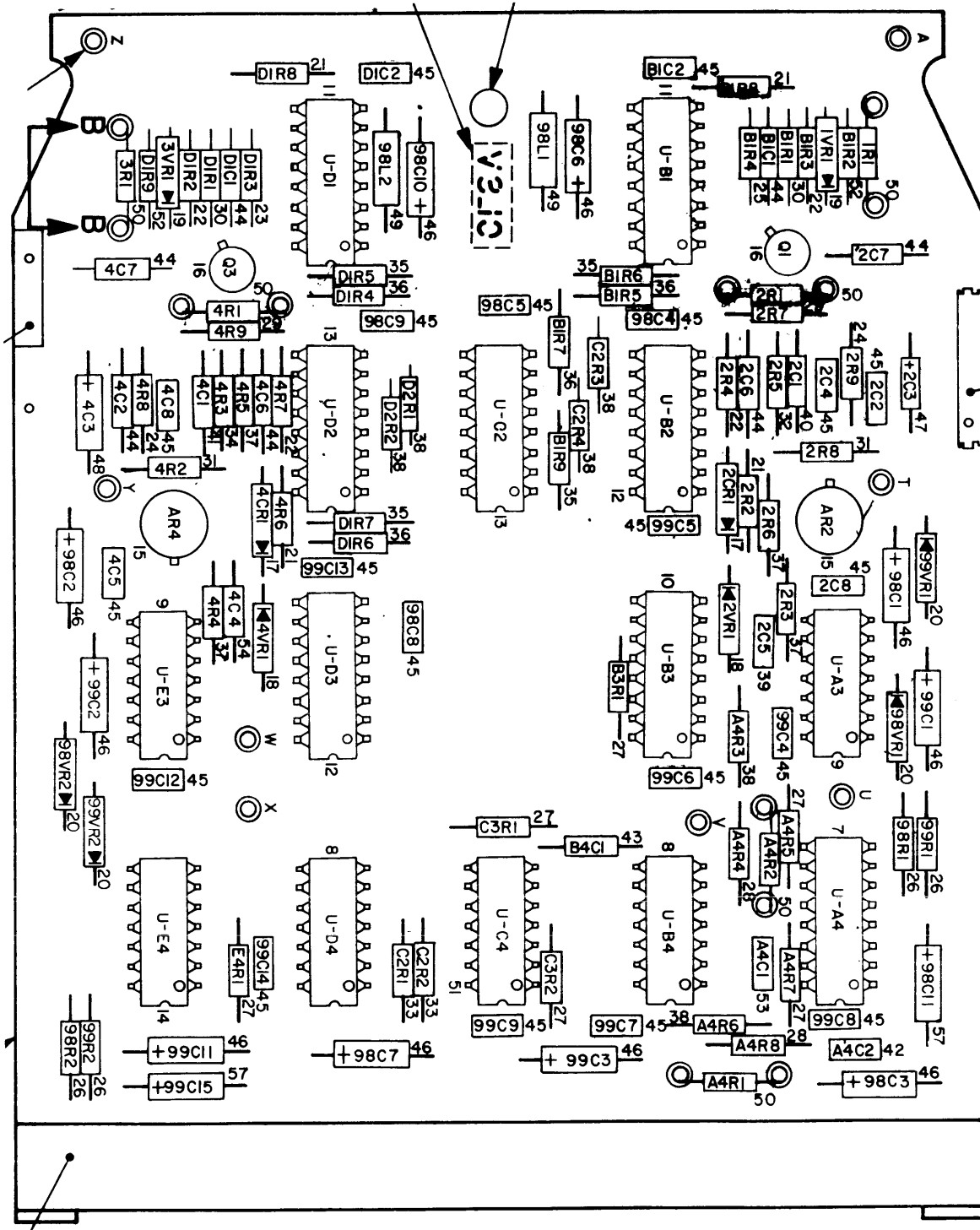
Numbers adjacent to the components are "find" numbers from the parts list used during card assembly. Disregard them. Also, note that the grid-oriented major components carry a U-prefix.



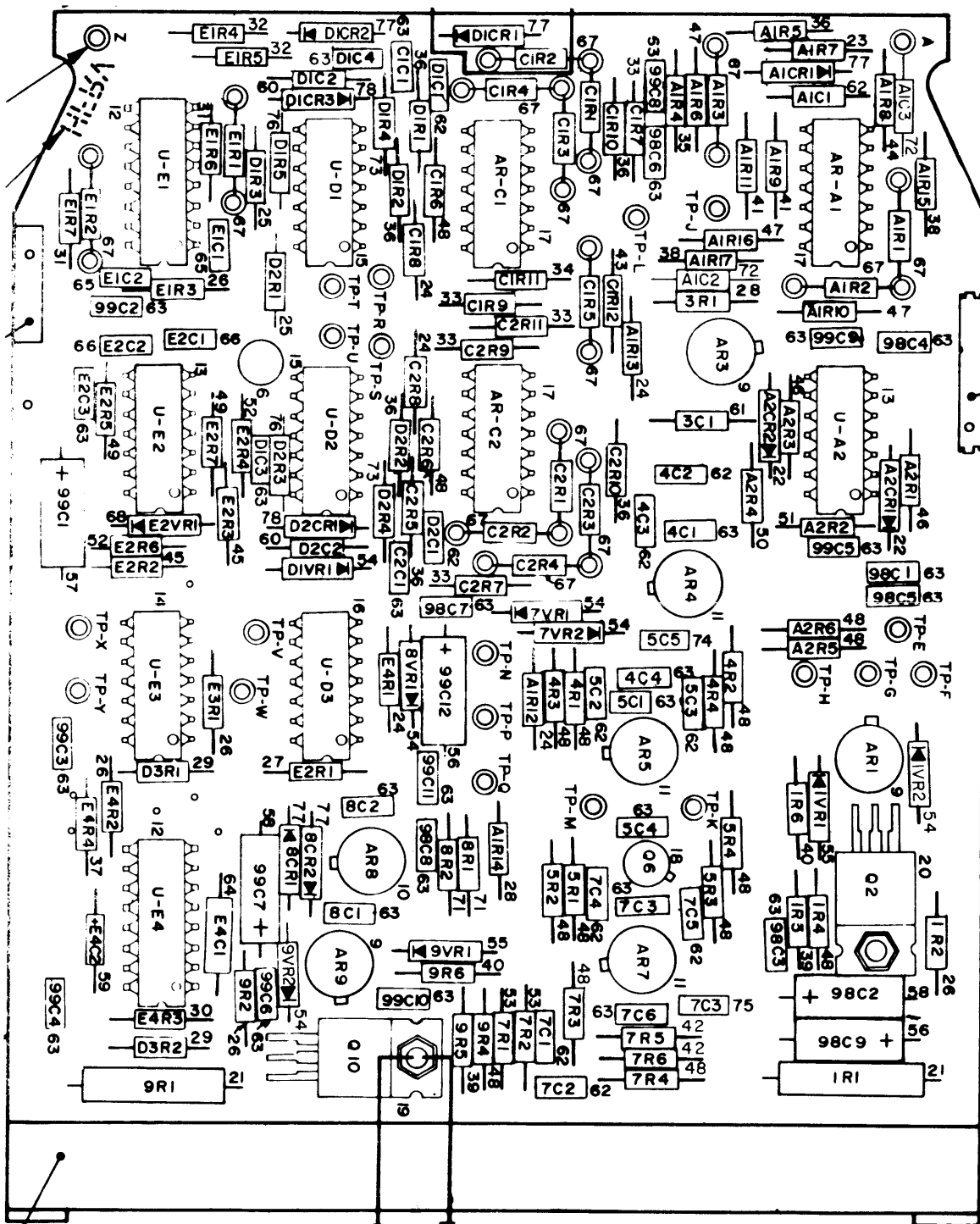
A1A02 (5SKV)



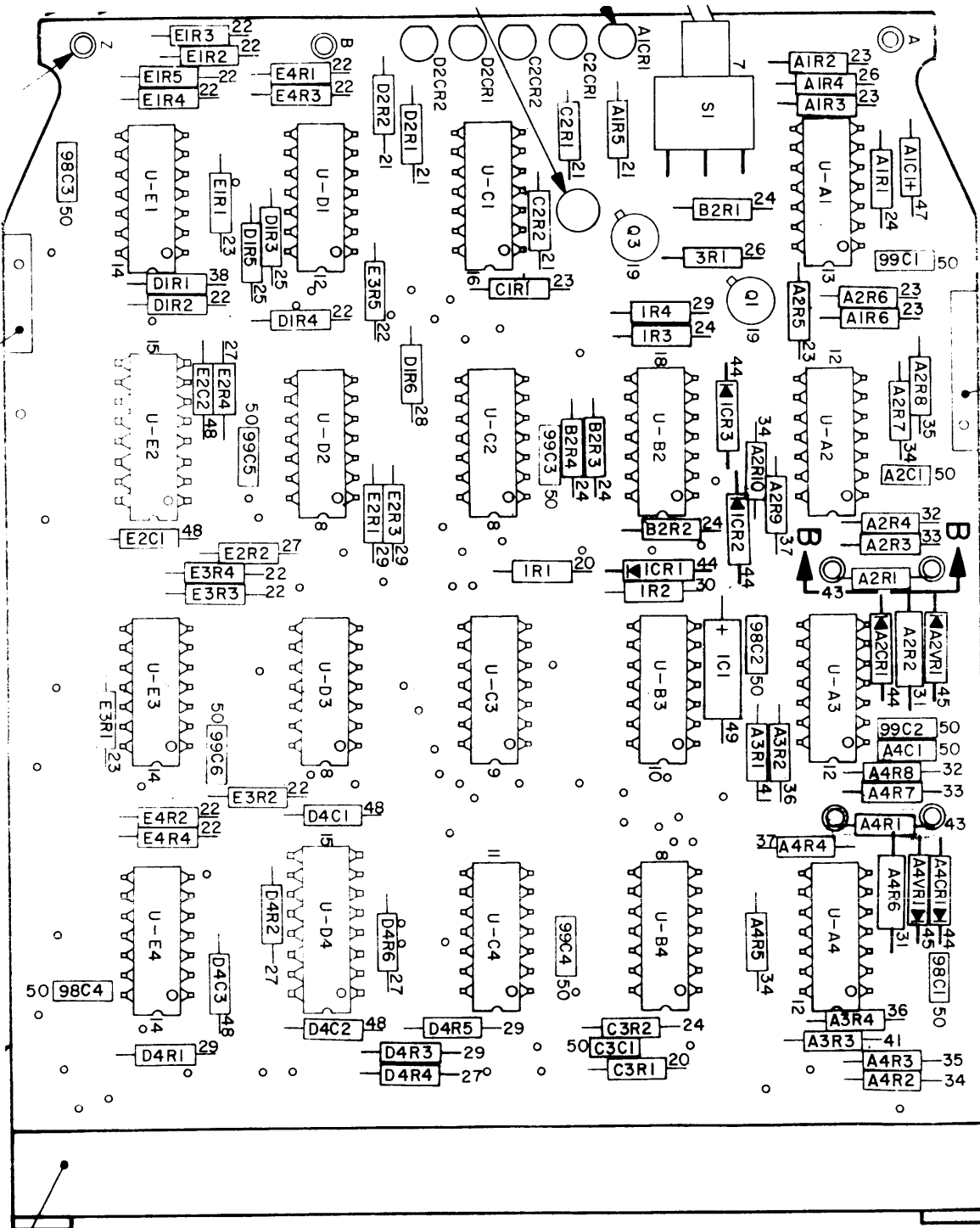
A1A03 (ASHV)



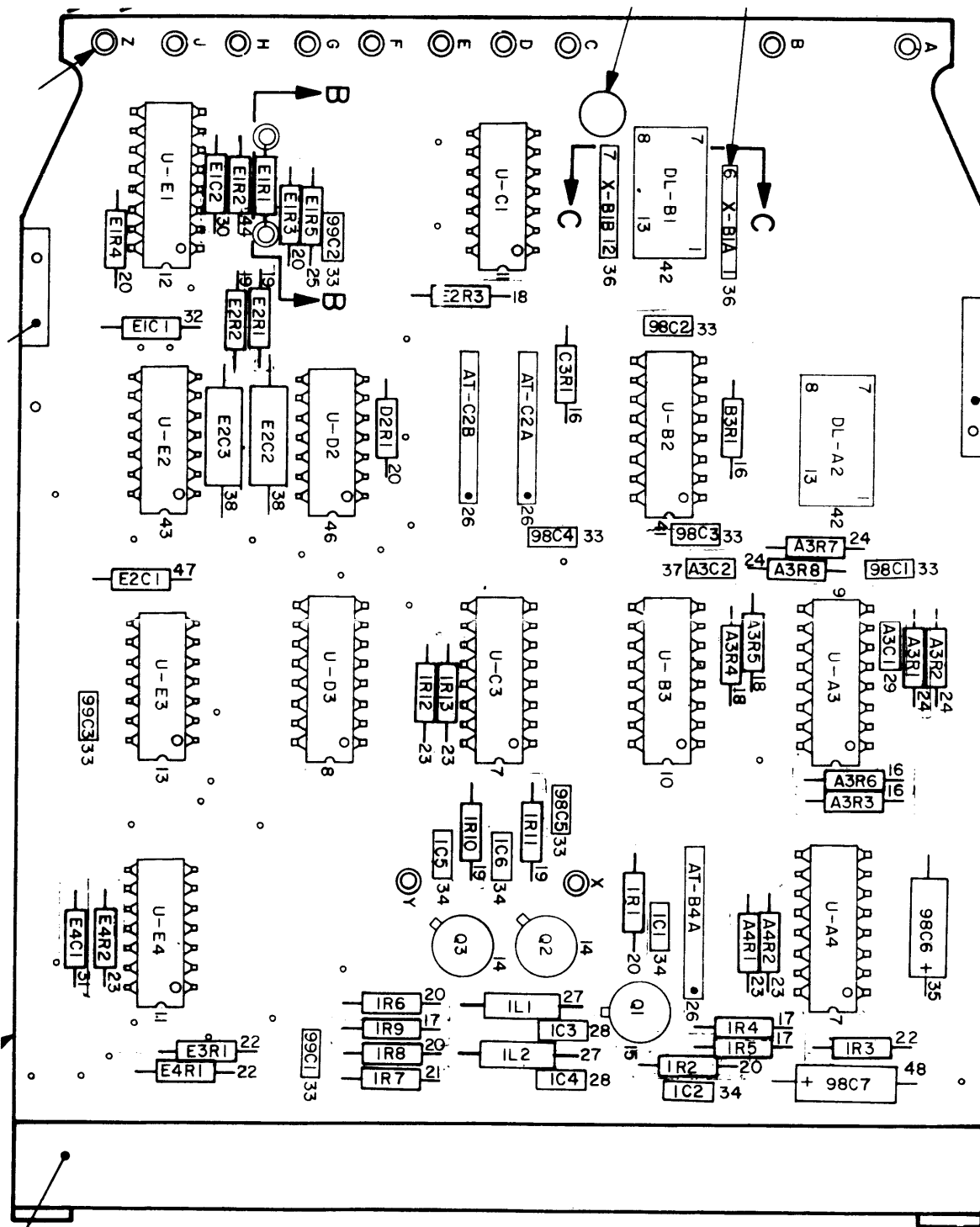
A2A01 (CLSV)



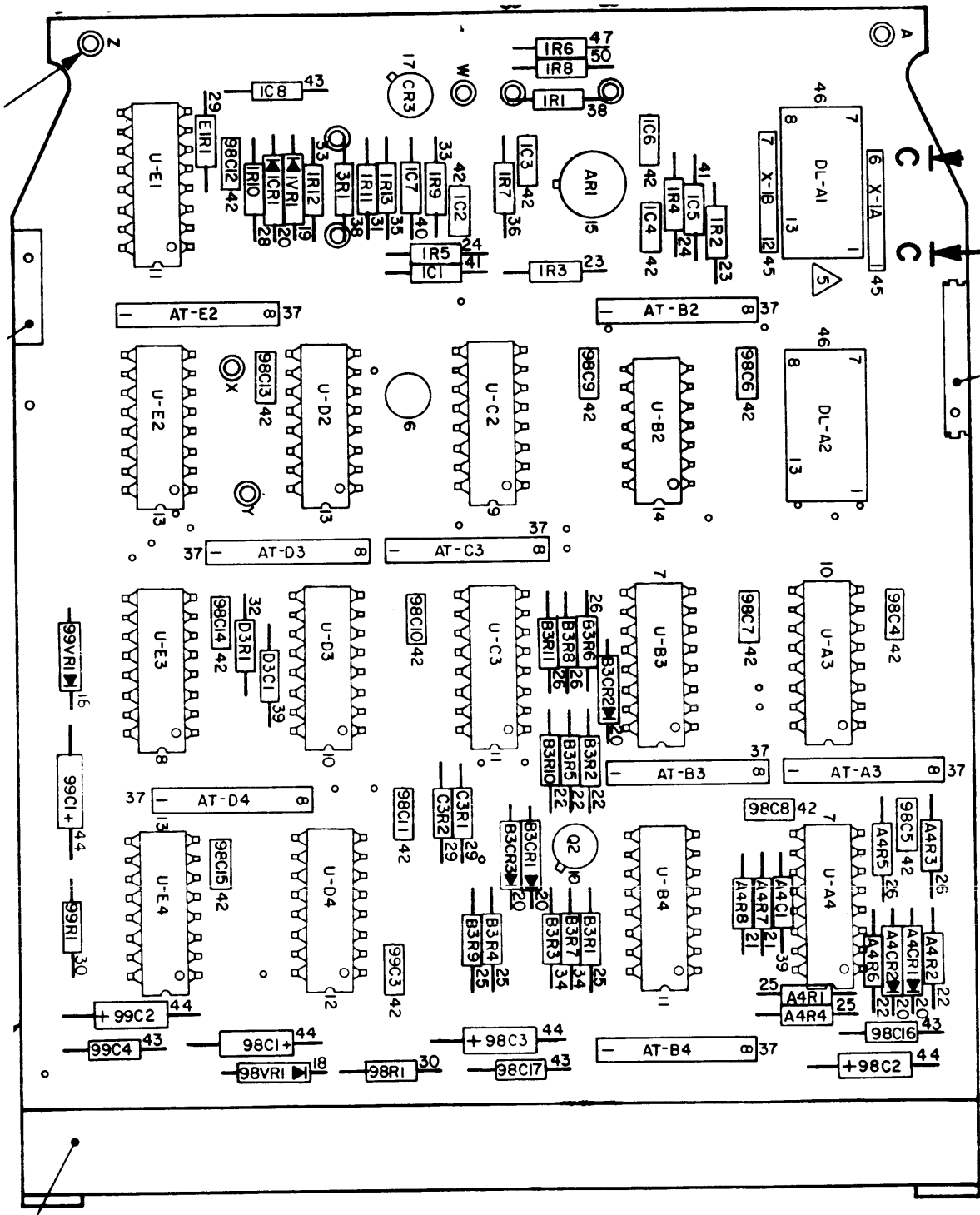
A2A03 (HFRV)



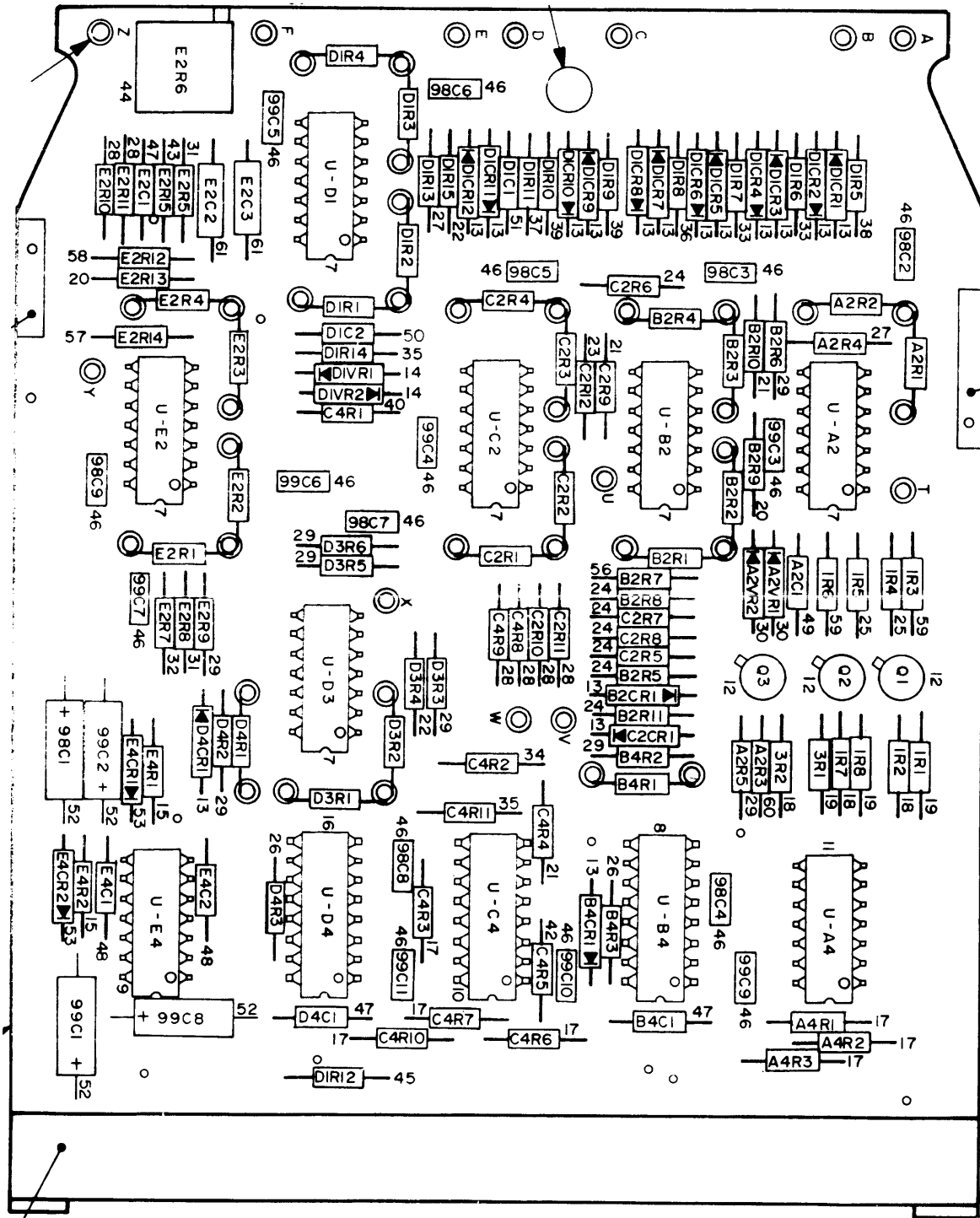
A2A04 (EKFV)



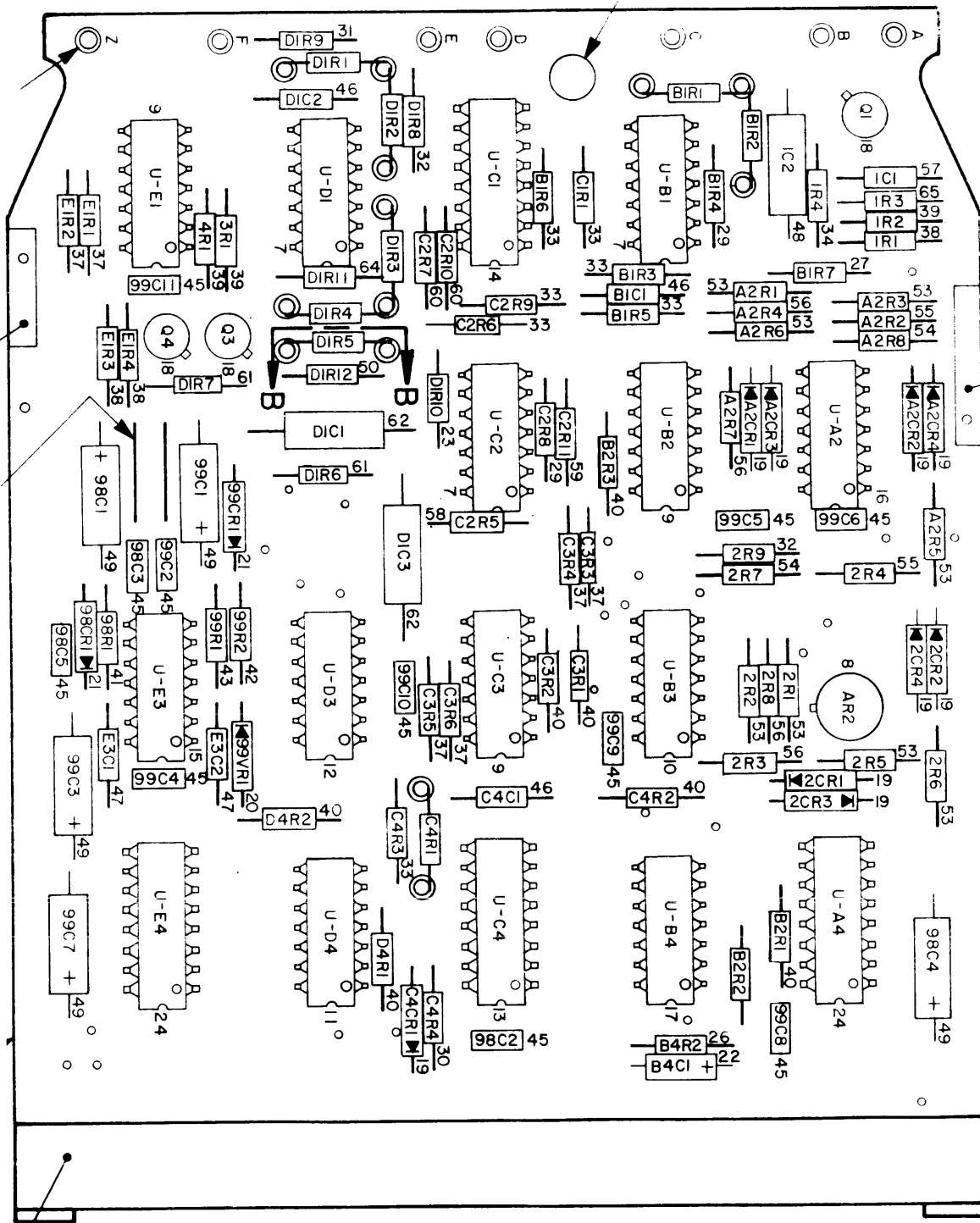
A2A05 (HLRV)



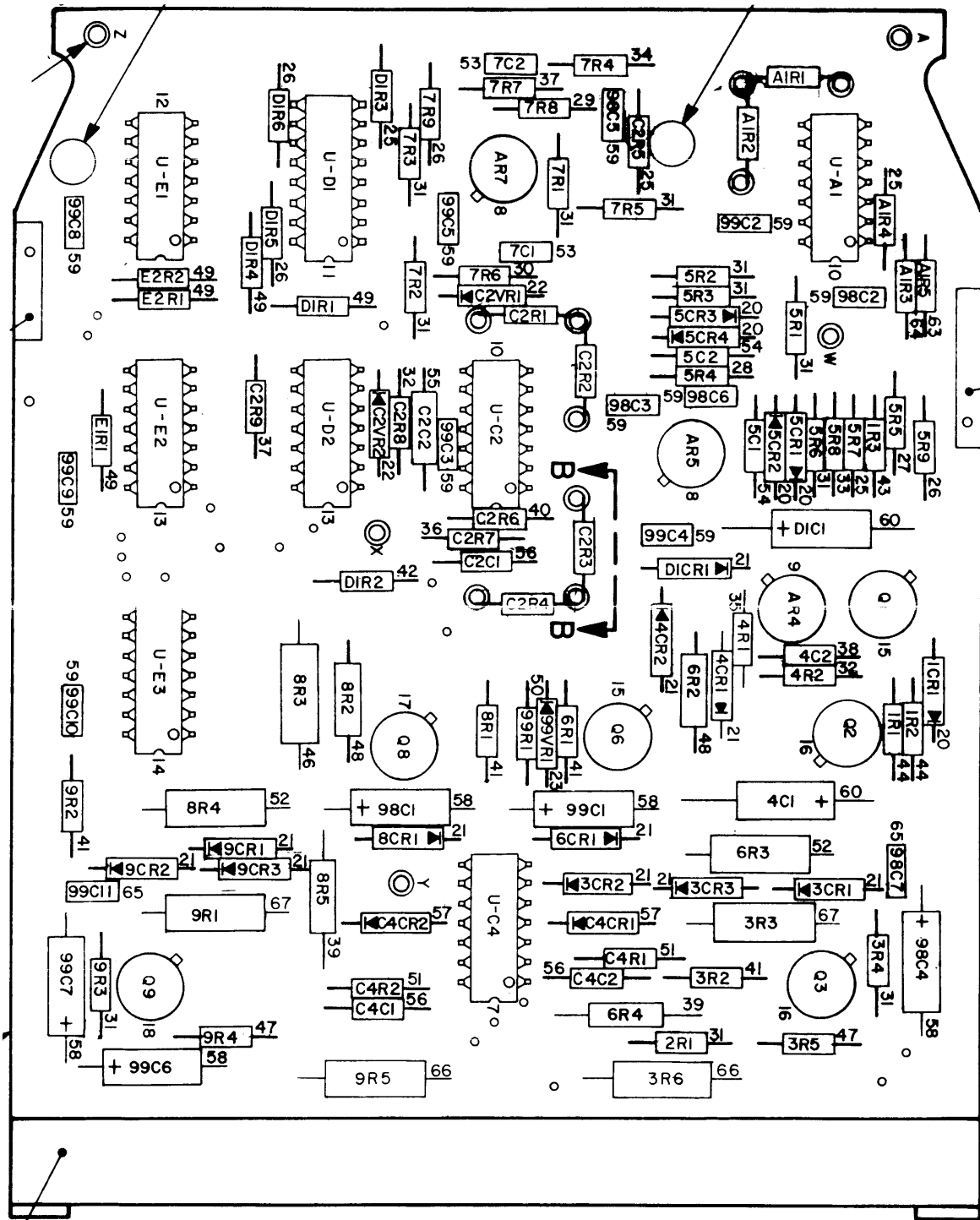
A2A06 (BLZV)



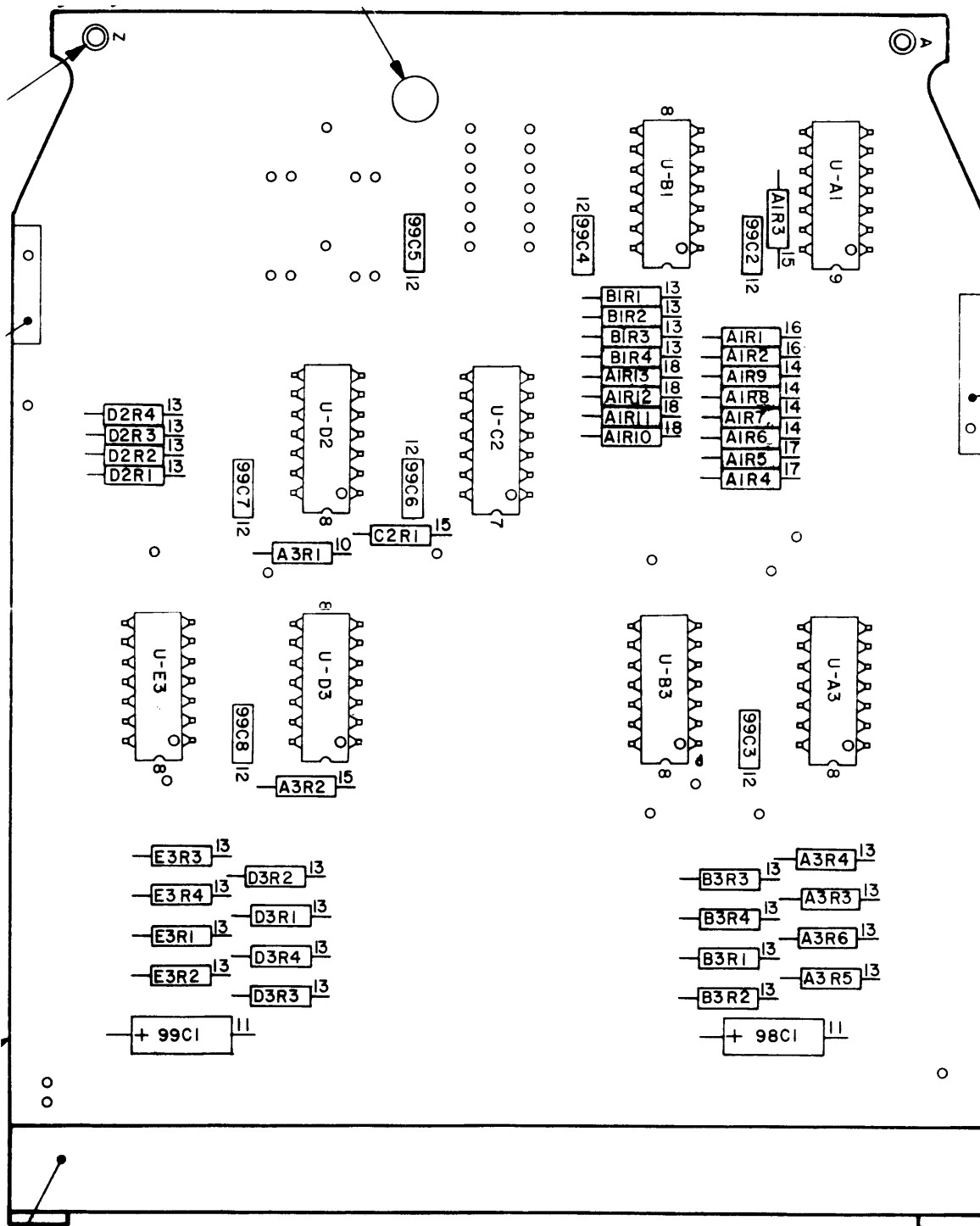
A2A07 (JLQV)



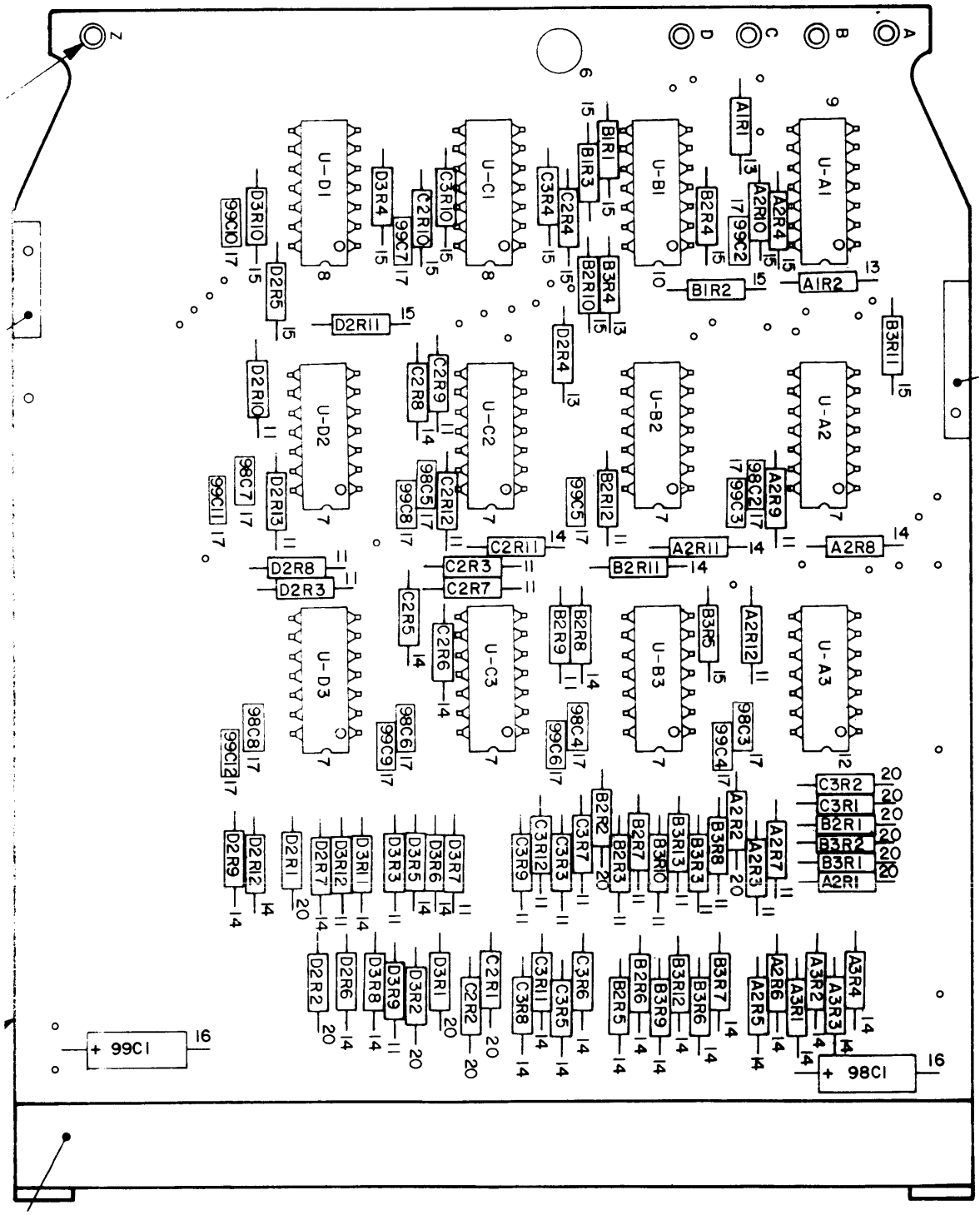
A2A08 (ELUV)



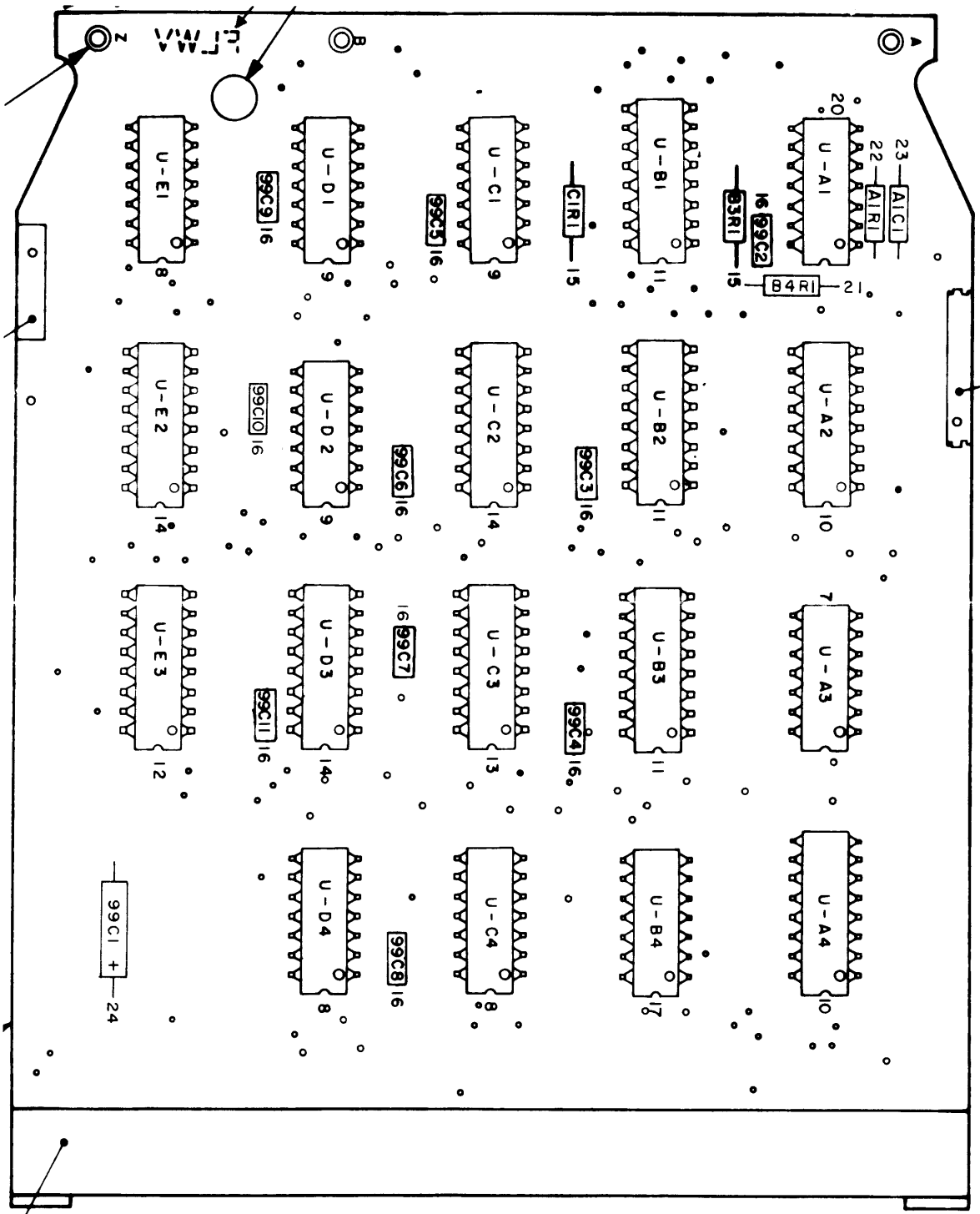
A2A09 (FLPV)



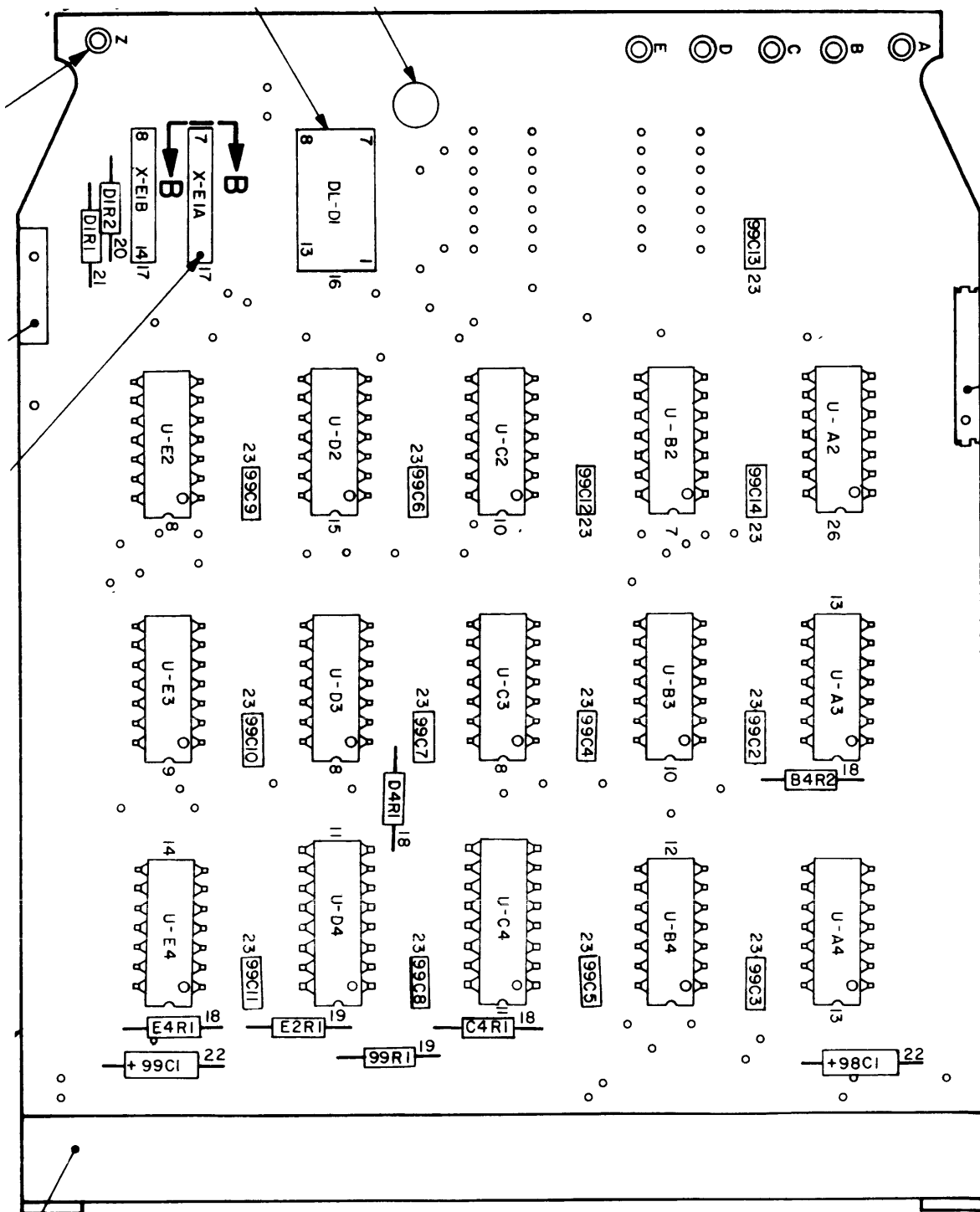
A2B01 (HTVV)



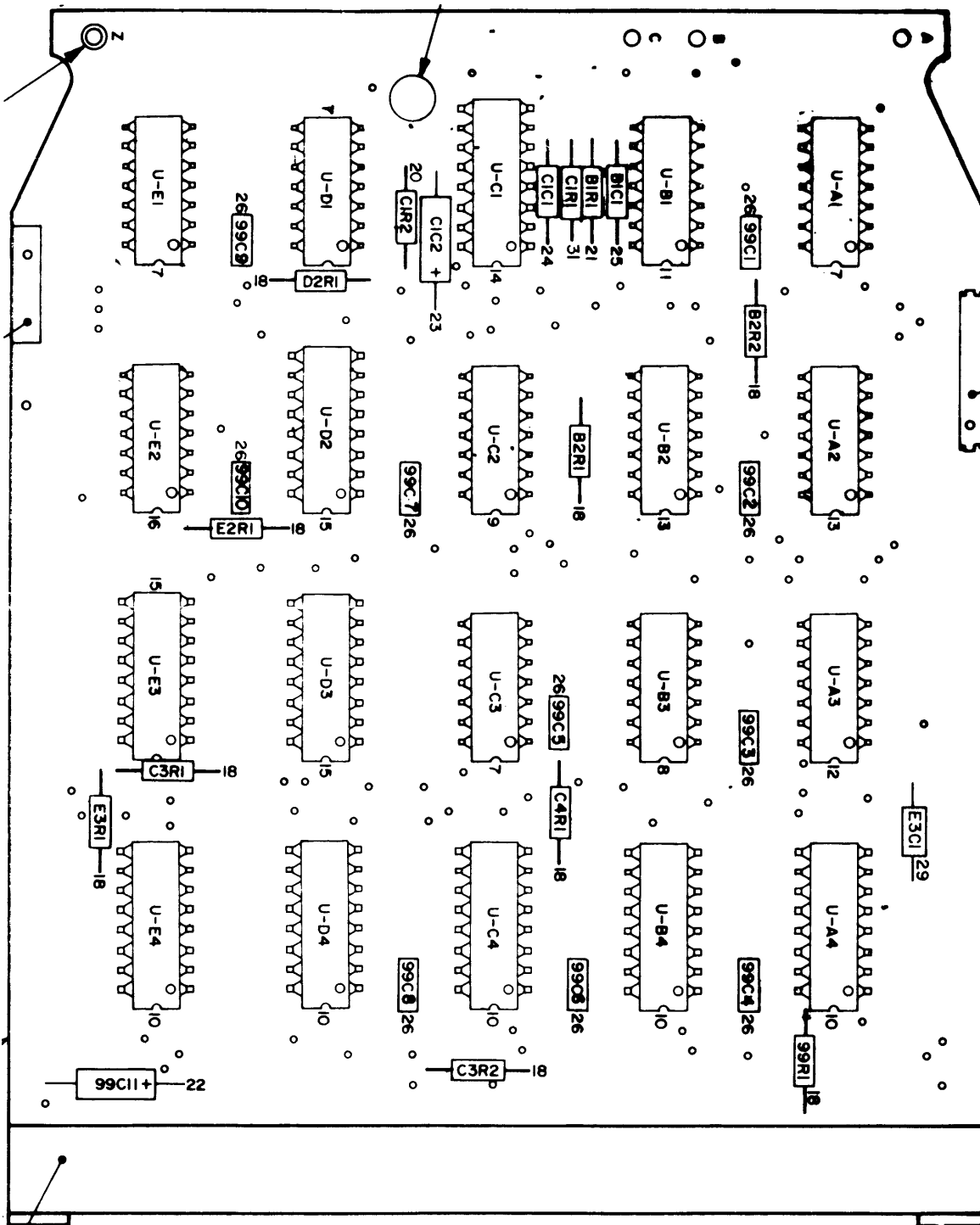
A2B02 (HRVV)



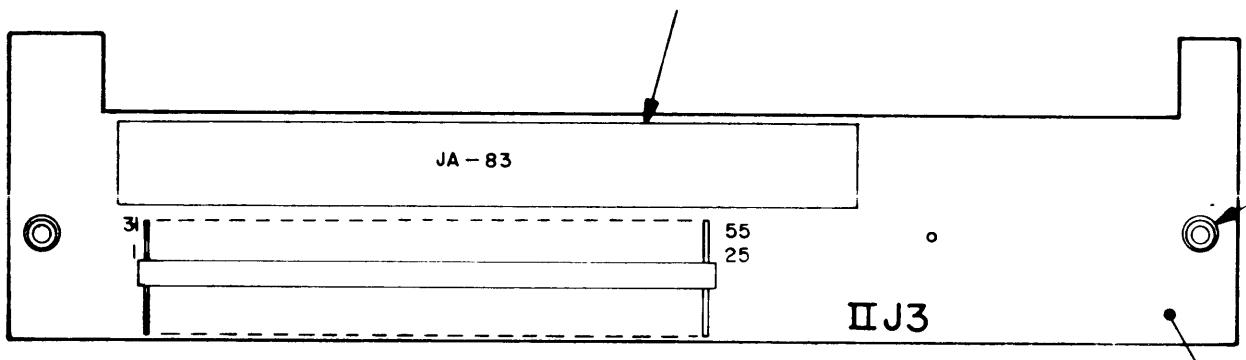
A2B06 (FLWV)



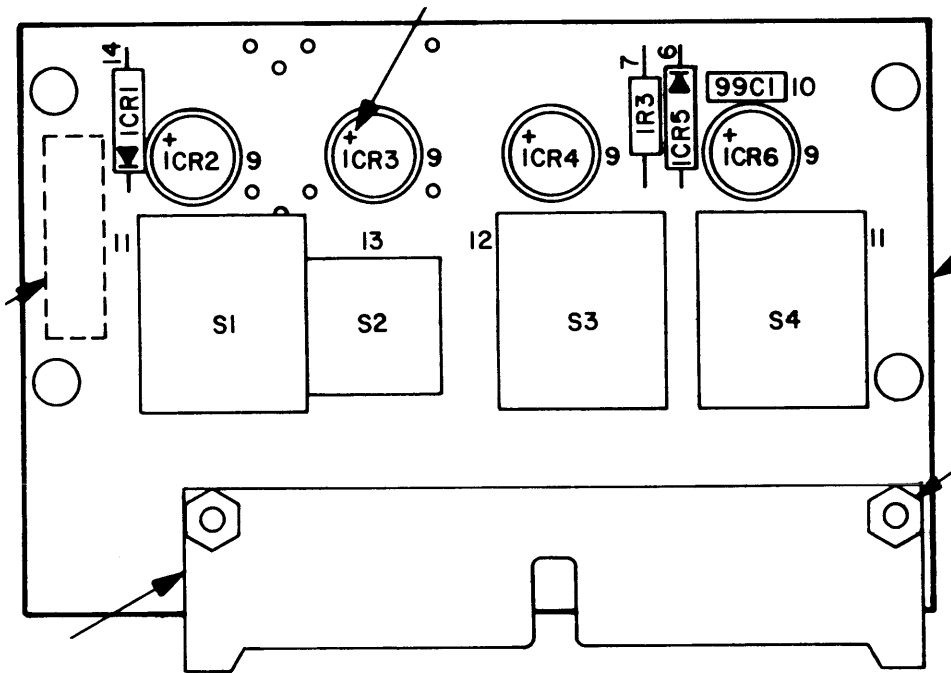
A2B07 (ELXV)



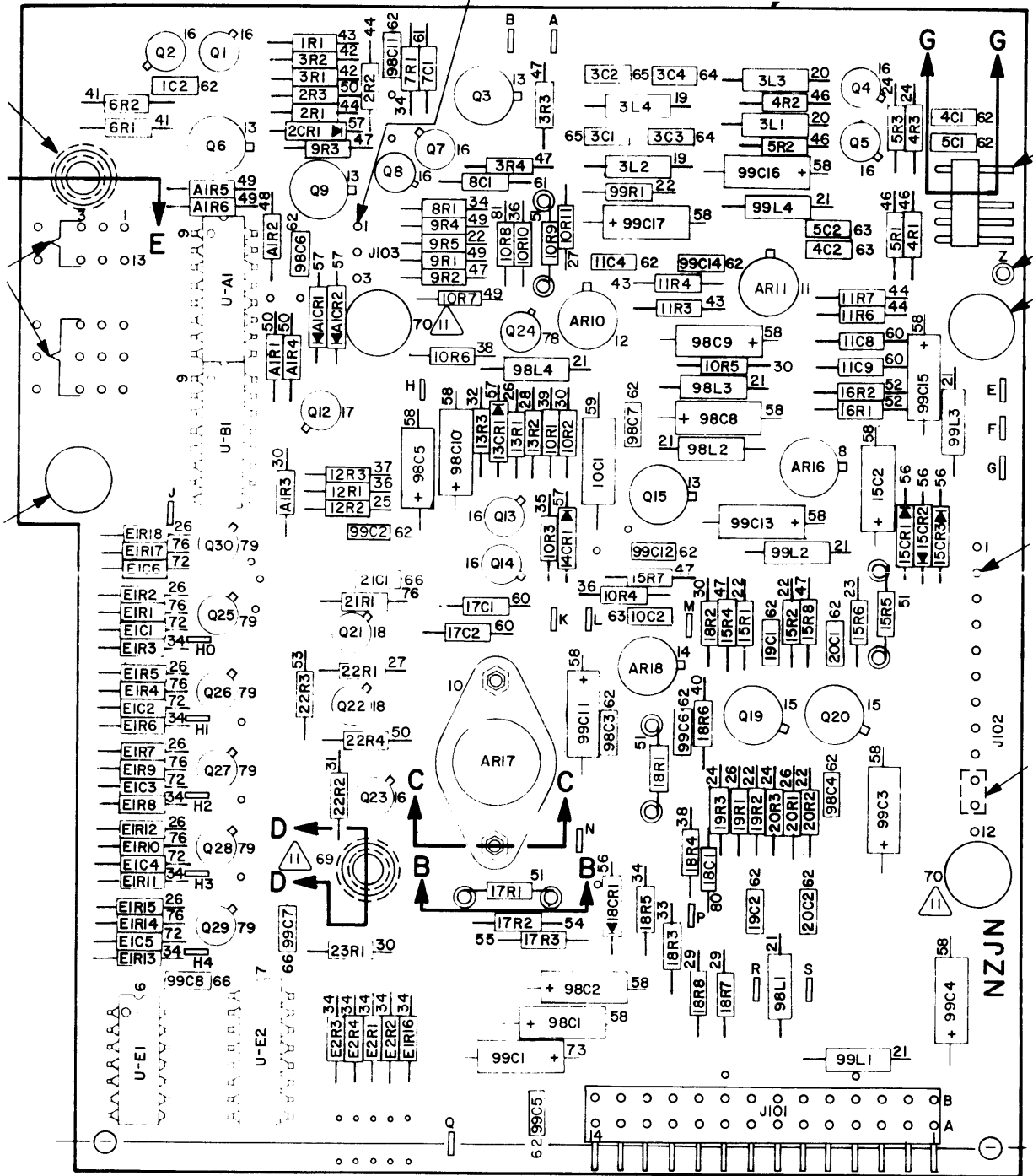
A2B08 (ELTV)



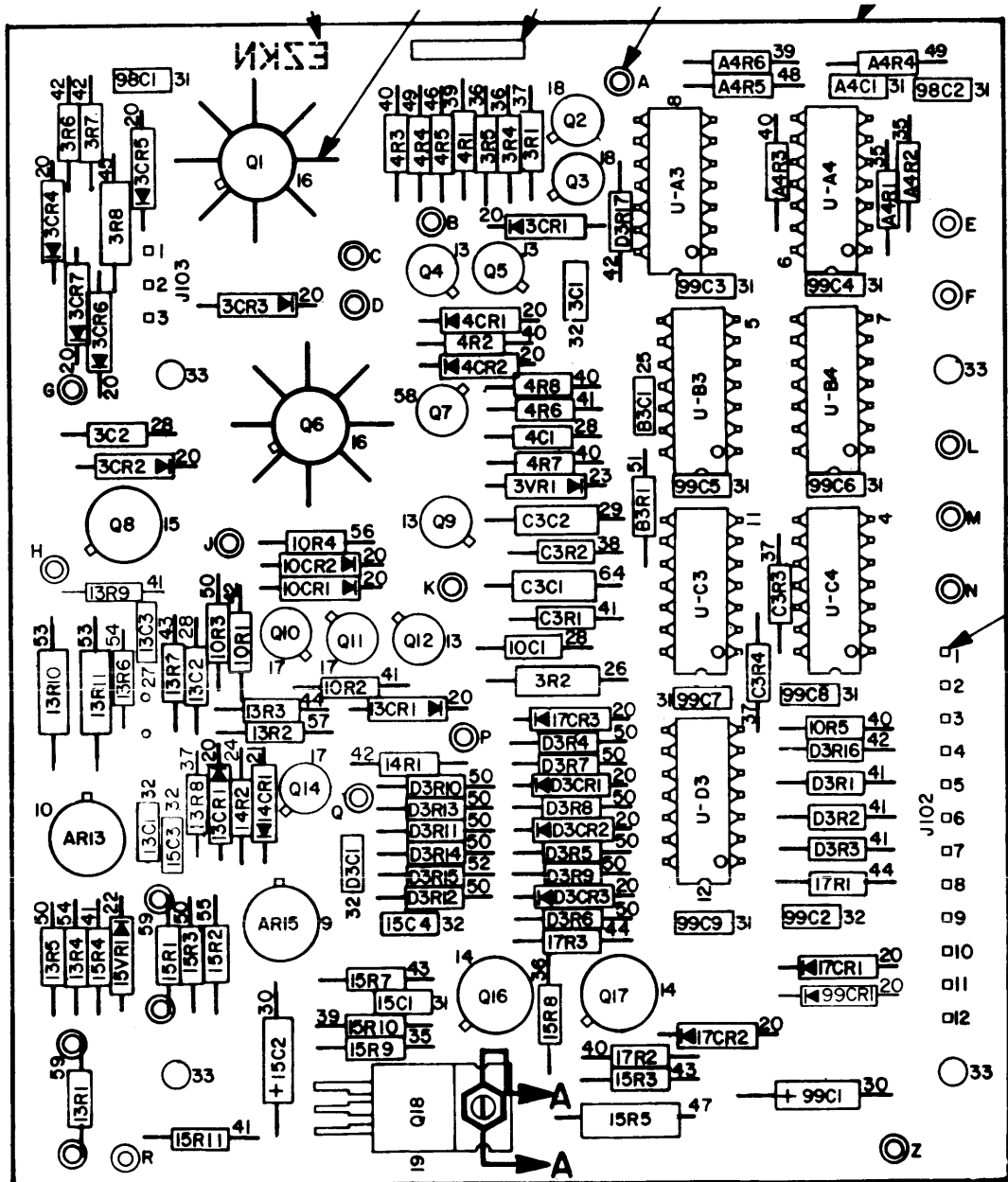
A2C1 (DXYV)



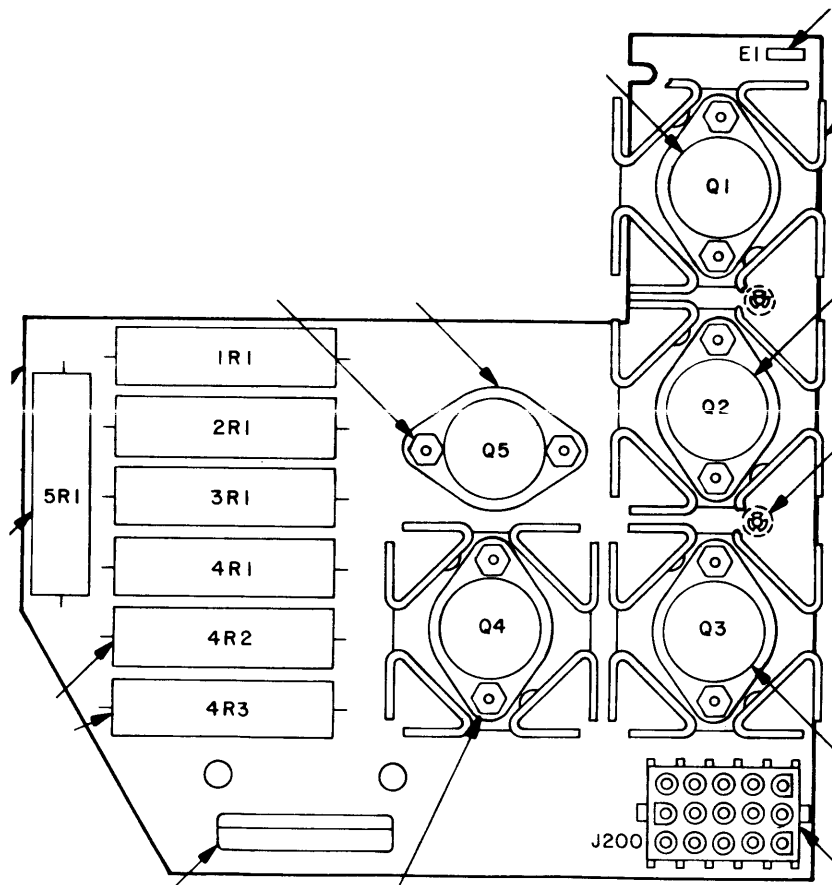
A3A01 (HZYN)



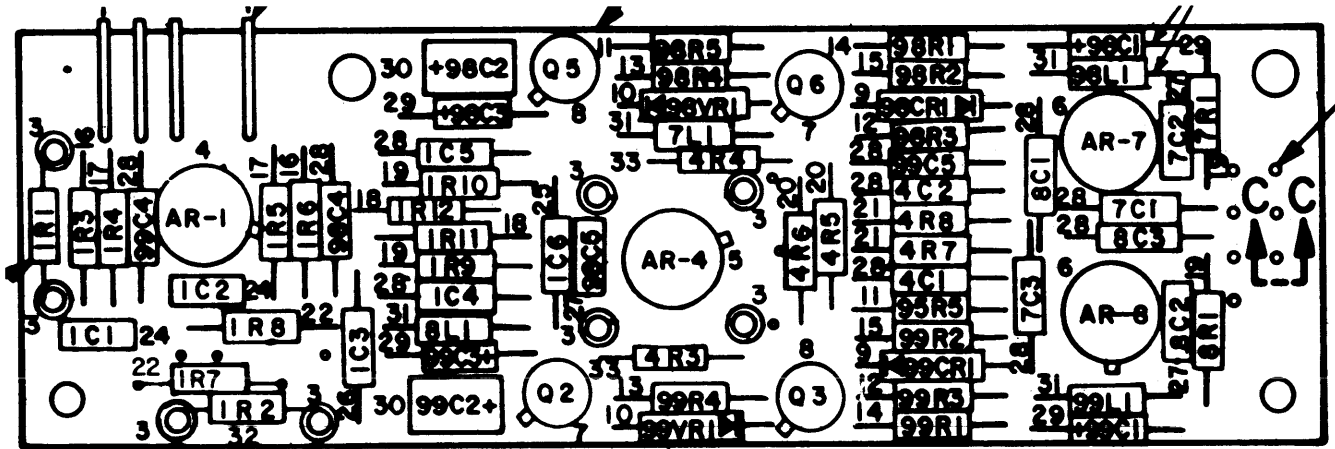
A3A02 (NZJN)



A3A03 (EZKN)



A3A04 (5VTN)



A3A05 (FZQN)

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