

# Mass Storage Unit

0402/0451

**INSTALLATION AND CHECKOUT  
PREVENTIVE MAINTENANCE  
CORRECTIVE MAINTENANCE  
DIAGRAMS  
WIRE LISTS**

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MAGNETIC  
PERIPHERALS INC.

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**MAGNETIC PERIPHERALS®**  
**DISK STORAGE UNIT**

**BR3C9**

**BR3E4**

**BR3E5**

**INSTALLATION AND CHECKOUT**  
**PREVENTIVE MAINTENANCE**  
**CORRECTIVE MAINTENANCE**  
**DIAGRAMS**  
**WIRE LISTS**

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Volume 1 of 2

**HARDWARE MAINTENANCE MANUAL**



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## PREFACE

This manual contains maintenance information applicable to the BR3C9/BR3E4/BR3E5 disk storage units. It has been prepared for customer engineers and other technical personnel directly involved with maintaining this equipment.

Information in this manual is applicable to the BR3C9 models A/B/C/D/E/F/G/H/J/K and BR3E4/BR3E5 models A/B/C/D/E.

Maintenance information is divided into five sections. The sections and a brief description of their contents are listed below.

- Section 1 - Installation and checkout: Provides information on preparing the drive for initial use, unpacking, power/signal cabling, and initial checkout.
- Section 2 - Preventive Maintenance: Provides procedures for maintaining the equipment.
- Section 3 - Corrective Maintenance: Provides check/adjustment and replacement information for

various components and assemblies in the device.

Section 4 - Diagrams: Contains logic diagrams and power schematics for the drive.

Section 5 - Wire Lists: Provides list of all wired connections other than printed circuits, in the drive.

For further information concerning the BR3C9 refer to the following manuals:

| <u>Publication No.</u> | <u>Title</u>  |
|------------------------|---|
| 83318200               | BR3C9/BR3E4/BR3E5 - General Description, Operation, Theory of Operation   |
| 83318300               | BR3C9/BR3E4/BR3E5 - Parts Data  |
| 83318600               | BR3D5/BR3D6/BR3C9/BR3E2/BR3E3/BR3E4/BR3E5 - Key to Logic, Integrated Circuits, Discrete Circuits, Card Schematics, Card Component Layout Diagrams |





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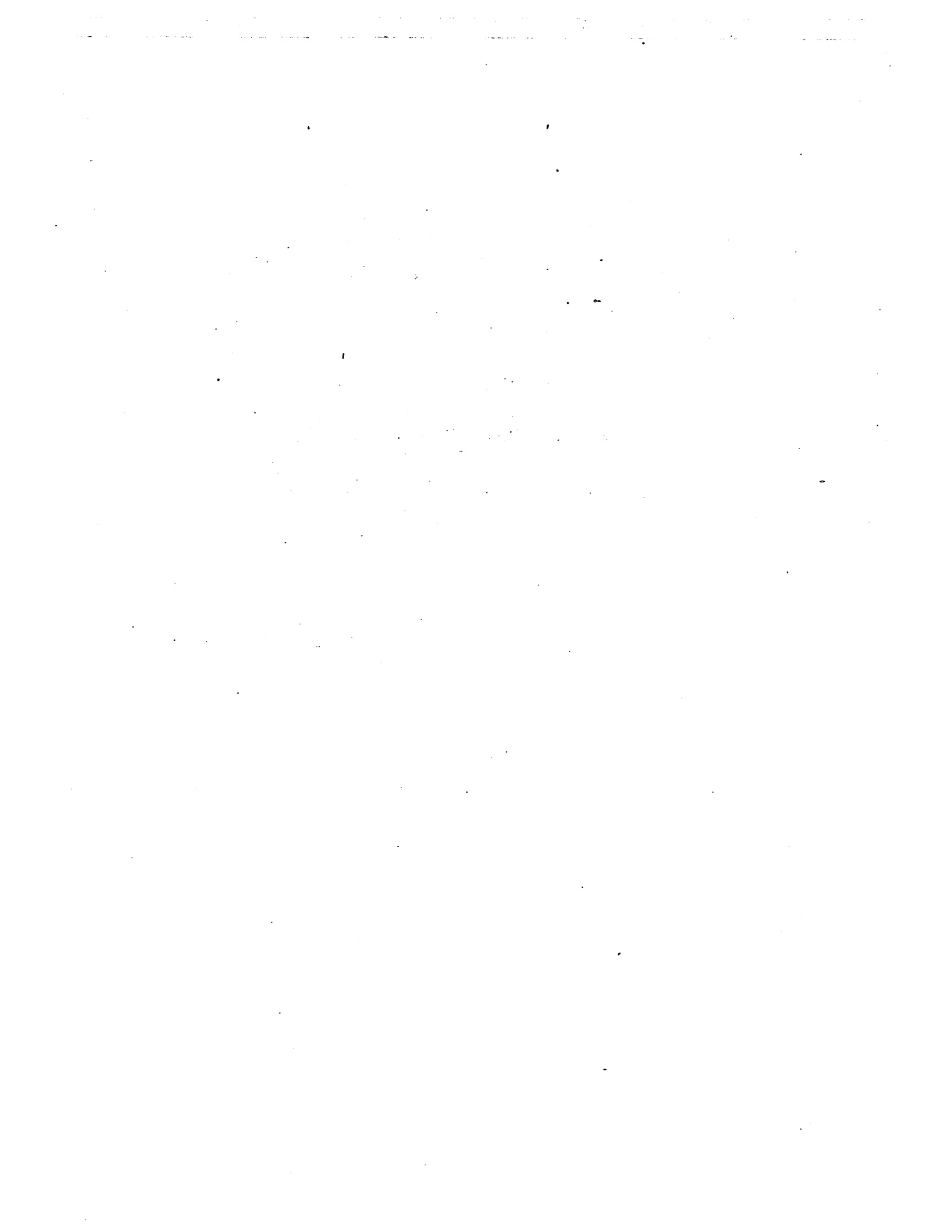
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**SECTION 1**

**INSTALLATION AND CHECKOUT**





## INTRODUCTION

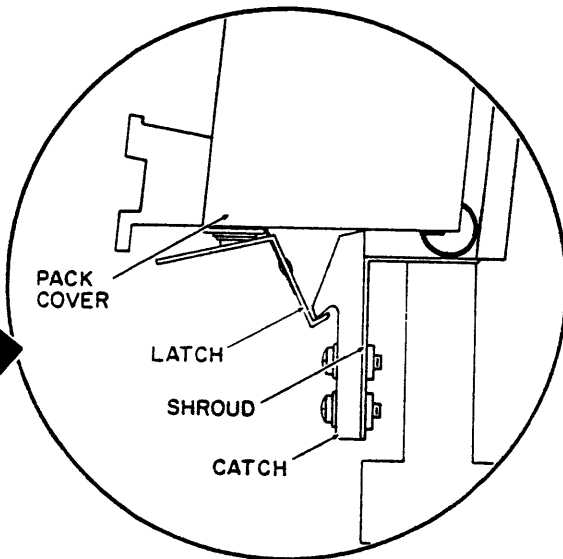
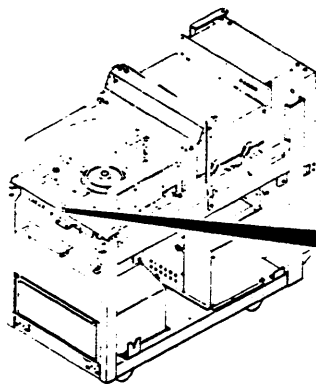
This section contains a listing of the steps involved in unpacking each unit. For air shipment, each unit is covered with a plastic dust shield enclosed within an outer corrugated fiberboard carton and then strapped to a wooden pallet. For domestic surface shipment, each unit is packaged in the same manner as for air shipment but is not placed on a wooden pallet. This permits each unit to be moved about on its own casters.

## INSPECTION

When uncrating the units, inspect each carton for possible shipping damage. All claims for this type of damage should be filed with the carrier involved. Most crating materials may be reused if reasonable care is taken while uncrating. When uncrating is complete, check off all parts listed in the Shipping Bill accompanying the equipment. Discrepancies, missing items, damaged equipment, etc., should be reported to the Account Sales Representative responsible for the equipment.

## UNCRATING

1. Remove external packing material.



SIDE VIEW

8D64

Figure 1-1. Pack Cover Latch

### WARNING

Use care when cutting straps as they may whip when cut.

2. Remove polypropylene straps securing unit to skid and remove dust shield.

### WARNING

The DSU weighs approximately 750 lbs when crated. To prevent injury to personnel or damage to unit, use Rol-a-Lifts or equivalent to remove unit from pallet.

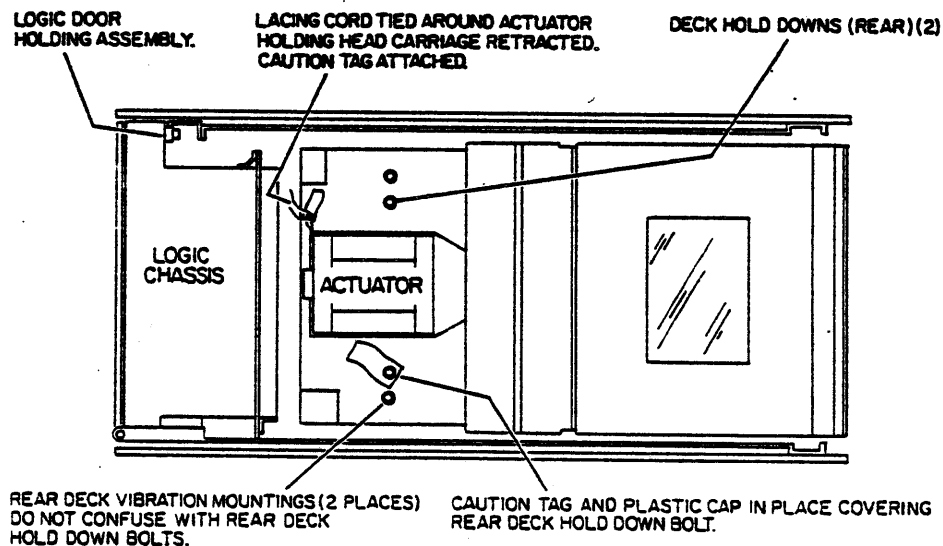
3. Remove unit from skid.
4. Remove filler tubes from top of pack cover glass. Remove material (if any) contained inside tubes.

#### NOTE

The pack cover is locked in place by a manually operated latch. Open cover by pulling upward on latch until clear of catch (see Figure 1-1).

5. Lift top cover.

6. Remove securing material from rear top cover latch.
7. Remove logic chassis-to-frame retainer.
8. Swing logic chassis out.
9. Remove all material shipped inside unit.
10. Remove actuator shroud (see Figure 1-2).
11. Remove front panel.
12. Remove side skins (if installed).
13. Remove front deck hold-down bolts - two places (see Figure 1-3).
14. Remove shipping hardware holding spindle motor plate (see Figure 1-4).
15. Remove rear deck hold-down bolts - two places. These bolts are identified by plastic plugs. Replace plugs after removing hold-down bolts.
16. Remove actuator tie-back cord.
17. Remove logic chassis access cover and check all modules for proper seating. Replace access cover.
18. Replace actuator shroud.
19. Thoroughly vacuum clean unit.
20. Replace front panel.
21. Replace side skins.
22. Reposition pack cover.
23. Swing logic chassis to closed position.



**TOP VIEW**  
(TOP COVER REMOVED)  
(ACTUATOR SHROUD REMOVED)

8U13

Figure 1-2. Drive-Top View

## INSTALLATION REQUIREMENTS

Site space and environmental requirements are listed in Table 1-1.

Figure 1-5 illustrates recommended clearances required for maintenance.

### LEVELING AND ALIGNING

1. Install leveling pads if necessary (in some units pads may already be installed.)
2. Turn down leveling pads until casters are completely off of floor.
3. Place spirit level on main deck so ends of level point to front and rear of deck.
4. Adjust leveling pads until surface is horizontal within three angular degrees.
5. Place spirit level on main deck so ends of level point toward sides.
6. Adjust leveling pads until surface is horizontal within three angular degrees.

7. Repeat procedure until main deck is horizontal within three angular degrees regardless of spirit level orientation.

## POWER WIRING

### SITE ELECTRICAL REQUIREMENTS

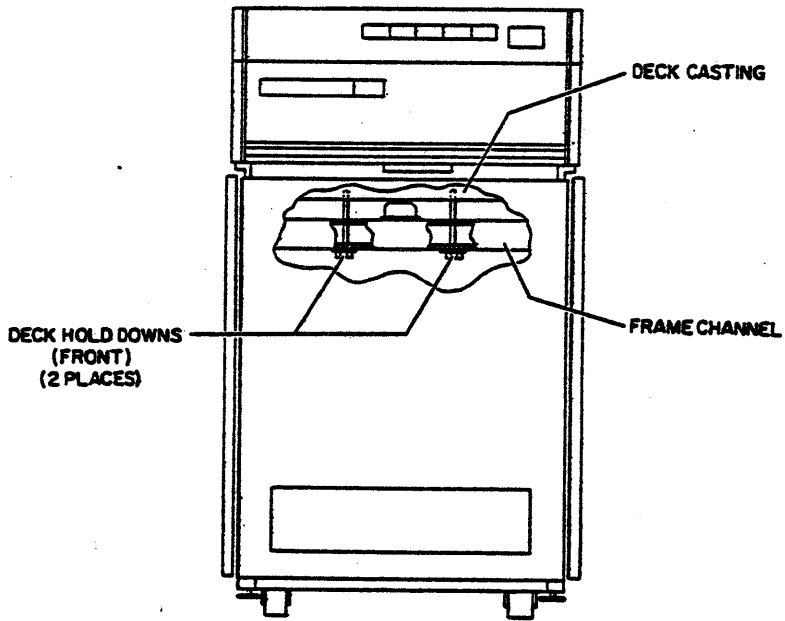
#### General Requirements

Drive power requirements are listed in Publication Number 83318200.

#### Power System Grounding Requirements

The site ac power system must have provisions for correct equipment safety grounding. All of the following conditions must be met:

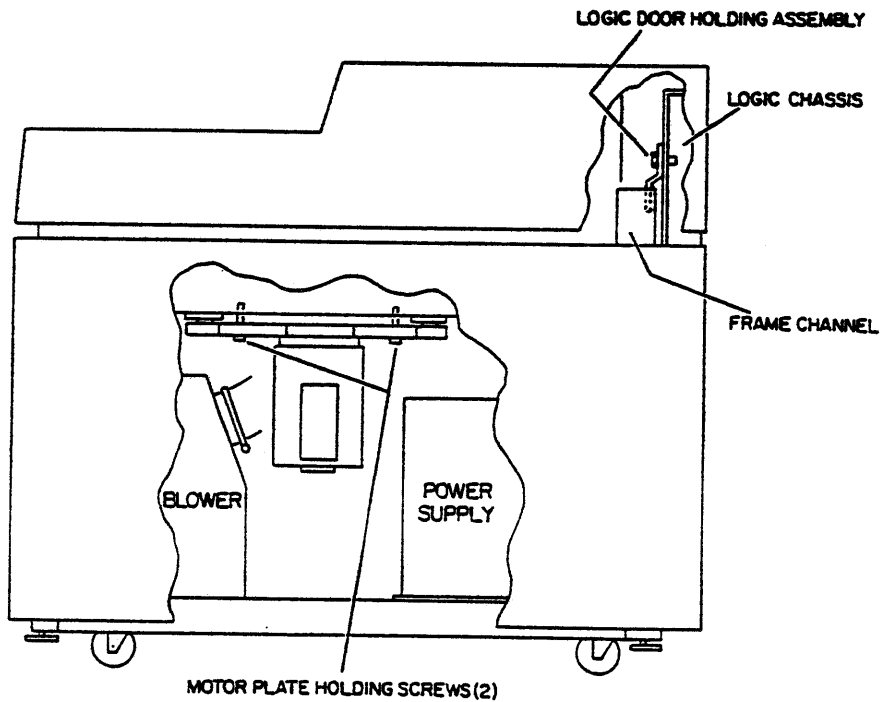
1. The branch circuit supplying ac power to the drive must have safety ground provisions. Therefore, this circuit must include an insulated grounding conductor that is identical to the grounded and ungrounded branch circuit conductors. The insulated grounding conductor shall show either a green color or green with a yellow strip.



FRONT VIEW

8U12

Figure 1-3. Drive - Front View



RIGHT SIDE VIEW

8U11

Figure 1-4. Drive - Right Side View

TABLE 1-1. INSTALLATION SPECIFICATIONS

| Physical (Approximate) |             |               |                      |                      |
|------------------------|-------------|---------------|----------------------|----------------------|
|                        | <u>Size</u> | <u>Crated</u> | <u>Crated (Van)</u>  | <u>Crated (Air)</u>  |
|                        | Height      | 39.5 in.      | 42 in.               | 46 in.               |
|                        | Width       | 22 in.        | 27 in.               | 27 in.               |
|                        | Depth       | 44.5 in.      | 48 in.               | 48 in.               |
|                        | Volume      | ---           | 31.5 ft <sup>3</sup> | 34.5 ft <sup>3</sup> |
|                        | Weight      | 700 lbs.      | 700 lbs.             | 740 lbs.             |

| Power Connectors |  |                              |                              |
|------------------|--|------------------------------|------------------------------|
|                  | <u>Description</u>                     | <u>Connector</u>             | <u>Mating Receptacle</u>     |
| 50 Hz            | 5-pole, 30 amp<br>220/380 vac, 3-phase | CDC 17634300<br>Hubble 45115 | CDC 17810700<br>Hubble 45135 |
| 60 Hz            | 5-pole, 30 amp<br>208 vac, 3-phase     | CDC 94292500<br>Hubble 25415 | CDC 94292400<br>Hubble 25250 |

| Environmental and Power Specifications |                                 |
|--|---------------------------------|
|  | See Publication Number 83318200 |

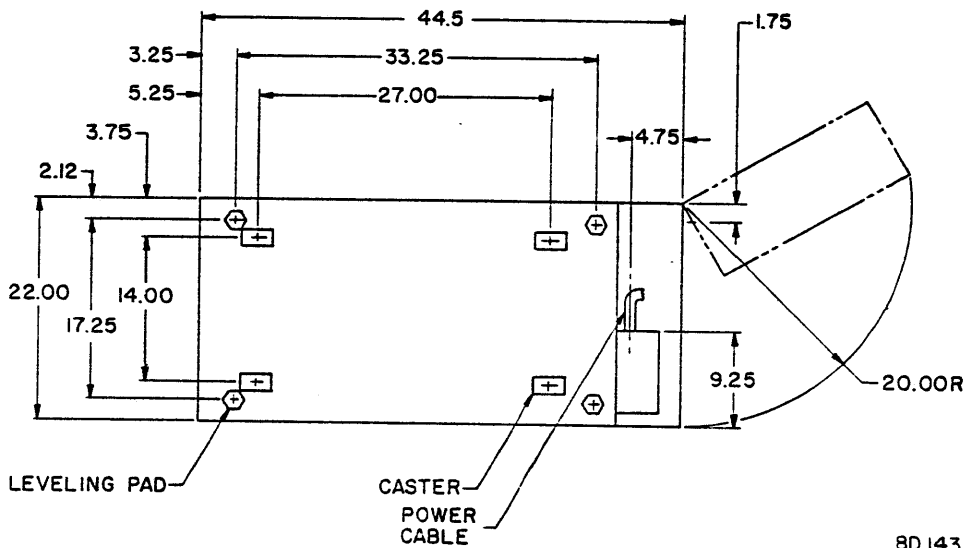


Figure 1-5. Space Requirements

2. The grounding conductor specified in step 1 is to be grounded at the service equipment.
3. All power receptacles (including convenience outlets for oscilloscopes and other test equipment) must be at a common ground potential to prevent shock hazards if two equipments are touched simultaneously. Therefore, all attachment-plug receptacles in the vicinity of the drive are to be of the grounding type; furthermore, the grounding conductors serving these receptacles are to be connected to the same grounding conductor that serves the drive.

#### SYSTEM GROUNDING

The controller and its attached drives must be connected to earth ground. The permissible grounding schemes, listed in preferred order, are:

1. Controller and drives connected to qualified site floor ground. A qualified ground would be a floor grid where the horizontal and vertical members of the grid are mechanically secure and have ground straps or their equivalent joining them to assure a constant ground potential. In turn, the grid must be connected to earth ground. An alternate qualified floor ground is a grounding grid or grounding bus system provided under the false floor.
2. Controller and drives connected to otherwise qualified floor grid, except that floor grid is isolated from earth ground. In this case, controller is then connected to earth ground to ground the system.
3. No site floor grid available: controller and drives connected to each other in a daisy chain configuration. Controller connected to earth ground.

#### Floor Grid Available

If a floor grid is available (schemes 1 or 2), each drive is to be individually connected to the floor grid. Ground each drive as follows:

1. Open logic chassis.
2. Grounding block is mounted at the bottom end of unit, next to I/O panel. Route braided strap with free end into floor cutout.
3. Drill 11/32-inch hole in grid.
4. Secure strap lug to grid using screw (P/N 17901524) and lockwasher (P/N 10126403). Lockwasher goes under terminal lug.

#### Floor Grid Not Available

If a floor grid is not available, all of the drives must be connected to the controller in a daisy chain grounding configuration. In turn, the controller must be connected to earth ground.

The ground connections are via flat braided shielding (P/N 95047301). Cut this shielding to the lengths required to go from drive to drive, drive to controller, and controller to earth ground. Crimp and solder a terminal lug (P/N 40125601) to the end of each strap.

Earth ground at the site may be available at the main power distribution panel (if it is connected to building ground), at the steel plate in contact with the masonry below the panel (if the panel is not connected to earth ground), or to an earth ground bus. Connect one end of a prepared ground strap to the available ground.

Connect remainder of grounds as follows:

1. Open logic chassis.
2. Grounding block is mounted at the bottom end of unit, next to I/O panel. Loosen grounding block screw that secures 3-foot length of ground strap (other end of this strap is not connected). Remove ground strap.
3. Attach two ground straps to this screw. One strap will go to each of the two closest drives. Tighten screws.
4. Repeat step 3 for remaining drives. Drive closest to controller is to be connected to controller ground.
5. Connect controller to earth ground.

#### AC POWER CONNECTIONS

#### CAUTION

The branch circuit protection must not exceed 20 amperes.

Each drive receives its ac power via a 15 foot cable. This cable originates from the Terminal Board ALTBI located in the AC Breaker Box at the rear of the drive.

Although each drive receives three-phase input power at the Circuit Breaker Box, only two wires are fed into the unit via the power circuit breaker. All motors and transformers are single phase, requiring 208 vac to operate. This may be obtained from a power distribution system as follows:

1. Phase to Phase - 60 Hz, 120/208 V, Star or 50 Hz, 220 V, Delta
2. Phase to Neutral - 50 Hz, 220/380 V, Star or 50 Hz, 240/415 V, Star

- Z - Phase B (red) (Brown for 50 Hz)
- Y - Phase C (orange) (Black for 50 Hz)
- N - Neutral (white) (Blue for 50 Hz)
- G - Ground (green or green/yellow) (Green/yellow for 50 Hz)

Note that the Power Option Kit STO 10341 (P/N 76042400) has to be installed for 415 V, 50 Hz application.

In order to balance the power line load, phases are rotated from drive-to-drive. Phasing is controlled by connecting wires from the Terminal Board AITBI to the power circuit breaker. Phase assignments are as follows:

X - Phase A (black)

The green wire is safety ground. It is not to be used as neutral as it is not a current carrying ground. This wire connects to a lug inside the UNIT POWER circuit breaker box. Make sure that this is a secure connection.

For correct power connection refer to the following connection diagrams figure 1-6.

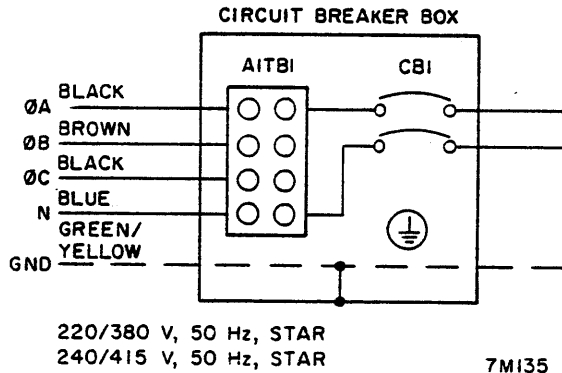
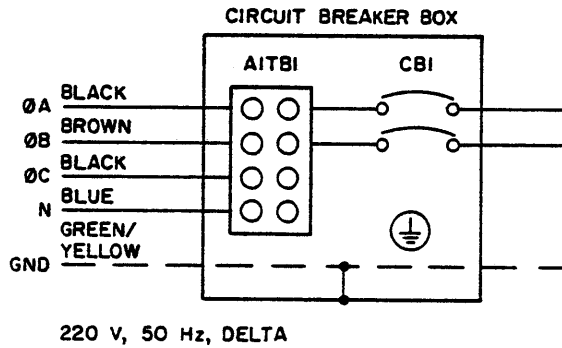
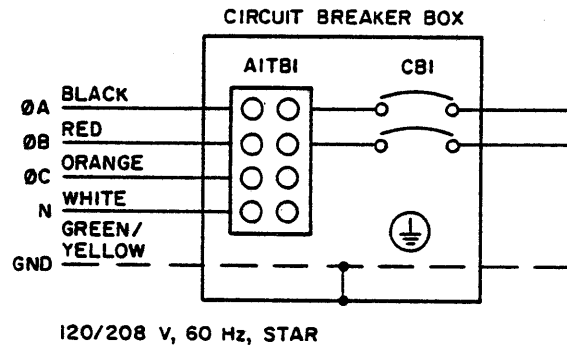


Figure 1-6. Power Input Connection Diagrams



## SIGNAL CABLING

### I/O CABLES

Each drive communicates with a controller by means of two interconnecting cables. The cables are illustrated in Figure 1-7. Each cable consists of 14 coax cables within one outer jacket. Signal functions are listed in Table 1-2.

### CAUTION

When installing I/O cables alternately tighten connector jackscrews or connector damage may result.

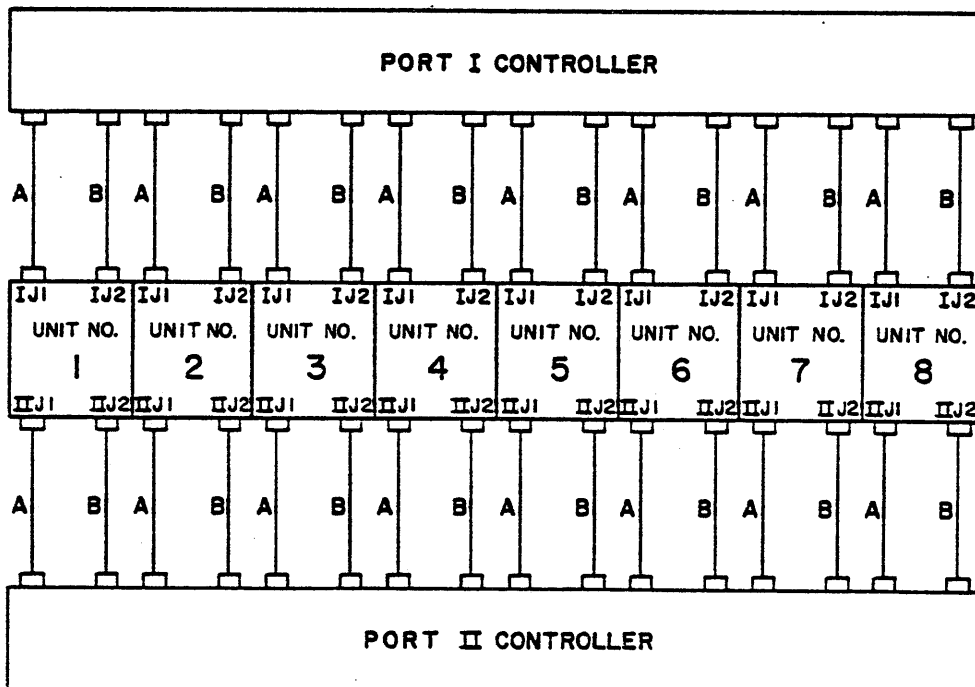
The I/O connectors are located on the frame below the logic chassis. If the drive has dual-channel capability, four I/O plugs are

provided: two for each controller. Connectors IJ1 and IJ2 are for Channel I; IIJ1 and IIJ2 are for Channel II.

### POWER SEQUENCE CABLE

Used only on units with power sequence feature.

The power sequence cable carries the Pick and Hold signals to and from the drive. The cables connect between the controller and drives in a daisy chain manner as shown in figure 1-8. In some cases, the cable from the controller to the first drive is replaced by a jumper plug connecting to J3 of the drive I/O panel, Figure 1-8 shows the signal lines and pin connections for the cables.



7M2A

Figure 1-7. System Cabling

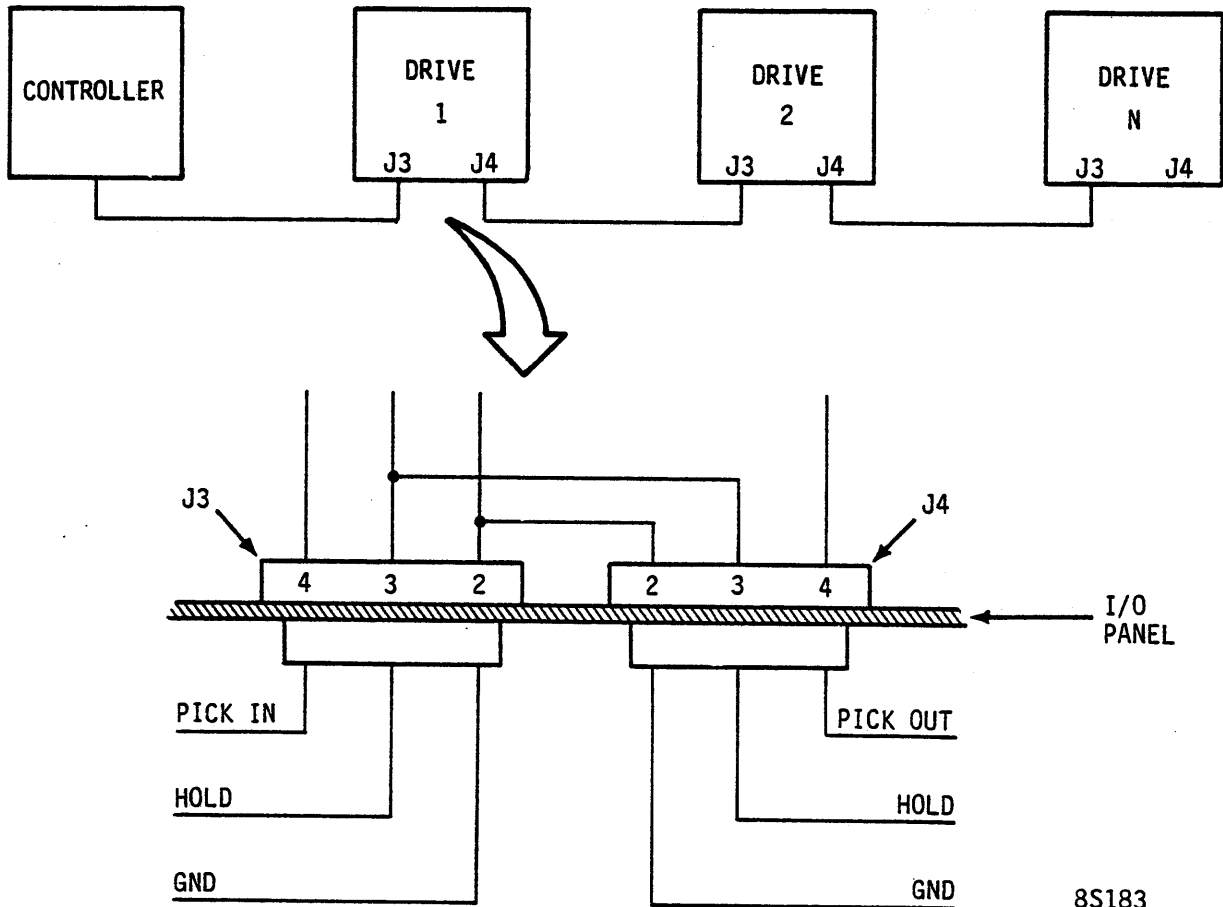
**DEVICE TYPE REQUEST WIRING**

The Device Type Request (DTR) byte is fixed at the time of installation. The byte is prewired at the factory to be 10011010. This byte may be changed by removing the factory-installed jumper wire and adding one jumper wire per bit with a wire wrap gun. For equipment types BR3E4 and BR3E5 the (DTR) byte is 10111010. Jumper locations are specified in Table 1-3.

**DEVICE NUMBER REQUEST**

The Device Number Request (DNR) byte is determined by the logical address plug inserted into the operator panel of the unit. The number associated with the plug is determined by the inserts installed in the plug and is identified by a decal on the front of the plug (refer to Figure 1-9).

The logic plug is assembled by bonding the inserts into the proper locations (refer to Table 1-4) and attaching the appropriate decal. This is done as follows:



8S183

Figure 1-8. Power Sequence Cable

TABLE 1-2. INPUT/OUTPUT CONNECTOR PIN ASSIGNMENTS

| Cable B (IJ2, IJ2) |                                 | Cable A (LJ1, IJ1) |                             |
|--------------------|---------------------------------|--------------------|-----------------------------|
| Pin*               | Function                        | Pin*               | Function                    |
| A                  | D1P (Parity)                    | A                  | Operational Out (OPO)       |
| B                  | D10 (2 <sup>7</sup> )           | B                  | DCP (Parity)                |
| C                  | D11 (2 <sup>6</sup> )           | C                  | Device Command Strobe (DCS) |
| D                  | D12 (2 <sup>5</sup> )           | D                  | DC0                         |
| E                  | D13 (2 <sup>4</sup> )           | E                  | DC1                         |
| F                  | D14 (2 <sup>3</sup> )           | F                  | DC2                         |
| H                  | D15 (2 <sup>2</sup> )           | H                  | DC3                         |
| J                  | D16 (2 <sup>1</sup> )           | J                  | DC4                         |
| K                  | D17 (2 <sup>0</sup> )           | K                  | DC5                         |
| L                  | Serial Write Out (SWO)          | L                  | Device Initialize (DIN)     |
| M                  | Fault (FLT)                     | M                  | Unused                      |
| N                  | Data Modifier (DM1)             | N                  | Unused                      |
| P                  | Device Event Notification (DEN) | P                  | Index (IDX)                 |
| R                  | Serial Read In (SRI)            | R                  | Operational In (OPI)        |

\*Each pin consists of a signal line and ground line as an integral unit.

TABLE 1-3. DTR JUMPER WIRING

| Bit Bit        | Decimal | Source Pin | To Make a "0" | 451 |   | 402 |  | To Make a "1" | 451 |   | 402 |  |
|----------------|---------|------------|---------------|-----|---|-----|--|---------------|-----|---|-----|--|
|                |         |            |               |     |   |     |  |               |     |   |     |  |
| 2 <sup>7</sup> | 128     | C1-6A      | C1-1A         |     |   |     |  | C1-5B         | *   | * |     |  |
| 2 <sup>6</sup> | 64      | C2-6A      | C2-1A         | *   | * |     |  | C2-5B         |     |   |     |  |
| 2 <sup>5</sup> | 32      | C3-6A      | C3-1A         | *   |   |     |  | C3-5B         |     |   | *   |  |
| 2 <sup>4</sup> | 16      | C4-6A      | C4-1A         |     |   |     |  | C4-5B         | *   | * |     |  |
| 2 <sup>3</sup> | 8       | C5-6A      | C5-1A         |     |   |     |  | C5-5B         | *   | * |     |  |
| 2 <sup>2</sup> | 4       | C6-6A      | C6-1A         | *   | * |     |  | C6-5B         |     |   |     |  |
| 2 <sup>1</sup> | 2       | C7-6A      | C7-1A         |     |   |     |  | C7-5B         | *   | * |     |  |
| 2 <sup>0</sup> | 1       | C8-6A      | C8-1A         | *   | * |     |  | C8-5B         |     |   |     |  |

Example: To change bit 2<sup>0</sup> from factory-installed value of "0", delete jumper from C8-6A to C8-1A. Add jumper from C8-6A to C8-5B. In no case shall pins 1A and 5B of the same card be interconnected.

\*NOTE: Jumper is connected from source pins to these pins before unit shipment.

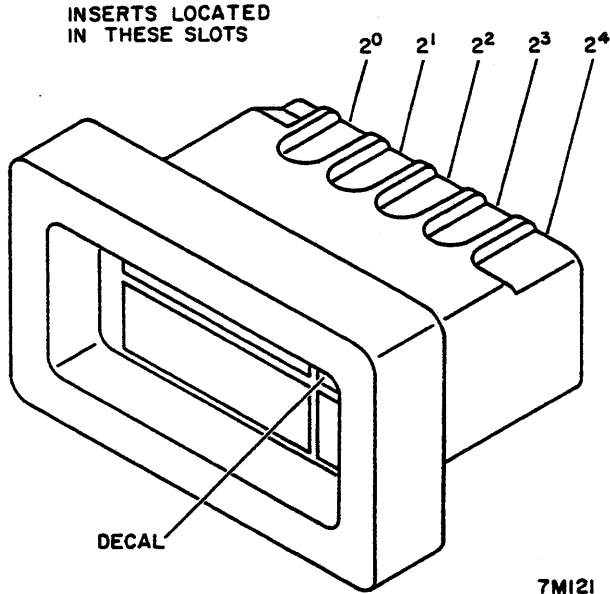


Figure 1-9. Logical Address Plug

### CAUTION

Read the instructions supplied with the adhesive prior to using it.

1. To install the first insert apply one or two drops of adhesive to the desired slot. Press the insert into place with the beveled edge facing up and towards the rear of the plug.
2. Select the decal corresponding to the device number (of the plug) and attach it to the front of the plug (refer to Figure 1-9).

### INITIAL CHECKOUT AND STARTUP

This procedure assumes that all of the preceding procedures have been completed. Before performing this procedure, become familiar with the safety precautions and maintenance preliminary conditions specified in Section 3. Proceed as follows:

### CAUTION

Bearing damage can occur if alcohol runs into spindle.

1. Wipe spindle clean with media cleaning solution dampened gauze.

2. Using vacuum cleaner, remove dust or dirt from interior of shroud and cabinet.

### CAUTION

The CE disk pack contains specially recorded tracks of data. Extreme care must be taken so that this data is not modified or destroyed.

3. Install CE disk pack.
4. Open cabinet rear door. Verify that all logic chassis cards are firmly seated in their connectors. Check all miscellaneous connectors to see that they are properly seated.
5. Open top cover and remove deck cover.
6. Check that logic cards next to positioner assembly are firmly seated. Check that connectors on read/write wire wrap panel assembly are properly seated. Check that head connectors are properly seated.
7. Turn off UNIT POWER circuit breaker.
8. Turn off all power supply circuit breakers.
9. Verify that drive is connected to external power source and that external breaker (if any) is on.
10. Turn on UNIT POWER circuit breaker. Blower motor begins to operate.
11. Turn on all remaining power supply circuit breakers. Power Supply elapsed time meter starts.

### NOTE

Only one drive should be accelerating the pack at a time. The second drive may be started after the first drive reaches operating speed (approximately 20 seconds).

12. Check all output voltages for nominal settings.
13. Press operator panel START switch.
14. Spindle drive motor and first seek interlock motor starts.
15. Actuator drives carriage forward to load heads (after 15-second First Seek Interlock delay).
16. Actuator moves heads to track 00 and Physical Unit Identification indicator on operator panel lights.

TABLE 1-4. DEVICE NUMBERS

| Device Number                          | 2 <sup>0</sup> | 2 <sup>1</sup> | 2 <sup>2</sup> | 2 <sup>3</sup> | 2 <sup>4</sup> | Device Number                                       | 2 <sup>0</sup> | 2 <sup>1</sup> | 2 <sup>2</sup> | 2 <sup>3</sup> | 2 <sup>4</sup> |
|--|----------------|----------------|----------------|----------------|----------------|---|----------------|----------------|----------------|----------------|----------------|
| 1                                      | x              |                |                |                |                | 17  | x              |                |                |                | x              |
| 2                                      |                | x              |                |                |                | 18  |                | x              |                |                | x              |
| 3                                      | x              | x              |                |                |                | 19  | x              | x              |                |                | x              |
| 4                                      |                |                | x              |                |                | 20  |                |                | x              |                | x              |
| 5                                      | x              |                | x              |                |                | 21  | x              |                | x              |                | x              |
| 6                                      |                | x              | x              |                |                | 22  |                | x              | x              |                | x              |
| 7                                      | x              | x              | x              |                |                | 23  | x              | x              | x              |                | x              |
| 8                                      |                |                |                | x              |                | 24  |                |                |                | x              | x              |
| 9                                      | x              |                |                | x              |                | 25  | x              |                |                | x              | x              |
| 10                                     |                | x              |                | x              |                | 26  |                | x              |                | x              | x              |
| 11                                     | x              | x              |                | x              |                | 27  | x              | x              |                | x              | x              |
| 12                                     |                |                | x              | x              |                | 28  |                |                | x              | x              | x              |
| 13                                     | x              |                | x              | x              |                | 29  | x              |                | x              | x              | x              |
| 14                                     |                | x              | x              | x              |                | 30  |                | x              | x              | x              | x              |
| 15                                     | x              | x              | x              | x              |                | 31  | x              | x              | x              | x              | x              |
| 16                                     |                |                |                |                | x              | 32*   |                |                |                |                |                |
| NOTES:<br>x Indicates insert location. |                |                |                |                |                | NOTES:<br>* For logic no. 32 - no inserts are used. |                |                |                |                |                |

17. Check head/arm alignment. If necessary, perform Head/Arm Alignment procedure in Corrective Maintenance section.



If unit fails to power down, refer to

Power Application procedure in Operation section of Reference manual.

18. To stop spindle motor, press operator panel START switch. To remove power to drive, turn off UNIT POWER circuit breaker.

**SECTION 2**  
**PREVENTIVE MAINTENANCE**



**INTRODUCTION**

Performance of the drive is dependent on the proper and timely execution of a preventive maintenance routine. Such a routine is provided by the Preventive Maintenance Index (Table 2-1).

The index consists of six levels based on a calendar period or hours of operation (whichever comes first). The power supply elapsed time meter keeps a cumulative record of hours of operation. Perform preventive maintenance in accordance with the indication of this meter. The Preventive Maintenance column (Table 2-1) lists the title of the paragraph containing the required instructions.

The following levels of scheduled preventive maintenance are required:

- Level 1 - Weekly or 150 hours (no preventive maintenance scheduled)
- Level 2 - Bimonthly or 1000 hours
- Level 3 - Quarterly or 1,500 hours
- Level 4 - Semiannually or 3,000 hours
- Level 5 - Annually or 6,000 hours (no preventive maintenance scheduled)
- Level 6 - Biennially or 9,000 hours

**MAINTENANCE MATERIALS**

The materials used in the procedure of this section are listed in table 3-1 (Maintenance Tools and Materials) of the Corrective Maintenance section.

TABLE 2-1. PREVENTIVE MAINTENANCE INDEX

| Level* | Estimated Time (Min) | Preventive Maintenance         |
|--------|----------------------|--------------------------------|
| 2      | 20                   | Head dusting***                |
| 3      | 1                    | Clean pack cover glass         |
| 3      | 10                   | Replace primary air filter     |
| 3      | 3                    | Check absolute filter**        |
| 4      | 1                    | Clean shroud and spindle       |
| 4      | 2                    | Clean and lubricate lock-shaft |
| 6      | 20                   | Replace absolute filter**      |

\*Intervals are maximum times. Preventive maintenance may be required more frequently depending on contamination level of operating area.

\*\*For units with hole plug on air supply assembly, replace absolute filter as required in absolute filter check procedure. Units without hole plug on air supply assembly replace absolute filter as required in table 2-1.

\*\*\*The head dusting level 2 interval is recommended for the average site. However, the interval may be shorter or longer or the procedure eliminated depending upon site conditions.



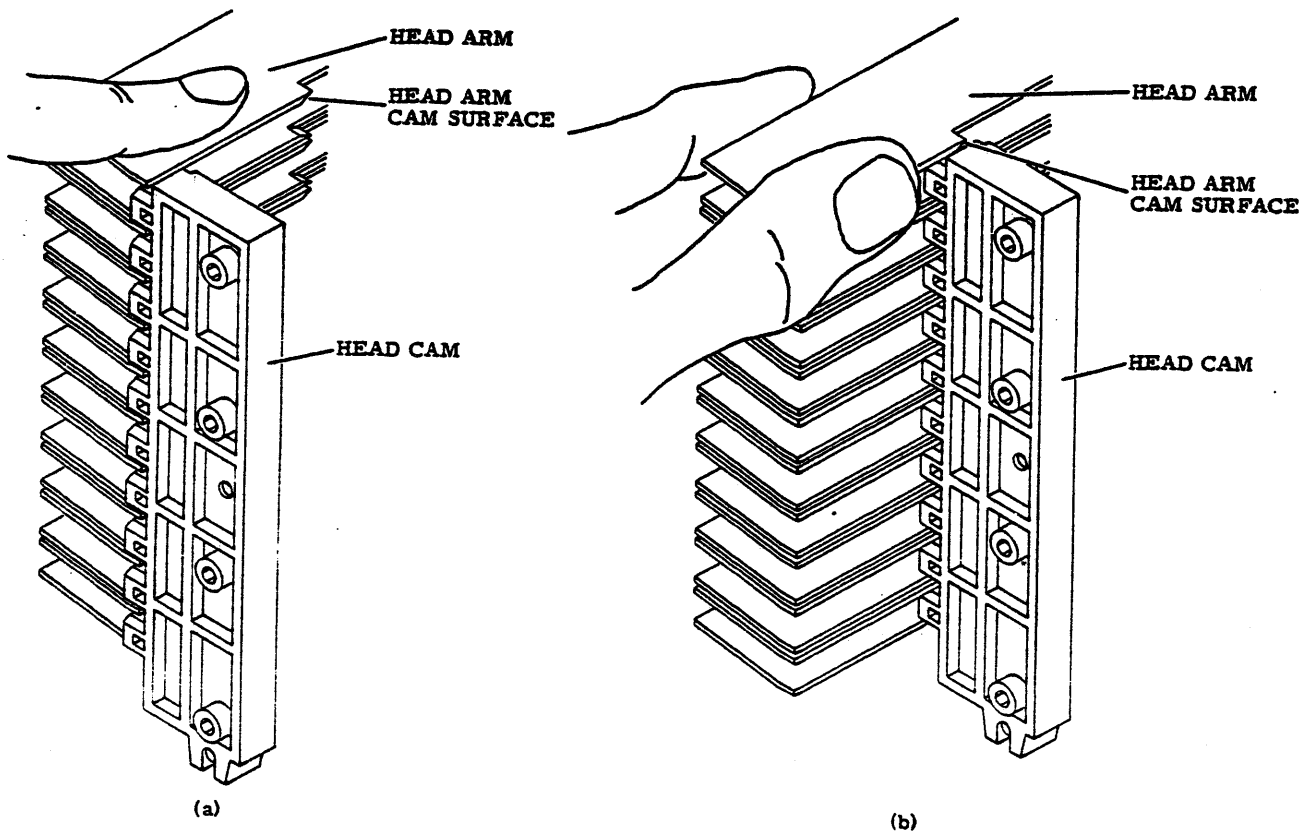
## LEVEL 2 MAINTENANCE PROCEDURES

### HEAD DUSTING

#### NOTE

Head dusting is a dry process. Do not use any type of cleaning solution.

1. Turn off drive motor.
2. Before removing the disk pack, use a lint-free cloth moistened with head and media cleaning solution to wipe off the top of the drive and around and behind the pack access cover.
3. Remove disk pack.
4. Set LOCAL/REMOTE switch to LOCAL.
5. Set Main Power circuit breaker to Off.
6. Place index finger on the top surface (toward the right side) of the first head arm assembly, as shown in figure 2-1a. Push down and pull the head arm assemblies toward the spindle about one-fourth inch. Then, grasp the side edges of only the top head arm assembly (see figure 2-1b) with the thumb and forefinger and continue pulling the head arm assemblies straight out toward the spindle to the point just before the head arms slide off the head cam. Do not grasp any head arm assemblies other than the top assembly or head misalignment may result.



8X14

Figure 2-1. Positioning Head Arm Assemblies

NOTE

If the head arms drop off the head cam, push head arm assemblies back to the retracted position as described in step 11, then repeat step 6.

7. Use the following procedure to blow off the loose oxide dust particles from the flying surface, spoiler holes, and leading edge of each head. (See figure 2-2.)

**WARNING**

Aim nozzle of can of dust remover away from face to prevent personal injury in case hose snaps off nozzle.

NOTE

Keep can of dust remover in an upright position to prevent liquid propellant from spraying on the heads.

- a. Connect plastic hose to nozzle of super dry dust remover can. (See figure 2-3.)

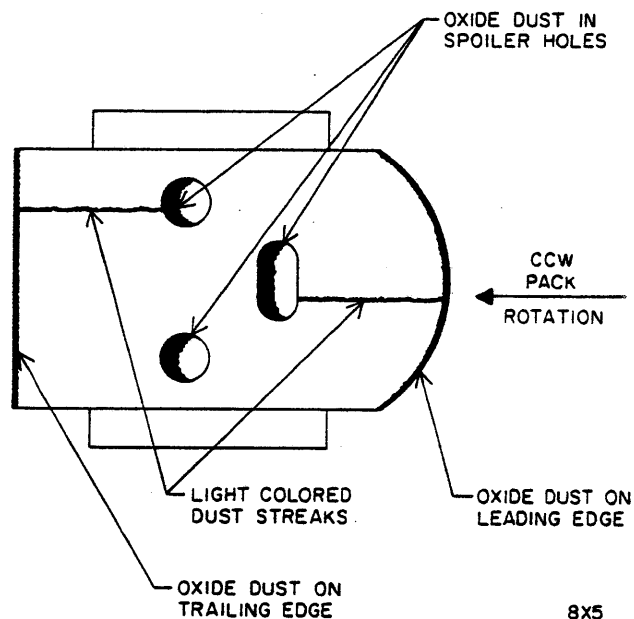


Figure 2-2. Typical Formation of Oxide Particles on Head Pad

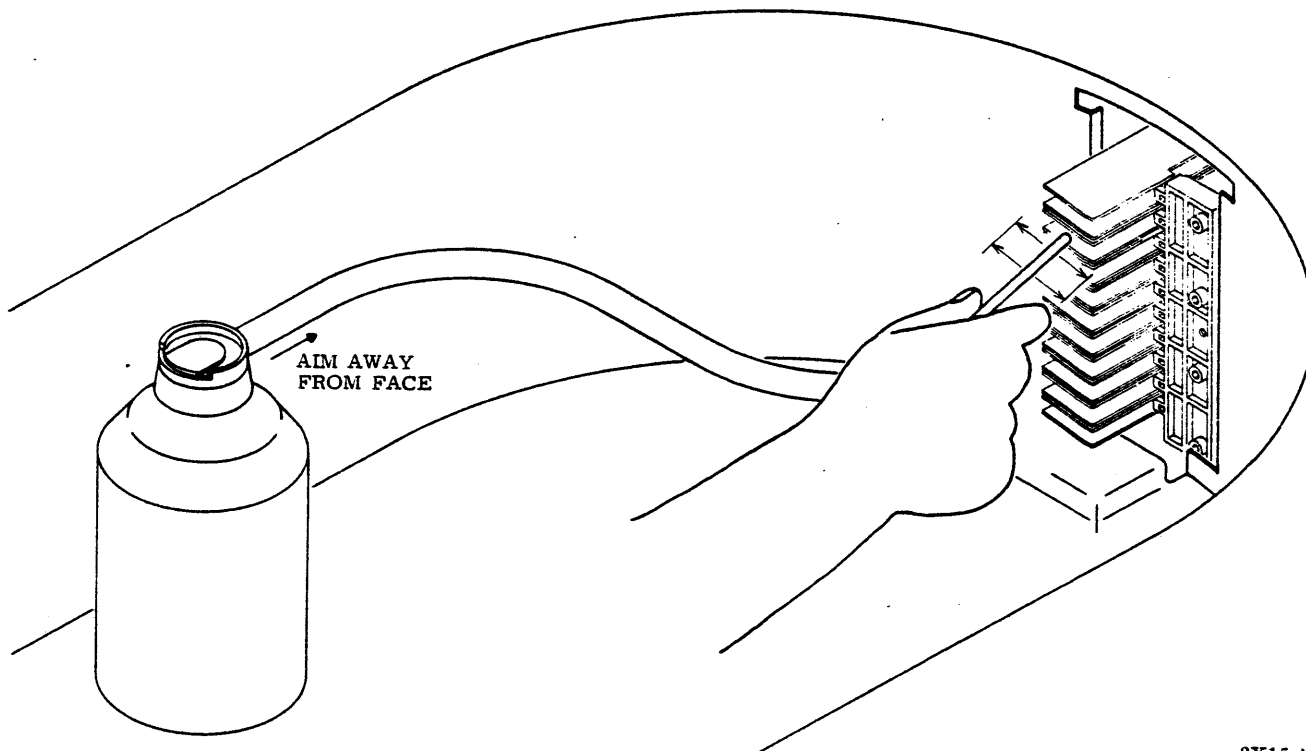


Figure 2-3. Using Super Dry Dust Remover

- b. Set the can of dust remover on a flat surface inside the shroud.

**NOTE**

Always start with the top head and proceed to the next lower head, doing the bottom head last.

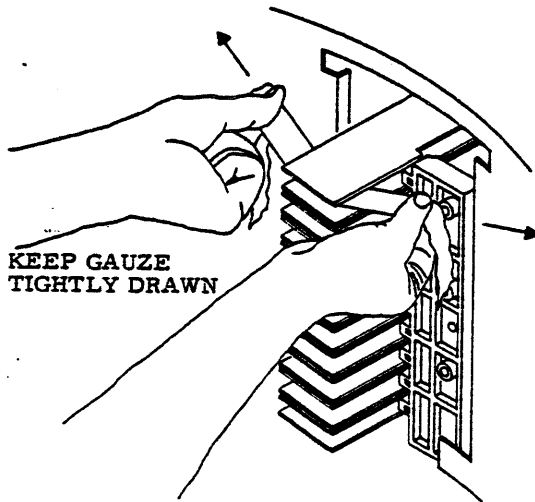
- c. Hold end of plastic hose one-fourth inch from head to be cleaned. Aim it upward for downward-facing heads and downward for upward-facing heads.
- d. While spraying, move hose back and forth six to eight times.
8. Buff the flying surface of each head as follows. (See figure 2-4).
- a. Hold an eight-inch strip of lint-free gauze between the thumb and forefinger of both hands. Hold gauze tightly, not slack.

- b. Place the gauze over a head and move the gauze back and forth eight to ten times on each head while applying light pressure.

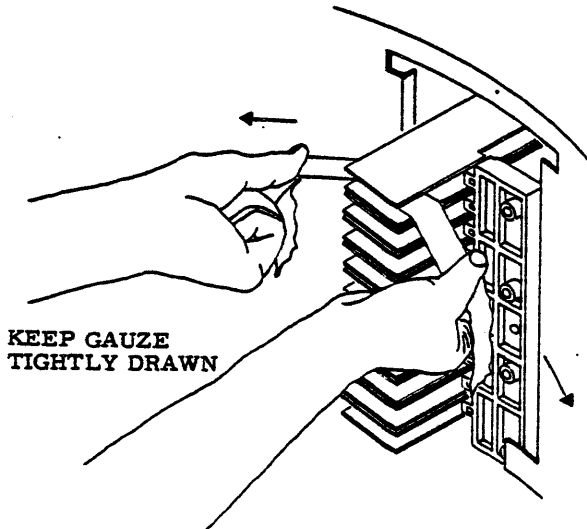
- c. Buff each head using the same piece of gauze.
- d. Repeat a through c using a new piece of gauze each time until there is no longer any evidence of oxide on the gauze.

If, after buffing heads three times, the gauze still shows evidence of oxide, the heads will have to be removed from the drive and cleaned as described in the head cleaning procedure in this manual.

9. Blow off heads again using the super dry dust remover, as in step 7. Be sure all lint and dust is removed.



DOWN FACING HEADS



UP FACING HEADS

8X16

Figure 2-4. Wiping Head Pads

10. Inspect heads with a high intensity light to see if any loose oxide dust particles remain. Use a two-inch minimum square mirror to view heads facing downward.

If after inspection, any head still shows evidence of oxide on flying surface, remove the head and clean or replace it as described in this manual.

11. When finished dusting heads, place both thumbs flat against the ends of the head arm assemblies and push the head arm assemblies back to the retracted position. (See figure 2-5.)
12. Set Main Power circuit breaker to On.
13. With the air blower on, wipe the inside of the shroud using a lint-free cloth moistened with head and media cleaning solution.
14. Place scratch pack in drive and close pack access cover. Allow the air flow to purge the system for one minute.
15. Start up drive and observe that drive functions properly. Allow drive to run on scratch pack for one minute.
16. Remove scratch pack and place customers pack in the drive.
17. Set LOCAL/REMOTE switch to REMOTE.
18. Return drive to computer operator.

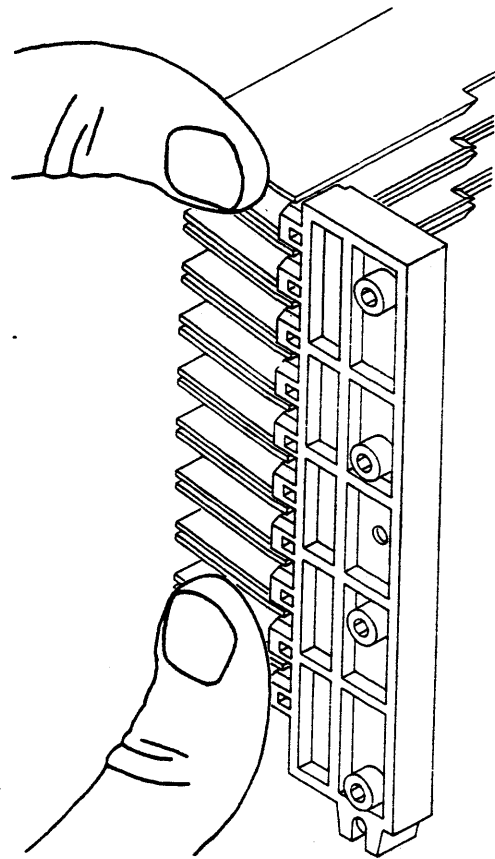


Figure 2-5. Returning Head Arm Assemblies to Retracted Position

8X17A

The following materials are required for head dusting (see the list of Maintenance Tools and Materials for the applicable CDC part numbers):

#### Description

1. Super Dry Dust remover
2. Hose Assembly
3. High Intensity Light
4. Lint-free Tube Gauze
5. Two Inch Minimum Square (Front Surfaced) Mirror

The following material is used only for moistening the lint-free cloth to wipe off the top of the pack access cover and inside the shroud:

#### Description

6. Head and Media Cleaning Solution
7. Lint Free Cloth

## LEVEL 3 MAINTENANCE PROCEDURES

### CLEAN AND INSPECT PACK ACCESS COVER GLASS

Use a lint-free gauze dampened (not soaked) with media cleaning solution to remove smudges and deposits from the glass in the pack cover.

Inspect the underside of Pack Access Cover for a series of nuts and screws which secure the glass in the cover. It is possible for these nuts to loosen. If so, loosen nuts on the underside of the Pack Access Cover (a few at a time) and apply a small quantity of "LOCTITE" to the screw thread area. Tighten nuts "Finger Tight" or 1.5 to 2.0 inch pounds if torque is used.

### REPLACE PRIMARY FILTER

1. Remove disk pack: Press START switch to stop drive motor. Open pack access cover, remove disk pack and place bottom on the pack cannister. Close pack access cover.
2. Open cabinet rear door and set UNIT POWER circuit breaker to OFF.
3. Remove cabinet front panel: Release two turnlock fasteners securing front panel to cabinet frame. Disconnect ground leadwire between front panel and frame. Remove and set front panel aside.
4. Remove primary air filter: Remove primary air filter from bottom of air supply assembly at front of cabinet (see figure 2-6), by pressing upward on spring clips while pulling filter out.

#### NOTE

Install primary filter with media facing the outside.

5. Install replacement primary air filter: Insert bottom of filter into spring clips at bottom of air supply assembly and push top of filter towards air supply assembly snapping filter in place into spring clips. Check to ensure that primary air filter is centered over inlet opening.
6. Install cabinet front panel: Position front panel in place on cabinet frame. Attach ground leadwire between front panel and cabinet frame. Secure front panel to cabinet with two turnlock fasteners.
7. Set UNIT POWER circuit breaker to on and close cabinet rear door.

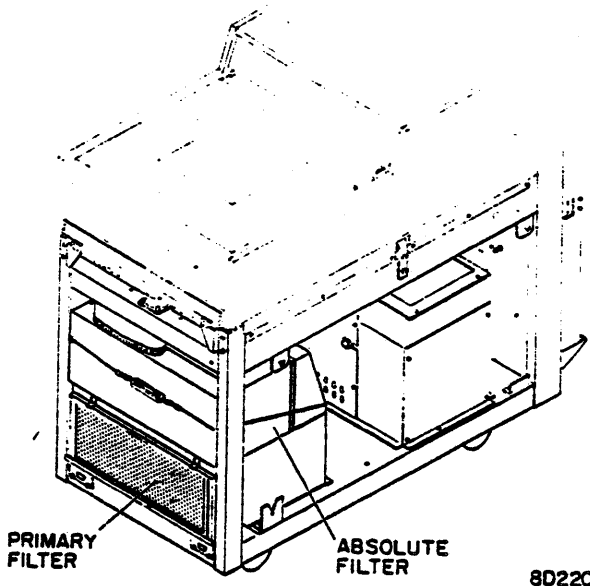


Figure 2-6. Cabinet Filters

### CHECK ABSOLUTE FILTER

1. Press START switch to stop spindle motor.
2. Remove front panel.

#### NOTE

The gage float must move freely. Check for free float movement before using, by inverting the gage to check for free fall of float.

3. Remove hole plug from the output air plenum and insert air sample gage tube.
4. Power up drive.
5. Hold the air sample gage in the vertical position and observe the gage reading. Filter should be changed if the reading is 0.4 or less.
6. Power down drive.
7. Remove gage tube from hole in plenum and install hole plug.
8. Install front panel.

## LEVEL 4 MAINTENANCE PROCEDURES

### CLEAN SHROUD AND SPINDLE

1. Stop spindle motor.
2. Open pack cover.

#### CAUTION

Keep any disk pack at least three inches away from any part of the magnet assembly.

3. Remove disk pack.
4. Clean shroud with a lint-free gauze that is slightly dampened with media cleaning solution. Wipe shroud to remove all dirt and smudges. Thoroughly wipe spindle surface.
5. Make certain that all particles are removed from interior of shroud.

### CLEAN AND LUBRICATE LOCKSHAFT

1. Stop spindle motor.
2. Open pack cover.
3. Remove disk pack.
4. Use lint-free gauze and a brush or sharp instrument to clean lockshaft threads on top end of spindle.
5. Apply a thin coat of lubricant paste to threads.
6. Check for free movement of lockshaft by depressing and checking that it freely returns to its original position.

#### CAUTION

Apply paste only to threads since excess paste could enter the pack assembly and do damage to the pack.

7. Apply a thin coat of lubricant paste to the threads of the pack lockscrew.
8. Place the pack in position on the spindle and turn the lockscrew in-to and out-of the spindle several times to transfer the lubricant to the lockshaft threads.
9. Remove pack and clean all remaining lubricant from the threads of the pack lockscrew and pack assembly.
10. Close pack access cover.

## LEVEL 6 MAINTENANCE PROCEDURES

### REPLACE ABSOLUTE FILTER

1. Remove disk pack: Press START switch to stop drive motor. Open pack access cover, remove disk pack, and place bottom cover on pack cannister. Close pack access cover.
2. Open cabinet rear door and set UNIT POWER circuit breaker to OFF.
3. Remove cabinet front panel: Release two turnlock fasteners which secure front panel to cabinet frame. Disconnect ground leadwire between front panel and frame. Remove and set front panel aside.
4. Replace primary air filter per the Replace Primary Air Filter procedure listed under Level 3 Maintenance procedures in this section. (Do not install replacement primary air filter until instructed to do so.)
5. Remove absolute air filter:
  - a. Loosen turnbuckle securing output plenum to filter. Allow wire and turnbuckle to fall free.
  - b. Swing air plenum up and remove absolute filter.
6. Install replacement absolute filter:
  - a. Inspect the foam tape on the mating surfaces of the absolute filter for damage or excessive compression of the foam tape. Replace as necessary. (If the tape is excessively compressed, the air filter may not make a good air seal with the plenum.)

#### NOTE

When installing replacement absolute air filter, the arrow should point towards the output plenum or the front of the drive (direction of air flow).

- b. Position replacement absolute filter in air plenum.
  - c. Position wire and turnbuckle over air filter and plenum. Tighten turnbuckle until plenum is secure.
7. Install replacement primary air filter: Position primary filter in lower spring clips of blower plenum. While pressing upward on upper spring clips, push filter against blower plenum and release upper spring clips.

#### NOTE

Ensure air inlet boot and clamp at the rear of the air plenum flange are tight.

8. Install cabinet front panel: Position front panel in place on cabinet frame. Attach ground leadwire between front panel and cabinet frame. Secure front panel to cabinet with two turnlock fasteners.

#### CAUTION

In the next step the blower is run for several minutes to purge dust or dirt particles from unit. Do not install disk pack until after purging is complete.

9. Set UNIT POWER circuit breaker to ON and ensure that blower starts. Allow blower to purge unit for two minutes before installing disk pack.

**SECTION 3**  
**CORRECTIVE MAINTENANCE**





## INTRODUCTION

This sections contains the instructions for drive maintenance. The information is provided in the form of Electrical Checks and Adjustments, and Mechanical Corrective Maintenance.

## SAFETY PRECAUTIONS

Observe the following safety precautions at all times. Failure to do so may cause equipment damage and/or personal injury.

1. Use care while working with power system. Line ac voltages are present at AlPl and inside the AC power assembly.
2. Keep hands away from positioner during seek operations and when reconnecting leads to voice coil. (Under certain conditions, emergency retract voltage may be present, causing sudden reverse motion and head unloading.)
3. Use caution while working near heads. If heads are touched, fingerprints can damage them. Clean heads immediately if they are touched.
4. Keep front cover closed unless it must be open for maintenance. This prevents entrance of dust into pack area.
5. Keep all watches, disk packs, meters, and other test equipment at least two feet away from voice coil magnet when deck cover is off.
6. Do not use customer disk pack; otherwise, customer data may be destroyed.
7. Do not use CE alignment disk pack unless specifically directed. These pack contain prerecorded alignment data that can be destroyed if the test procedure requires the drive to write. These alignment tracks cannot be generated in the field.
8. If unit fails to power down when START switch is pressed, disconnect yellow leadwire to voice coil and manually retract heads before troubleshooting malfunction.

## MAINTENANCE PRELIMINARY CONDITIONS

### OFFLINE OPERATIONS

Certain procedures require execution of operational commands (seek, read, etc.).

These commands can be generated by the Field Test Unit.

Manual operation of the positioner is possible if the yellow leadwire is disconnected from the voice coil. Observe the following safety precautions during manual operation:

1. Before manually moving carriage to load heads (disk pack not in place), install head cam tool per Manually Positioning Carriage Procedure.
2. Make certain that heads are unloaded before turning off power. If power to spindle motor is lost while heads are loaded, immediately retract carriage. Otherwise heads will crash when disk speed is insufficient to permit heads to fly.
3. Before reconnecting yellow lead, make sure fingers are clear of positioner. Rapid positioner movement will occur if difference counter contains a value other than 1023\* or if an emergency retract condition exists.

### MANUALLY POSITIONING CARRIAGE

Manually positioning the carriage (with power off and/or disk pack removed) requires installation of the head cam tool.

1. Open pack cover and remove disk pack.
2. Close pack cover.
3. Open top cover and remove deck cover.
4. Open pack cover.
5. Remove voice coil yellow lead wire.
6. Position head cam tool against head cam mounted on actuator (Figure 3-1) using one hand.
7. With other hand, move carriage forward until head/arm assemblies enter and begin to grasp tips of head cam tool, then move tool along with forward movement of head/arm assemblies. When head/arm assembly securely holds head cam tool, release tool. Carriage is now free to move without damaging heads.
8. To remove head cam tool, grasp head cam tool and retract carriage until head/arm assemblies release tool. Remove tool.

\* 511 for models BR3E4/3E5

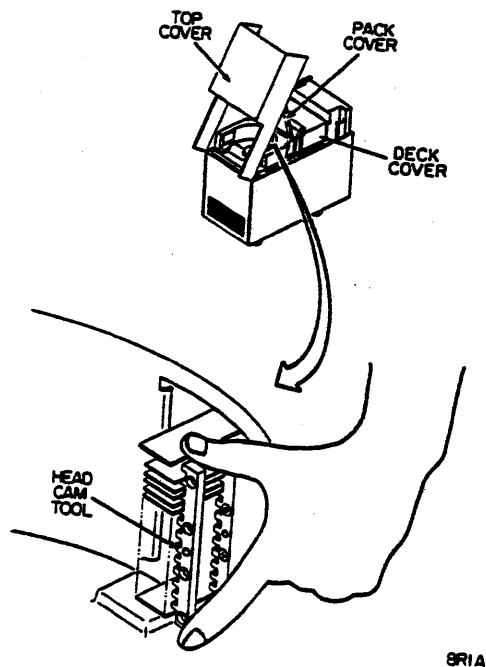


Figure 3-1. Head Cam Tool Installation

### WARNING

Keep hands away from the actuator when replacing yellow voice coil lead. Sudden movement of the actuator could result in injury.

9. Connect voice coil yellow leadwire.
10. Install deck cover.
11. Close pack and top cover.

## MAINTENANCE TOOLS AND MATERIALS

The tools, test equipment, and materials recommended for drive maintenance are listed in table 3-1.

## ELECTRICAL CHECKS AND ADJUSTMENTS

### INTRODUCTION

The electrical adjustments should be performed prior to replacing any parts. This ensures that apparent malfunctions are not caused simply by misadjustments. Also, these

procedures should be performed whenever logic cards or other electrical components are repaired or replaced.

These adjustments are divided into two parts:

- Servo System - the parts involved in moving the positioner to the selected cylinder.
- Miscellaneous Logic - the remaining logic in the drive not directly applicable to the servo system.

Before performing any of these procedures, be thoroughly familiar with the safety precautions and preliminary conditions specified earlier in this section.

### SERVO SYSTEM CHECKS

Figure 3-2 is a simplified diagram of the servo subsystem. This illustration indicates the primary test points used for checking and aligning the servo loop along with a brief explanation of the various signals, their test points, and the applicable checkout procedure. Servo test point waveforms for various seek lengths are shown in Figure 3-3.

#### Seek Procedure

Any BR3E4/3E5 tests that require a seek to a cylinder greater than 511 must be performed as follows:

1. Command a seek to half the number of cylinders desired.
2. Momentarily ground B17-10B to reset the cylinder register.
3. Command a seek length to complete the seek to the desired cylinder.

#### General Checkout Criteria

Of the procedures listed in Figure 3-2, only the procedures listed below are adjustments, the remainder are checks to verify proper operation:

- Velocity Gain Adjustment
- Coarse Position Gain Adjustment
- Integrator Gain Adjustment
- Fine Position Offset Adjustment

Because the subsystem is a closed loop servo, all of the signals are interacting. Therefore, misadjustments may cause seek difficulties that appear to be hardware malfunctions. Check all adjustments before initiating

TABLE 3-1. MAINTENANCE TOOLS AND MATERIALS

| Description                    | Part Number         | Description   | Part Number                                     |
|--------------------------------|---------------------|---|---|
| Actuator Stop Adjustment Tool  | CDC* 87008000       | Mirror, Front Surfaced (Two Inch Square Minimum)                            | Commercially Available                          |
| Adapter (3/16 Hex to 1/4 sq)   | CDC 12262582        | Non-Metallic Feeler Gage, 0.005 inch  | CDC 12205633                                    |
| Air Flow Gage                  | CDC 87170900        | Null Meter  | CDC 73576400                                    |
| Ball End Hex Driver (3/16 Hex) | CDC 12263201        | Offline Tester  | **CDC 72841004                                  |
| Card Extender (Half-Size)      | CDC 54099701        | Oscilloscope, Dual Trace  | Tektronix 454A or equivalent                    |
| Card Extender (Full-Size)      | CDC 54109701        | Oscilloscope Hood   | Tektronix 016-0083-00                           |
| Card Extraction Tool           | CDC 87399200        | Pin Straightener  | CDC 87369400                                    |
| Carriage Alignment Arm         | CDC 87007900        | Plastic Spatula (or wooden tongue depressor)                                | Commercially Available                          |
| Carriage Alignment Ring        | CDC 87389800        | Push-pull Gage  | CDC 12210797                                    |
| Carriage Blocking Tool         | CDC 76534200        | Removal Tool, 20-30 Gage  | CDC 12259183                                    |
| CE Disk Pack (M4459)           | CDC 70430005        | Scope Probe Tip (Hatchet Type)  | CDC 12212885                                    |
| Chip Extender-Chip Cliplog     | CDC 12212196        | Shim Assortment (used for carriage stop adjustment when replacing actuator) | CDC 75039400                                    |
| Cloth, Lint Free               | CDC 94211400        | Spindle Adjustment Tool   | CDC 87059900                                    |
| Computer Card                  | 5084                | Torquemeter   | Snap-On TQ S-1-FU or equivalent                 |
| Disk Pack (200 MB) (M4451)     | CDC 70430511        | Torque Wrench, 1/4 inch   | CDC 12263205                                    |
| Dust Remover, Super Dry        | CDC 95047800        | Volt/ohmmeter   | Ballantine 345 or equivalent digital volt-meter |
| Filter Coat                    | CDC 12210958        | Wire Wrap Bit, 30 Gage  | CDC 12218402                                    |
| Gauze, Tube, Lint Free         | CDC 12209713        | Write Wrap Gun, Electric  | CDC 12259111                                    |
| Grease, Silicone               | CDC 95109000        | Wire Wrap Sleeve, 30 Gage   | CDC 12218403                                    |
| Head Adjustment Tool           | CDC 75009100        |   |   |
| Head Alignment Card (DFSV)     | CDC 54226505        |   |   |
| Head Cam                       | CDC 75212300        |   |   |
| Hose Assembly                  | CDC 82346500        |   |   |
| Light, High Intensity          | CDC 12212038        |   |   |
| Loctite, Grade #242            | CDC 95125322        |   |   |
| Loctite Primer, Grade N        | Loctite Corporation |   |   |
| Lubricant Paste                | CDC 95016101        |   |   |
| Media Cleaning Solution        | CDC 82365800        |   |   |

\* CDC® is a registered trademark of Control Data Corporation.  
 \*\* CDC 72841004 supercedes CDC 86073404 for documentation.

detailed trouble analysis procedures. All adjustments should be checked if any servo loop cards have been replaced. All adjustments must be made on a thermally stable unit with the deck cover installed. For thermal stabilization, perform 15 minutes of 256-track repeated seeks.

**VELOCITY CIRCUITS**

**Velocity Gain Adjustment**

This procedure adjusts the gain of the velocity signal applied to the summing amplifier. The purpose of this procedure is to adjust for different sensitivities of velocity transducers.

1. Install a scratch disk pack.

**NOTE**

This procedure uses a field test unit to command drive seeks; however, a controller with appropriate software may also be used.

2. Connect field test unit to drive.
3. Remove rear door panel.
4. Set oscilloscope control settings as follows:
  - CH 1 VOLTS/DIV: .5V
  - A TIME/DIV: 50 mS
  - A TRIGGERING: Positive/External



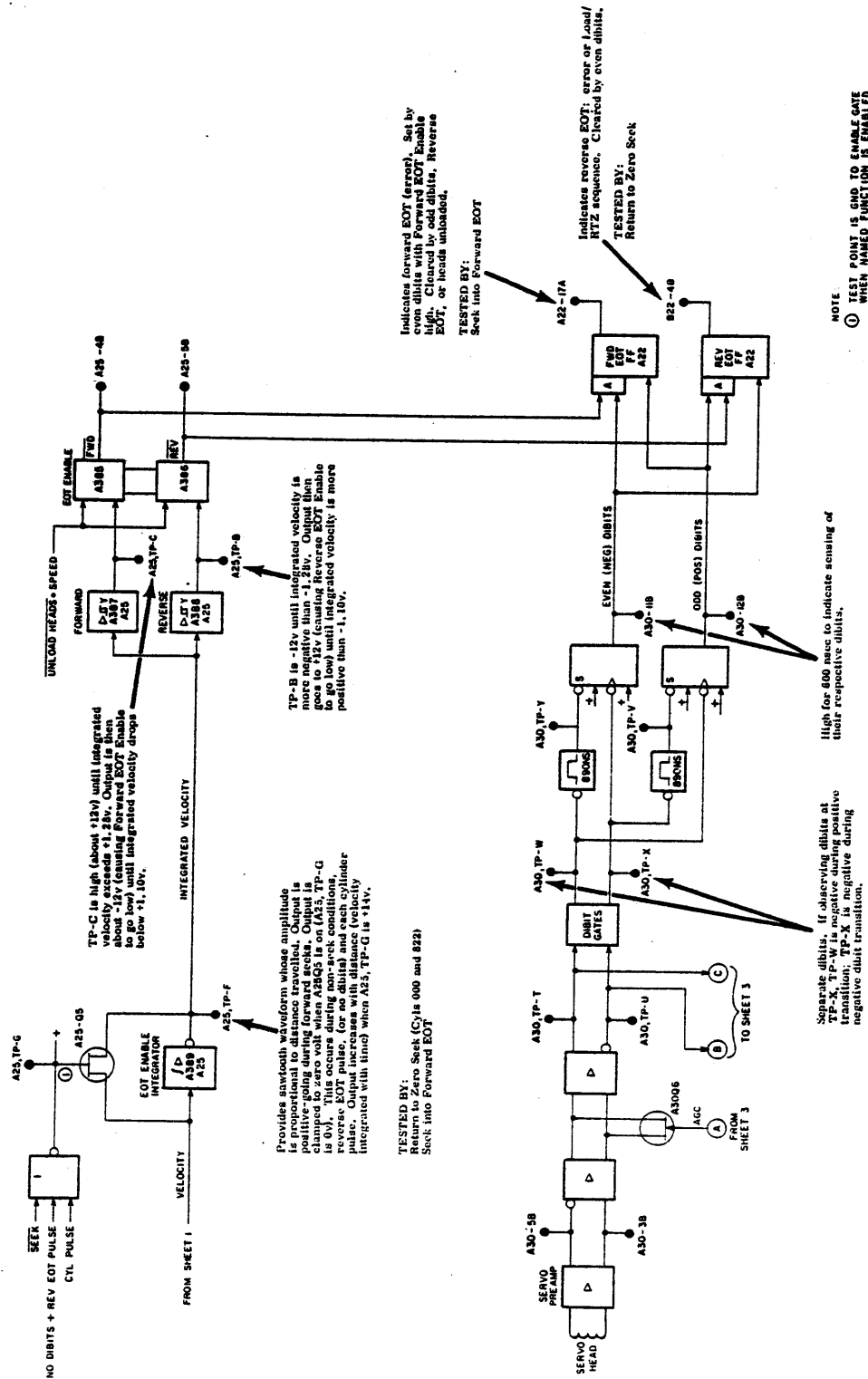


Figure 3-2. Servo System Test Points (Sheet 2 of 3)

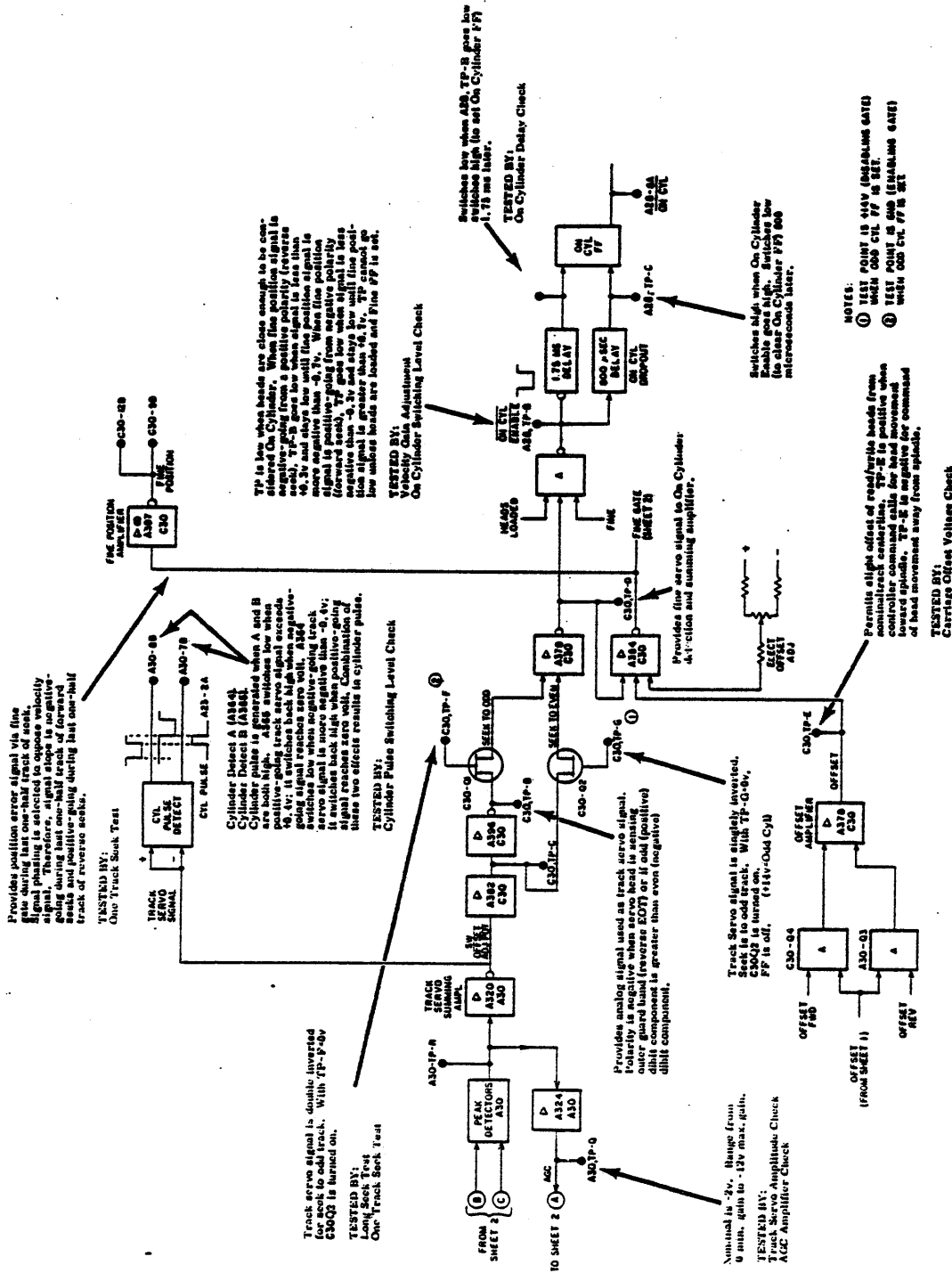
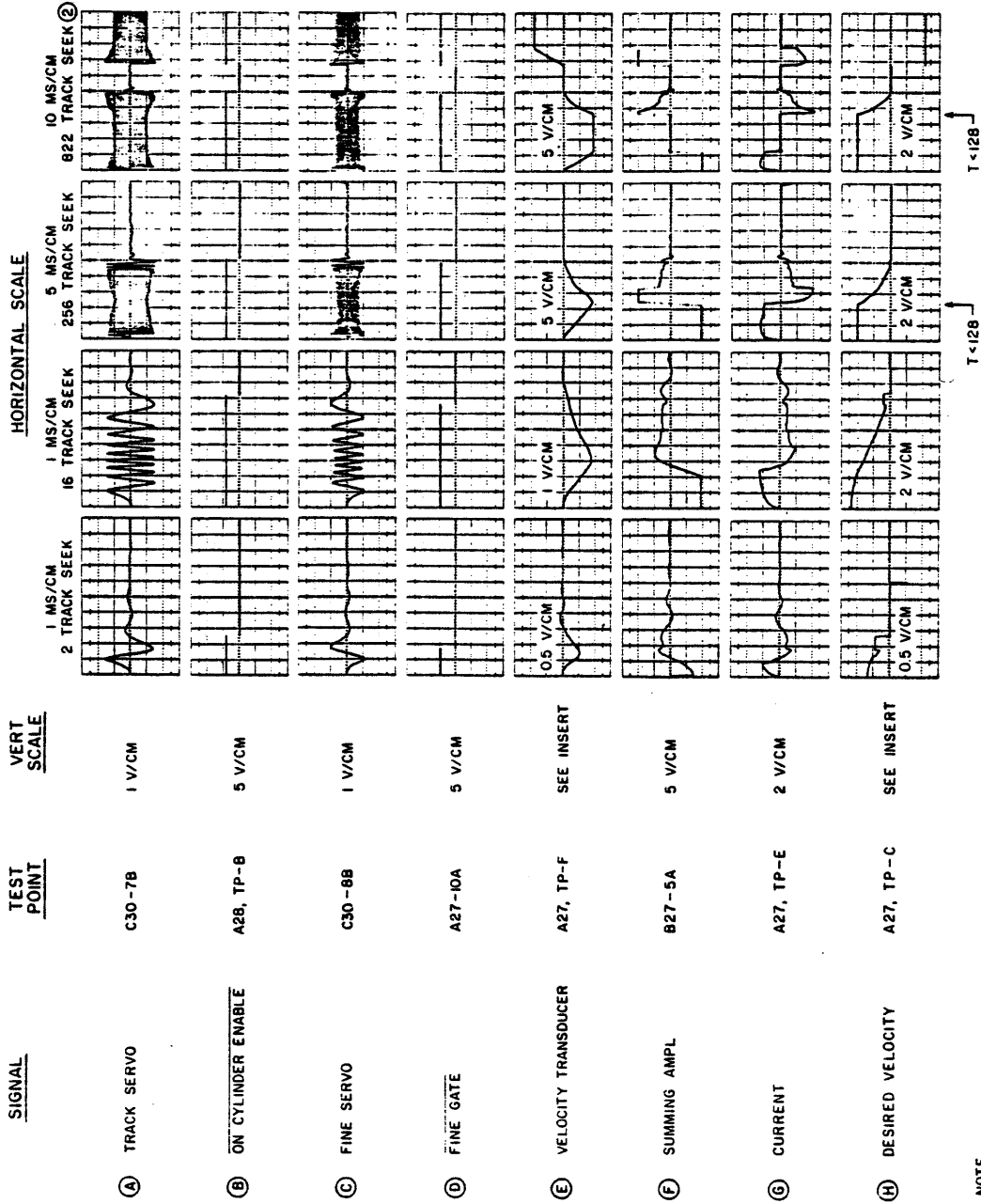


Figure 3-2. Servo System Test Points (Sheet 3 of 3)



7MI14A

NOTE:  
 1. SYNC (-) ON FORWARD SEEK (A27-I2A)  
 2. 410 TRACK SEEK FOR BR3E4/BR3E5

Figure 3-3. Forward Seek Waveforms



- MODE TRIGGER: CH 1
- HORIZONTAL DISPLAY MAG: XI

5. Connect oscilloscope as follows:

- Use X10 probe.
- CH 1 to backpanel pin A28-08A (Not on Cylinder).
- A TRIGGERING to backpanel pin B27-06B (RTZS).

NOTE

See procedure for seeks of 511 cylinders or greater on page 3-2.

6. Command a direct seek to cylinder 822 for BR3C9 and cylinder 410 for BR3E4 and BR3E5.
7. Command an RTZ and observe oscilloscope waveform. The time from initiation of RTZ command to Not On Cylinder signal going to logical 0 shall be  $340 \pm 10$  ms for BR3C9 and  $180 \pm 5$  ms for BR3E4 and BR3E5.
8. If requirement of step 7 is met, proceed directly to Coarse Position Gain Adjustment. If requirement is not met, adjust velocity gain potentiometer (middle pot) and Card A27 while repeating steps 6 and 7. If unable to adjust to meet requirements, perform Velocity Transducer Gain Uniformity Check and Integrator Gain Check and Adjustment.

Velocity Gain Damping Check

This procedure measures the damping effect of the Velocity signal applied to the summing amplifier. The purpose of this procedure is to measure the track following capabilities.

1. Install a scratch disk pack.

NOTE

This procedure uses an FTU to command drive seeks; however, a controller with appropriate software may be used.

2. Connect FTU to drive.
3. Remove rear door panel.
4. Set oscilloscope control settings as follows:
  - CH 1 VOLTS/DIV: 10 mV
  - A TIME/DIV: 5 ms
  - A TRIGGERING: Positive/External

- MODE TRIGGER: CH 1
- HORIZONTAL DISPLAY MAG: XI

5. Connect oscilloscope as follows:

- Use X10 probe.
- CH 1 to card C30, TPD (Fine Position Signal).
- A TRIGGERING to card C30-TPY (square wave generator).

6. Enable square wave generator by connecting a wire between backpanel pins C30-01A and C30-16B.

7. Adjust vertical position control on oscilloscope to move trace up until area A in Figure 3-4 is centered on middle graduation of oscilloscope.

8. Measure first overshoot (point B in Figure 3-4). It must be between 100 and 400 mV (1 to 4 divisions) below center graduation on oscilloscope.

9. Adjust vertical position control on oscilloscope to move trace down until area C in Figure 3-5 is centered on middle graduation of oscilloscope.

10. Measure first overshoot (point D in Figure 3-5). It must be between 100 and 400 mV (1 to 4 divisions) above center graduation on oscilloscope.

NOTE

The square wave generator must be disabled while seeking or a seek error will occur.

11. Remove wire used to enable square wave generator (between backpanel pins A26-01A and A26-16B).
12. Command a seek to cylinder 822\* for the BR3C9 and perform steps 6 through 11.

NOTE

The amplitude of the overshoots will vary and sometimes they may fall outside the 100 to 400 mV range; however, the overshoots must be within the 100 to 400 mV range most of the time.

13. If overshoot of any check is too high or too low, perform Transducer Gain Uniformity Check and/or Track Servo Amplitude Check.

\* See procedure for seeks  $\geq$  511 cylinders. (Page 3-2).

**OSCILLOSCOPE SETTINGS**

LOGIC GND TO SCOPE GND

VOLTS / DIV

CH 1 - 10 MV/DIV (READ SCALE AS 100 MV/DIV)  
CH 2 - NOT USED

TIME / DIV

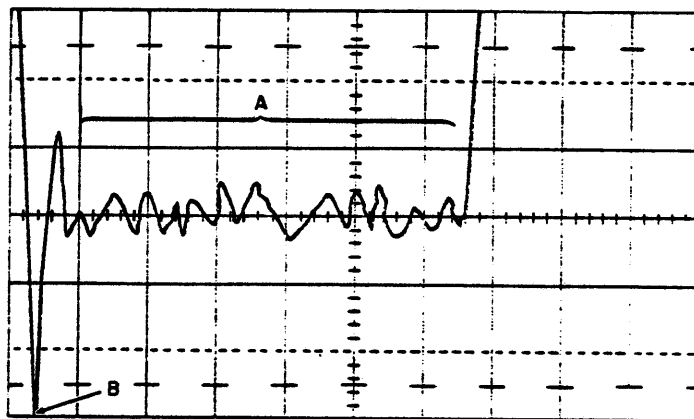
A - 5 MS/DIV  
B - NOT USED

TRIGGERING

A - POSITIVE, EXTERNAL ON SQUARE WAVE GENERATOR  
B - NOT USED

PROBE CONNECTIONS (USE 10X PROBE)

CH 1 TO FINE POSITION SIGNAL  
CH 2 NOT USED



8D204B

Figure 3-4. Velocity Gain Damping Check - Negative Overshoot

**OSCILLOSCOPE SETTINGS**

LOGIC GND TO SCOPE GND

VOLTS / DIV

CH 1 - 10 MV/DIV (READ SCALE AS 100 MV/DIV)  
CH 2 - NOT USED

TIME / DIV

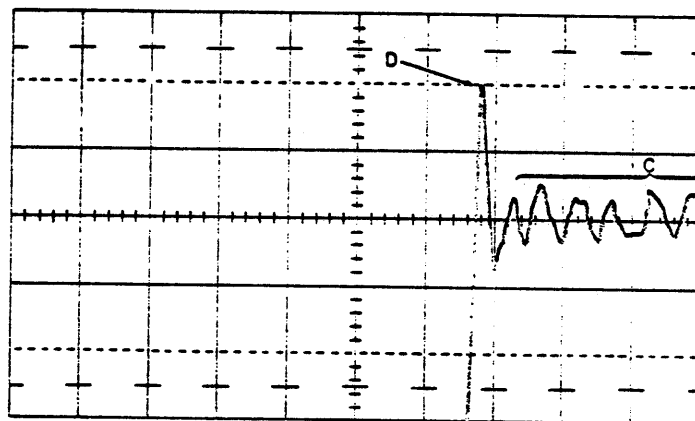
A - 5MS/DIV  
B - NOT USED

TRIGGERING

A - POSITIVE, EXTERNAL ON SQUARE WAVE GENERATOR  
B - NOT USED

PROBE CONNECTIONS (USE 10X PROBE)

CH 1 TO FINE POSITION SIGNAL  
CH 2 NOT USED



8D205B

Figure 3-5. Velocity Gain Damping Check - Positive Overshoot

## Coarse Position Gain Adjustment

### NOTE

For the coarse gain adjustment after a power up condition, a wait of 30 minutes without seeking with blowers on and heads loaded will be necessary, or after a seeking condition, a 45 minute wait with blowers on and heads loaded is necessary. This wait for both conditions is necessary to temperature stabilize the drive before running the coarse gain adjustment. Without the wait, the adjustment is invalid.

1. Install a scratch disk pack.
2. Connect FTU to drive.
3. Set oscilloscope control settings as follows:
  - HORIZONTAL DISPLAY MAG: X5
  - CH 1 VOLTS/DIV: 50 mV
  - CH 2 VOLTS/DIV: 0.1 mV
  - A and B TIME/DIV: 5 ms
  - A TRIGGERING: Negative/External
  - MODE: CHOP
4. Connect oscilloscope (use 10x probes) to drive as follows:
  - CH 1 to C30-TPD (Fine Position Signal, A2609).
  - CH 2 to A27-TPE (Current Sense, input to A2807).
  - A TRIGGERING to wirewrap pin A27-12A (Not Forward Seek, input to A2701).
5. Command the drive to perform a 256-cylinder repeat seek, access only, for a period of ten minutes: Set UNIT POWER circuit breaker to ON. Press START switch to start drive motor and to load heads. Using FTU, command a 256-cylinder repeat seek, access only, for a period of ten minutes.

### NOTE

If faults occur during the following adjustment, perform Integrator Gain Check and Adjustment first. If

faults still occur, ground A13-14B (I5503, Spike Detect) until Coarse Gain and Integrator are both adjusted.

6. Immediately after the ten-minute 256-cylinder repeat seek, adjust coarse position gain (top pot) on A27 so that point A (figure 3-6) lies between the 14th and 15th negative pulses. Allow the drive to access at this adjustment for one minute to allow temperature stabilization. Re-adjust if necessary.
7. Proceed to Integrator Gain Adjustment and then return to step 3 of this procedure. Repeat until both adjustments meet their respective limits.
8. If the requirements of steps 6 and 7 are met, go to step 9. If requirements of steps 6 and 7 cannot be met, troubleshoot drive servo logic (refer to Servo Margin Test procedure).
9. Remove scratch disk pack.
10. Disconnect FTU and oscilloscope from drive: Set UNIT POWER circuit breaker to OFF. Disconnect oscilloscope probes and FTU from drive. Install logic chassis card cover and cabinet rear door panel. Set UNIT POWER circuit breaker to ON and close cabinet rear door.

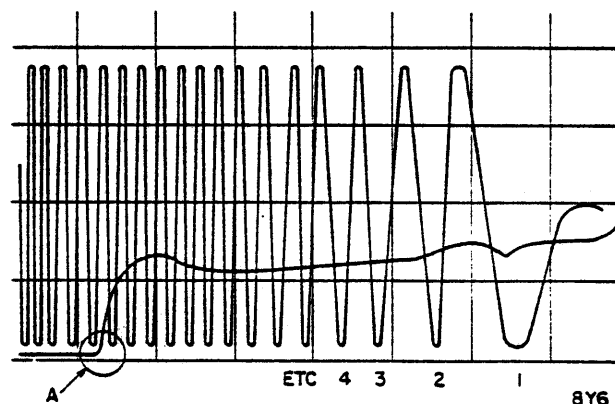


Figure 3-6. Coarse Position Gain Waveform

### Integrator Gain Check and Adjustment

This procedure must always be done in conjunction with the Coarse Position Gain Adjustment.

1. Command 32-track repeated seeks between cylinder 000 and 32.
2. Sync negative on A27-11A.
3. Connect oscilloscope to A27, TP-C (observe both positive and negative wave shapes).
4. Set horizontal sweep to 5 ms/cm magnified by 5.
5. Check for continuous smoothness of waveshapes within areas indicated in Figure 3-7.
6. Adjust integrator gain pot (bottom pot) on A27 until both waveshapes are as similar as possible, and until irregularities of each waveshape in the indicated areas are less than 30 mV peak-to-peak (ignore the narrow spikes).
7. Proceed to Coarse Position Gain Adjustment procedure.

### Servo Margin Test

This procedure is intended to be a troubleshooting aid and not an adjustment procedure. Perform this test after adjusting the velocity gain, coarse position gain, and integrator gain.

1. Adjust coarse position gain (top pot on A27) so that point A (Figure 3-6) lies at the 7th negative pulse.
2. Perform five minutes of random access seeks (no read/write function). No access errors should occur.
3. Access errors indicate:
  - a. Velocity gain misadjusted.

- b. Velocity transducer defective. (Excessive velocity drift causes point A on Figure 3-6 to drift to first pulse.)
  - c. Defective servo cards (MRV or MSV).
  - d. Defective servo head.
4. Readjust coarse position gain (top pot on A27) so that point A (Figure 3-6) lies between the 14th and 15th negative pulses.

### On Cylinder Delay Check

This procedure is intended as a useful troubleshooting aid and is not an adjustment.

1. Command a one-track repeated seek.
2. Connect oscilloscope to A27, TP-B and A28-8B.
3. Sync positive on A28, TP-B and measure time A28, TP-B is a logical 1. It shall be a logical 1 for 4.75 ( $\pm 1.2$ ) ms.
4. Sync positive on A28, TP-B and measure time A28-8B is a logical 0. It shall be a logical 0 for 7.0 ( $\pm 1.75$ ) ms.

### Fine Position Offset Check and Adjustment

(Servo Offset Null/DC Offset Adjustment)

1. Connect minitester. Install head alignment card DFSV, PN 54226505, in A21 and connect null meter (PN 54226505) to test points X and Z.
2. Install CE pack.
3. Insure deck cover is installed.
4. Switch to Write Protect.
5. Press START switch to load heads.

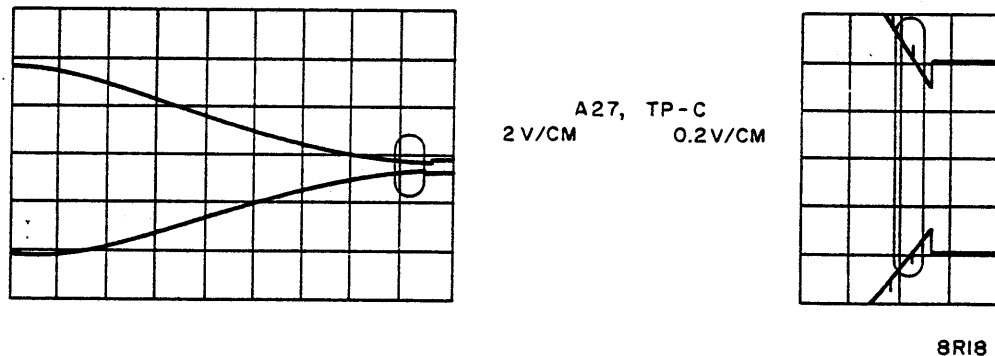


Figure 3-7. Velocity Integrator Waveforms

#### NOTE

Perform 15 minutes of 256 repeated seeks (access seeks only) for thermal stabilization. This 15 minute warmup is not required if the head/arm alignment check is in progress and the 30-60 minute warmup requirement of that procedure is met.

6. Command a direct seek (access only) to cylinder 490.
7. Set READ/WRITE-SERVO switch on head alignment card to servo.

#### NOTE

Steps 8, 9 and 10 adjust the odd-even track null (servo offset null adjustment). If unable to perform any of these adjustments, refer to Servo Fine Position Maintenance Criteria.

8. Note meter reading on cylinder 490.
9. Command a seek to cylinder 491 and note meter reading.
10. Adjust the bottom potentiometer on card at C30 so that the reading on cylinder 491 moves towards the reading on cylinder 490. Seek between cylinders 490 and 491 while adjusting potentiometer until readings are less than 10 mV.

#### NOTE

Steps 11 to 14 adjust the track servo signal null (dc offset adjustment). If unable to perform adjustment, refer to Servo Fine Position Maintenance Criteria.

11. Command a seek to cylinder 490 and note meter reading.
12. Toggle the POS/NEG switch on the head alignment card and adjust the top potentiometer on card at C30 so that the positive and negative readings move towards each other. Repeat procedure until readings are equal or within 2 mV.
13. Command a seek to cylinder 491 and verify the null (using POS/NEG switch) on an odd cylinder. If meter reading is not nulled, repeat procedure starting at step 6. If reading is nulled, go to step 14.
14. Make note of POS/NEG meter reading at cylinders 8 and 800\*. Do not readjust potentiometers. If P-N differences are greater than 20 mV at cylinders 8 and 800, refer to Servo Fine Position Maintenance Criteria.

\* See procedure for seeks  $\geq$  511 cylinders. (Page 3-2.)

#### Servo Fine Position Maintenance Criteria

Servo loop and servo data offset effects may be so large that servo offset null and dc offset adjustments will not reduce error to acceptable limits. If unable to complete these adjustments, replace card at C30 or A27 for servo offset null, or replace card at A30 or servo head/arm assembly for the dc offset adjustments.

Dirty rails may affect null adjustments. If this seems to be a problem, seek to two nearby cylinders such as 460-461 and perform servo offset null dc offset adjustment procedures. If requirements can be met at these cylinders, clean rails and repeat adjustment procedure at cylinders 490-491.

P-N readings may deviate up to 20 mV at extreme cylinder positions (such as 8 and 800). This effect is normally due to variations in the disk pack air currents and head cable stresses at extreme positions. However, if mechanical parts have been changed (heads, carriage, head cable bracket, etc.), mechanical stresses may have developed which will cause excessive deviation (P-N readings) at extreme cylinder positions. If P-N readings do not meet requirements at these positions check the following:

1. Check head cables for binding, kinking or twisting.
2. Check that head cables are properly clamped in clamping block, that cables have equal dress, and that none of the shields protrude from the rear of the clamping block.
3. Check clamping block to see if it is twisted or bent.
4. Check for blockage that could affect air flow in pack area (clogged air filter, obstructions, etc.).

#### Fine Position Test

#### NOTE

The requirements of the Fine Position Offset Check and Adjustment must be met before performing this test.

This test checks the track following capability of the drive and runout of the spindle. Runout is the degree to which a rotating object rotates off center. Too much runout causes the object to wobble or vibrate. Runout of the pack and spindle are additive, therefore a pack with known characteristics must be used (preferably a CE pack).

1. Load heads.
2. Sync positive on C21-17B (Index).
3. Connect oscilloscope to C30-TPD (Fine Position signal). Set sweep rate to 2 ms/div.

4. Perform direct seek to cylinder 400.

**NOTE**

The signal measured in step 4 is the 60 Hz component of the displayed waveform. The waveform in Figure 3-8 is typical and may vary from drive to drive.

5. Observe waveform on scope. The average peak-to-peak value of the observed waveform should not exceed the requirements of Figure 3-8. If value exceeds requirements, go to step 8. If value is within requirements, go to step 6.
6. Remove pack, rotate pack 90 degrees and install pack.
7. Observe waveform on scope. The average peak-to-peak value should not exceed requirements of Figure 3-8. If value exceeds requirements, go to step 10. If within requirements, go to step 8.
8. Observe waveform on scope to determine where Fine Position signal synchronizes with Index.
9. Remove pack, rotate pack 90 degrees and install pack.

**NOTE**

The point at which Index and the Fine Position signal synchronizes may be different from pack to pack. However, the sync point (Index) will be the same for the pack under test, no matter how many times the pack is removed, rotated, and installed on the spindle because Index is derived from a pre-recorded code on the servo track.

10. Observe waveform on scope to determine where Fine Position signal synchronizes with respect to Index.

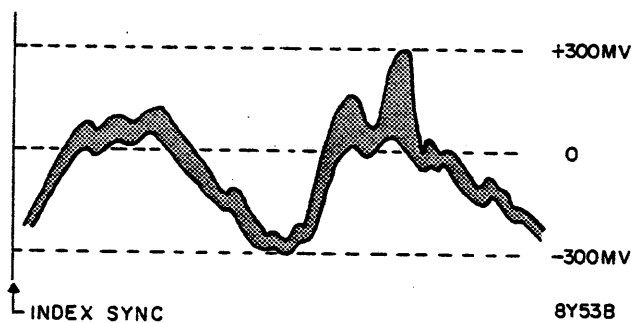


Figure 3-8. Fine Position Gain Waveform

- a. If the waveform coincides with the sync point as observed in step 8, the problem is pack runout. Replace pack with a known good pack and repeat the test.
- b. If the waveform does not coincide with the sync point as observed in step 8, the problem is a defective spindle or servo head. Replace spindle or servo head and repeat the test.

**Average Seek Time Check**

The average seek timing check is performed to verify that the average time falls within the range specified for a 256 track seek.

1. Install scratch disk pack.
2. Connect FTU to drive.
3. Connect oscilloscope with controls set as follows:
  - CH I VOLTS/DIV 1
  - A TIME/DIV: 10 ms
  - A TRIGGERING: Positive/Internal
  - Connect CH I to wirewrap A28-8A (I3018 On Cylinder)
4. Command a 256 track continuous seek.
5. Measure the duration of the logical 1 time. This should be between 25 and 30 ms.
6. Remove scratch disk pack.
7. Disconnect FTU and oscilloscope.

**Maximum Seek Timing Checks**

The seek timing checks verify correct over-all loop operations. These tests are not necessarily requirements. Failure to pass any of these tests, however, indicate potential degraded performance that may cause difficulties at a later time.

**One Track Seek Test**

1. Connect oscilloscope to A28-8A (On Cylinder, I330).
2. Sync negative external on A22-07B (Fwd Seek).
3. Command one-track sequential seeks.
4. Observe waveform through at least 80 tracks of seek. Waveform from start of seek (starting at "1") until it goes to "0" must be 6 to 8 ms.

### Long Seek Test

1. Connect oscilloscope to A28-8A (On Cylinder, I330).
2. Sync negative external on A22-07B (Fwd Seek).
3. Command repeated seeks between tracks 000 and 822, or 000 to 410 for BR3E4/3E5.
4. Waveform must be "1" for 55\* ms maximum.  
\* 40 ms for BR3E4/3E5.

### Return to Zero Seek from Cylinder 000

1. Connect oscilloscope to A28-8A (On Cylinder, I330).
2. Sync positive internal.
3. Command direct seek to cylinder 000.
4. Command RTZ. Waveform must be "1" for 20 ( $\pm 7$ ) ms.

### Seek Into Forward EOT

1. Connect oscilloscope to A28-8A (On Cylinder, I330).
2. Sync positive internal.
3. Command direct seek to cylinder 822.
4. Command a one-track forward seek.
5. Waveform must be "1" for 25 ( $\pm 8$ ) ms.
6. Command RTZS to clear error.

\* See procedure for seeks  $\geq 511$  (page 3-2).

### Velocity Transducer Linearity Test

1. Connect channel A of oscilloscope to A27,TP-F (Velocity Feedback, A311). Connect channel B to A27,TP-d (Velocity Integrator, A312).
2. Sync negative external on A22-7B (Forward Seek).
3. Command a one-track repeated seek between tracks 000 and 001.
4. Note approximate location of integrator peak with respect to position of velocity peak.
5. Repeat test between tracks 821\* and 822\*. Timing relationship of step 4 should be approximately the same as step 5.  
\* Tracks 409 and 410 for BR3E4/5.

### Track Servo Logic Checks

These tests check the logic associated with the track servo. The tests are applicable only if the adjustments could not be made or if troubleshooting a malfunctioning drive.

### Track Servo Amplitude Check

This test checks the amplitude of the track servo signal output of the servo preamp.

1. Disconnect voice coil yellow leadwire.
2. Manually load heads after pack is up to speed.

3. Connect oscilloscope channel A vertical input to B30-3B; channel B to B30-5B. (Track Servo preamp output.)
4. Invert channel A and add algebraically. Sync internal. Set channel A and B sweep rate at 2.0  $\mu$ sec/cm.
5. Move carriage and monitor maximum signal points (between tracks) at track 000 and track 800, or track 000 and 398 for BR3E4/5.
6. Peak-to-peak amplitude of waveform must be between 0.35 and 2.1 volts.

#### CAUTION

Failure to unload the heads manually, or by reconnecting the yellow voice coil lead will result in the heads crashing if the unit is powered down.

7. Manually unload heads, power the unit down and reconnect the yellow voice coil wire removed in Step 1.

#### AGC Amplifier Check

This test verifies that agc amplifier and the agc voltage are working correctly.

1. Extend A30.
2. Disconnect voice coil yellow leadwire.
3. Manually load heads after pack is up to speed.
4. Connect oscilloscope channel A vertical input to A30, TP-T; channel B to A30, TP-U.

5. Invert channel A and add algebraically. Sync internal.
6. Observe waveform similar to Figure 3-9. Move carriage to position near cylinder 000 so that horns (one set positive, other set negative) are of equal amplitude. Carriage is now on cylinder. Peak-to-peak voltage must be 1.0 ( $\pm 0.25$ ) volt.

#### CAUTION

Failure to unload the heads manually, or by reconnecting the yellow voice coil lead will result in the heads crashing if the unit is powered down.

7. Manually unload heads, power the unit down and reconnect the yellow voice coil wire removed in Step 1.

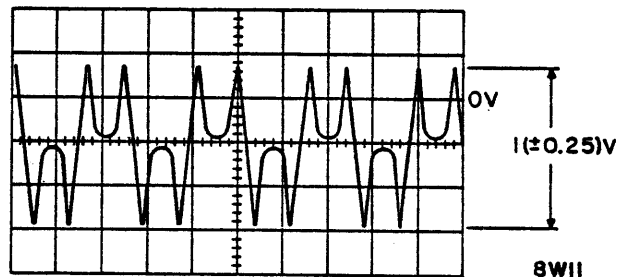


Figure 3-9. Track Servo Amplitude



### Cylinder Pulse Switching Level Check

#### NOTE

If the requirements of steps 1 through 4 are met, it is not necessary to perform steps 5 through 10.

1. Sync external negative on A22-7B (Forward Seek).
2. Connect oscilloscope vertical input to A23-2A (Cylinder Pulses, N2017).
3. Command repeated four-track seeks. Check for series of positive-going 10  $\mu$ sec cylinder pulses. (Depending on system alignment, last pulse may be 1.2  $\mu$ sec.)
4. Command repeated seeks of varying lengths. Verify that pulses are consistently generated during long seek lengths. (Track servo signal amplitude decreases with increasing velocity.) Proceed to step 5 if requirements of steps 3 or 4 are not met.
5. Connect oscilloscope vertical input to C30-TP-B (Track Servo signal).
6. Sync negative on A30-8B (Cylinder Detect A). Set horizontal sweep to 0.2 ms/cm.

#### NOTE

The following steps may be accomplished by moving positioner manually with voice coil yellow leadwire disconnected or by commanding three-track repeated seeks.

7. Check that servo signal is +0.4 ( $\pm 0.1$ ) volt at beginning of sweep.
8. Sync positive. Check that servo signal is 0 ( $\pm 0.1$ ) volt at beginning of sweep.
9. Sync positive on A30-7B (Cylinder Detect B, A365). Check that servo signal is 0 ( $\pm 0.1$ ) volt at beginning of sweep.
10. Sync negative. Check that servo signal is -0.4 ( $\pm 0.1$ ) volt at beginning of sweep.

### On Cylinder Switching Level Check

This procedure verifies that On Cylinder is enabled when the fine position signal approaches null with the Fine FF set.

1. Disconnect yellow leadwire from voice coil.
2. Manually load heads after pack is up to speed.
3. Connect oscilloscope to C30-TP-D (Fine Position, A379).

4. Sync positive on A28, TP-B (On Cylinder Enable, I329). Set horizontal sweep to 0.2 ms/cm.
5. Calibrate scope to ground.
6. Slowly move carriage manually (take care not to enter either EOT area as this disables the level detection). Two erratic horizontal waveforms will be displayed. Check that waveforms at beginning of track are +0.70 ( $\pm 0.05$ ) volt and -0.70 ( $\pm 0.05$ ) volt.
7. Sync negative and recalibrate trace to ground.
8. Slowly move carriage manually (take care not to enter either EOT area as this disables the level detection). Check that horizontal waveforms at beginning of sweep are +0.30 ( $\pm 0.05$ ) and -0.30 ( $\pm 0.05$ ) volt.

### CAUTION

Failure to unload the heads manually, or by reconnecting the yellow voice coil lead will result in the heads crashing if the unit is powered down

9. Manually unload heads, power the unit down and reconnect the yellow voice coil wire removed in Step 1.

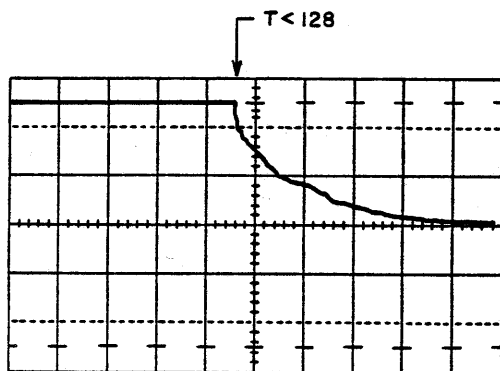
### Velocity Logic Checks

These tests check the logic associated with the desired velocity logic. The tests are applicable only if the adjustment could not be made or if troubleshooting a malfunctioning drive.

### Position Converter Output Check

The Position Converter Output should be clamped until  $T < 128$ . The remaining tracks of the seek are under control of the D/A converter.

1. Command a repeated 130 track seek.
2. Connect channel A to A27, TP-B (D/A converter output A302).
3. Sync negative on A22-07B (Forward Seek, I186). Set sweep time to 2 ms/cm.
4. Observe waveforms similar to Figure 3-10.
5. At  $T=128$  DA output is 10 volts. It then steps down with each track to control converter output. The lowest level is 0 volts.

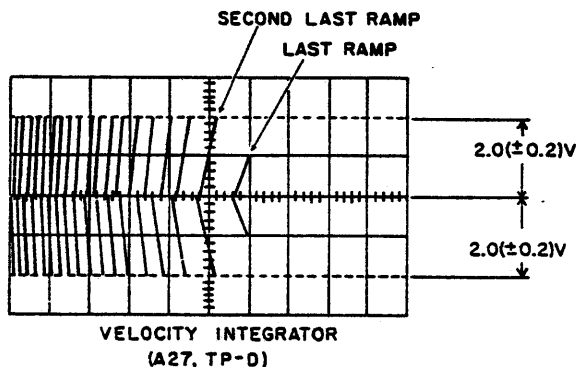


8R20A

Figure 3-10. Position Converter Output

Velocity Transducer Gain Uniformity

1. Command repeated seeks between tracks 000 and 822.
2. Sync positive on B23-5B (I249,  $T < 128$ ). Set sweep at 10 ms/cm magnified by 5.
3. Connect oscilloscope vertical input to A27, TP-D (Integrated Velocity, A312).
4. Observe waveform similar to Figure 3-11. Adjust triggering controls to observe both negative and positive ramps. Ramps represent integrated velocity sawtooth during last 127 tracks of seek. Positive ramps are forward seek; negative ramps are reverse seek.
5. Check voltages of next to last positive and negative ramps. Their amplitudes



NOTE: WAVEFORM IS IDEALIZED

8W12A

Figure 3-11. Velocity Transducer Gain Uniformity Waveform

must be 2.0 ( $\pm 0.2$ ) volts. Also, these voltages shall be equal (the difference of their absolute values) within 0.3 volt. If not:

- a. Perform Integrator Gain Adjustment.
- b. Repeat this procedure. If it still fails, replace velocity transducer.

Fine Enable Switching Level

This procedure verifies that fine enable switches in at the proper level. This signal, along with  $T < 1$ , should set the Fine FF.

1. Load heads and command repeated one-track seeks.
2. Sync negative on A22-7B (Fwd Seek, I186).
3. Connect channel A to A27-10A (Fine, K304).
4. Connect channel B to A27-TP-D (Integrated Velocity, A312).
5. Check that Fine switches to 0v when integrated velocity signal is 0.90 ( $\pm 0.10$ ) volts. See Figure 3-12.
6. Sync negative on A22-8B (Rev Seek, I187) and repeat procedure.

Head Amplitude Test

This procedure verifies that the read signal has sufficient amplitude to be reliably processed by the read logic. Readback amplitude decreases as the recording frequency increases, thus the minimum amplitude in MFM recording is obtained when reading an all "0's" or all "1's" pattern. Maximum readback amplitude is obtained when reading a pattern of alternate "1010...".

Since read data is tested by the same heads that write the data pattern, head alignment is not verified by this test. If this test fails on only one head, replace that head. If it fails on all heads, replace card E00 (on main deck) and repeat test.

Perform this test on all heads as follows:

1. Seek to cylinder 800. BR3E4/3E5 see procedure for seeks  $\geq 511$  on page 3-2.
2. Connect oscilloscope vertical inputs to E00, TP-X and TP-Y. Measure signal differentially by placing in Add mode and inverting channel B.
3. Sync positive on C21-17B (Index, A707).
4. Write Data pattern of all "1's".

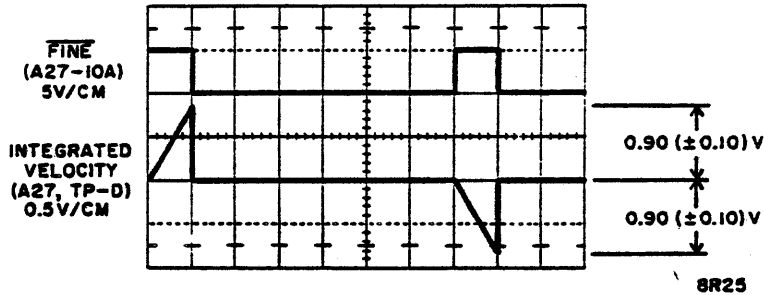


Figure 3-12. Fine Enable Switching Level Waveform

**NOTE**

The Off Line Tester writes by syncing on negative-going edge of Index, then delays 630  $\mu$ s before writing 150  $\mu$ s of "0's", sync byte, and cylinder address before writing data pattern. Measurements made in this procedure refer to data pattern only without regard to preamble.

5. Measure and record peak-to-peak amplitude of read signal. It shall be at least 85 mv.
6. Seek to cylinder 000.
7. Write data pattern of 101010...
8. Measure and record peak-to-peak amplitude of read signal. It shall not exceed 800 mv.

**MISCELLANEOUS LOGIC CHECKOUT**

**Clock/Index Timing**

This procedure verifies correct operation of the 806 kHz clock and the Index timing. Proceed as follows with a pack installed.

1. Load heads.
2. Connect oscilloscope channel A to B20-11B (Odd + Even Dibits).
3. Connect oscilloscope channel B to B20-9B (806 kHz Pulses).
4. Observe that waveforms are synchronous. (Dibits are not present during Index detection portion of disk.) If waveforms are not synchronous, check clock circuit at B20.
5. Connect oscilloscope to C21-17B (Index). Sync positive internal. Observe that signal is "1" for 2  $\mu$ s ( $\pm 0.5$ ). If not, check Index Detection circuit at All.

**Check Power Supply Outputs**

1. Open cabinet rear door.
2. Start spindle motor and allow read/write heads to load.
3. Command a 256-track repeat seek (256 tracks forward and 256 tracks reverse continuously) starting at track 0.
4. Use an AC/DC volt/ohmmeter to measure output voltages at corresponding test jacks on logic chassis maintenance panel.
  - a. Measure +5v. Meter shall read +5.00 ( $\pm 0.05$ ) volts. If voltage is not within limits, adjust potentiometer shaft on edge of +5v regulator card.
  - b. Measure -5v. Meter shall read -5.00 ( $\pm 0.05$ ) volts. If voltage is not within limits, adjust potentiometer shaft on edge of -5v regulator card.

**Start/Stop Time**

This procedure verifies correct operation of the spindle drive motor and hysteresis brake. Use a stopwatch or wristwatch with sweep second hand. With a pack installed and all covers closed, proceed as follows:

1. Connect oscilloscope to back panel pin A8-4A (Up to Speed, Y000). Sync positive internal.
2. Press START switch and start timer. Observe the following results:
  - a. Up to Speed should be "1" in 10 ( $\pm 5$ ) seconds.
  - b. Heads should load when first seek delay cycle is completed in 15 ( $\pm 2$ ) seconds.
3. Press START switch. Pack should come to complete stop in less than 30 seconds.

### Speed Sensing

This procedure verifies correct operation of the speed detection function. Proceed as follows with a pack installed.

1. Load heads.
2. Connect oscilloscope to back panel pin A8-7B (Speed Transducer Output). Sync positive internal. Calibrate scope trace to ground.

#### NOTE

Observed waveform in following step must first go positive, then negative with respect to ground. If not, check sensor wiring.

3. Observe waveform on oscilloscope. Signal should be 4 to 7v peak-to-peak. If not, check sensor gap as directed in Speed Sensor Assembly Check and Adjustment procedure in Corrective Maintenance section.
4. Connect oscilloscope to A8-3B (Speed pulses A026). Sync positive internal.
5. Observe that signal is "1" for 55 ( $\pm 14$ ) usec.

### Power Up Clear

This procedure verifies that the internal Master Clear is operational during startup conditions. A pack need not be installed.

1. Turn off UNIT POWER circuit breaker.
2. Connect oscilloscope channel A to +5 test point on logic chassis maintenance panel. Sync positive internal.
3. Connect oscilloscope channel B to back panel pin B11-10B (Power Up Blanking, I047).
4. Turn on UNIT POWER circuit breaker while observing oscilloscope.
  - a. Channel A (+5v) should reach +4.5v within 100 ms. If not, check power supply and regulator A2A2.
  - b. Channel B pulse width ("1") should be 200 ( $\pm 100$ ) ms. If not, check delay Y001 on card at B11.

#### NOTE

The following procedures on the read recovery circuit apply only to cards being installed as replacement parts. Cards installed in

the unit at the factory require no further test or adjustment.

### Read Recovery Circuit

The phase lock oscillator card at C24 and the data separator card at C25 require exacting delay timing. These cards are factory aligned and considered as a matched set: if either card is replaced, both must be replaced.

Because of head variation, final data strobe timing cannot be determined until the cards are installed in the unit. This procedure determines the final setting. Cards must not be on extenders while performing this procedure.

When a matched set of read recovery cards is installed in a unit, a verification test of the factory settings of the read recovery timing adjustment will be required. In most cases, the unit will perform to spec with the factory setting and will only require soldering the delay line tap permanently into place.

In some units, the normal variation of read/write head parameters will require a readjustment of the factory alignment. The Read Recovery Timing Adjustment procedure should be performed only if the verification of factory alignment test was not passed.

### Verification of Read Recovery Alignment

1. Set jumper wires on C1 and B3 of data separator card at C25 per settings indicated on tag or label on the card. See Figure 3-12.1.
2. Install phase lock oscillator card in C24 and data separator card in C25.
3. Install scratch pack and power up drive.
4. Write following repetitive data pattern on all heads at cylinder 410: 111000 110110 101010 101010.
5. Read all heads sequentially at track 410 for three minutes. Verify no read errors have occurred.
6. Command an Advance Read Clock (ARC) and read all heads sequentially at track 410 for three minutes. Verify no read errors have occurred.
7. Command a Retard Read Clock (RRC) and read all heads sequentially for three minutes. Verify no read errors have occurred.

8. If no read errors occurred in steps 5, 6, or 7, no further testing is necessary. Remove the data separator card from C25 and remove the plug-in jumpers from delay lines B3 and C1.
9. Solder the factory designated setting terminals together using #20 bare wire. Install card in C25.
10. If read errors occurred during steps 5, 6, or 7, perform the Read Recovery Timing Adjustment procedure.

#### Read Recovery Timing Adjustment

The purpose of the adjustment is to center the strobe in the data window to achieve the optimum nominal setting.

The procedure consists of three parts. First, the strobe is advanced in discrete steps by adjusting taps on a delay line until errors occur. Second, the strobe is retarded in discrete steps until read errors occur. In the third step, the strobe is permanently set to a position half-way between the limits for advanced and retarded strobe obtained during steps 1 and 2.

1. Command Advanced Read Clock (ARC).
  2. Read in sequential head mode for one minute.
    - a. If errors occur, perform Shifting Read Clock Retarded procedure until no errors occur. Make note of tap settings. Proceed to step 3.
    - b. If errors do not occur, perform Shifting Read Clock Advanced procedure until errors occur. Make note of tap settings. Proceed to step 3.
3. Command Retard Read Clock (RRC).
  4. Read in sequential head mode for one minute.
    - a. If errors occur, perform Shifting Read Clock Advanced procedure until no errors occur. Make note of tap settings. Proceed to step 5.
    - b. If errors do not occur, perform Shifting Read Clock Retarded procedure until errors occur. Make note of tap settings. Proceed to step 5.
5. Calculate the new delay tap settings by subtracting the shortest delay (determined from steps 2 and 4) from the longest delay. Divide the result by two and add this to the shortest delay, the result is the new delay setting.
6. Solder jumper from B3 pin 14 to terminal determined in step 5, required to maintain timing relation-

ship between C1 and B3. For example, if final setting requires that C1 tap must be repositioned counterclockwise by two terminals from factory-recorded terminal, B3 tap must be repositioned clockwise by two terminals from factory-recorded terminal.

7. Set READ CLOCK switch to NORMAL.
8. Read continuously for three minutes to verify that no read errors occur.

#### Shifting Read Clock Advanced

Adjust the data strobe for a more Advanced setting by moving the jumper on selector plug C1 counterclockwise (shorter delay time) by one 2 nsec-tap and moving the jumper on selector plug B3 clockwise (longer delay time) by one 2 nsec-tap. These jumpers must both be moved to maintain the correct timing relationship between the two delay lines.

#### Shifting Read Clock Retarded

Adjust the data strobe for a more Retarded setting by moving the jumper on selector plug C1 clockwise (longer delay time) by one 2 nsec-tap and moving the jumper on selector plug B3 counterclockwise (shorter delay time) by one 2 nsec-tap. These jumpers must both be moved to maintain the correct timing relationship between the two delay lines.

## MECHANICAL CORRECTIVE MAINTENANCE

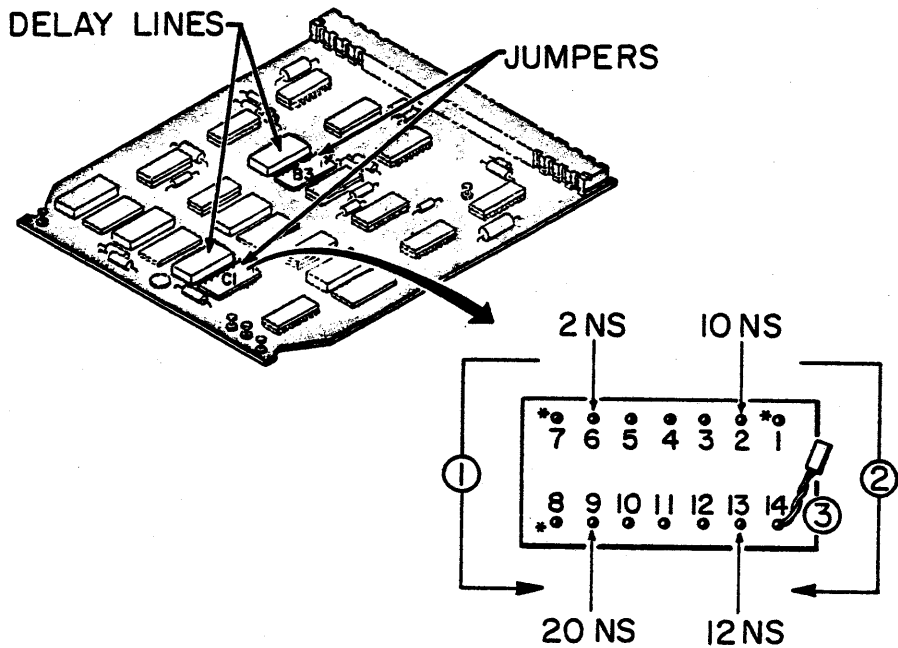
### SIDE PANEL REMOVAL/INSTALLATION

1. Stop Spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Release two turnlock fasteners securing cabinet front panel. Reach behind front panel to remove ground lead. Then remove panel.
5. Raise two leveling jackscrews in front base of cabinet until casters contact floor.
6. Open cabinet rear door.
7. Raise two leveling jackscrews in rear base of cabinet until casters contact floor. Close cabinet rear door.

### CAUTION

Use care when wheeling drive cabinet out of line so that input/output cables and connectors are not damaged.

8. Roll drive clear of adjacent units.



NOTES:

- ① CCW MOVEMENT OF TAP ON CI ADJUSTS STROBE EARLY BY 2 NS/TAP CW ON CI ② DELAYS STROBE.
- ② CW MOVEMENT OF TAP ON B3 REQUIRED FOR CCW ① MOVEMENT ON CI.
- ③ ONE END OF JUMPER WIRE IS ALWAYS CONNECTED TO PIN 14.
4. \*PINS 1, 7 AND 8 OF JUMPER ARE UNUSED.

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Figure 3-12.1. Data Separator Card Delay Wiring

9. Open cabinet rear door.
10. Release two quarter-turn fasteners securing panel side cover. Disconnect side panel ground wire. Remove and set panel aside.
11. After performing desired maintenance, install side panel and return unit to normal operating position by reversing steps 1 through 10.

#### AIR SUPPLY REMOVAL/INSTALLATION

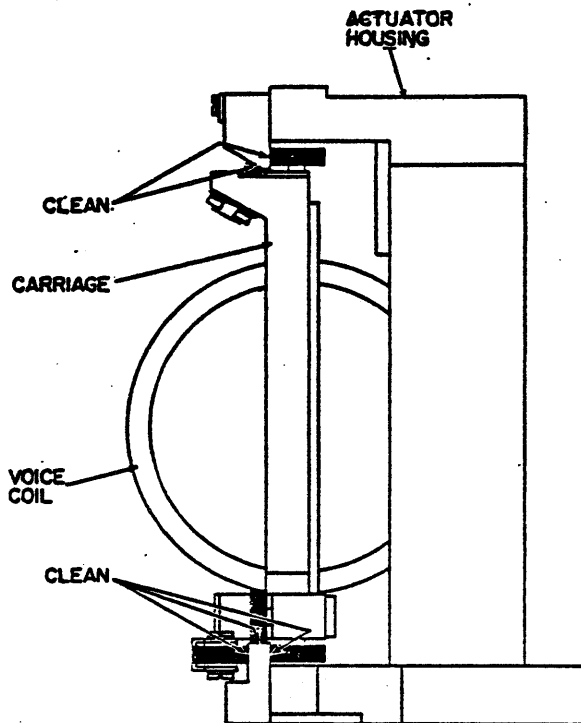
1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Release two turnlock fasteners securing front panel to drive, reach behind front panel to disconnect ground lead, then remove panel.
5. Loosen hose clamp securing rubber boot to top outlet of air supply. Remove rubber boot.
6. Remove air supply primary filter by pressing clips away from primary filter frame (refer to Figure 3-1).
7. Remove two screws (located behind primary filter) that attach air supply to frame.
8. Reach behind air supply and pull the two-inch hose from air supply with a twisting motion.

#### INSPECT ACTUATOR ASSEMBLY

1. Raise cabinet top cover.
2. Remove deck cover.
3. Inspect entire actuator for presence of dust and other foreign materials. Pay particular attention to following areas:
  - a. Circular cutout in face of magnet assembly (receives voice coil).
  - b. Rail surfaces (particularly horizontal surfaces) of carriage track on which carriage and bearing assembly travels.
4. Use lint-free gauze dampened with media cleaning solution (not soaked) to remove deposits or attracted particles. Refer to Clean Carriage Rails and Bearings procedure.

#### CLEAN CARRIAGE RAILS AND BEARINGS

1. Stop spindle motor.
2. Set UNIT POWER circuit breaker to OFF.
3. Remove disk pack.
4. Open top cover and remove deck cover.
5. Clean rails and bearing surfaces (Figure 3-13) with lint-free gauze that is slightly dampened with media cleaning solution. It is necessary to manually move carriage to gain access to all surfaces. Install head cam tool per Head Cam Tool Installation procedure.
6. Wipe rails and bearing surfaces with dry gauze.
7. Check for cleanliness by manually moving carriage through operating range. If any slight resistance to free rolling is encountered, repeat steps 4 and 5.



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Figure 3-13. Carriage Rails and Bearings

## ACTUATOR REPLACEMENT

### CAUTION

Replacement of the actuator is to be performed only by trained service personnel.

### WARNING

The magnetic field generated by the magnet assembly is very strong. Permanent watch damage will occur if brought near magnet.

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove right (viewed facing drive front) side panel.
5. Open cabinet top cover.
6. Remove deck cover.
7. Make note of voice coil leadwire connection scheme and disconnect leadwires.
8. Disconnect velocity transducer plug P4.
9. Leadwires to heads loaded switch are fastened to actuator side with a cable tie. Cut cable tie to free leadwires.
10. Loosen two screws attaching heads loaded switch and remove switch.
11. Open pack access cover.
12. Remove two screws holding lower mounting bracket of gas cylinder to deck (one bracket on each side of pack access cover).
13. Remove five screws securing parking brake cover to shroud and remove cover.
14. Remove two screws attaching access cover interlock switch to shroud. Take switch out of shroud area and let hang by its leadwires.
15. Remove five screws securing shroud side panels to shroud and deck (one panel on each side of shroud).
16. Remove ground cable between shroud and operator control panel.
17. Remove 12 screws attaching shroud to deck.
18. Close pack access cover. Lift up on front of shroud/access cover to enable rear to clear operator panel and pull shroud forward to remove it.
19. Remove two screws securing servo preamp housing cover (Figure 3-14). Remove and set cover aside.
20. Disconnect servo head plug and servo output plug P8 from servo preamp circuit board. Write "SERVO" on servo head plug.
21. Remove head cable plugs from card E0 (mark each plug in sequence removed from top plug "0" to last plug "18").

### CAUTION

Remove one head/arm assembly at a time.

22. Remove head/arm assemblies starting at top of carriage (refer to Head/Arm Replacement procedure).
23. Remove logic card E0.
24. Loosen four screws securing read/write chassis to deck, slide chassis toward the rear, lift off deck and lay it aside.
25. Remove screw attaching head cable bracket to deck. Remove bracket.
26. Refer to Velocity Transducer Replacement procedure and remove velocity transducer.
27. Remove two screws securing forward stop plate to stop mount (Figure 3-15).
28. Remove 10 screws holding rear deck seal to deck. Remove rear deck seal.
29. Remove screw securing actuator to magnet assembly.
30. Remove three screws (under deck) securing magnet assembly to deck (screw above motor mounting plate cannot be completely removed, allow screw to rest on motor mounting plate).
31. Fully extend carriage.

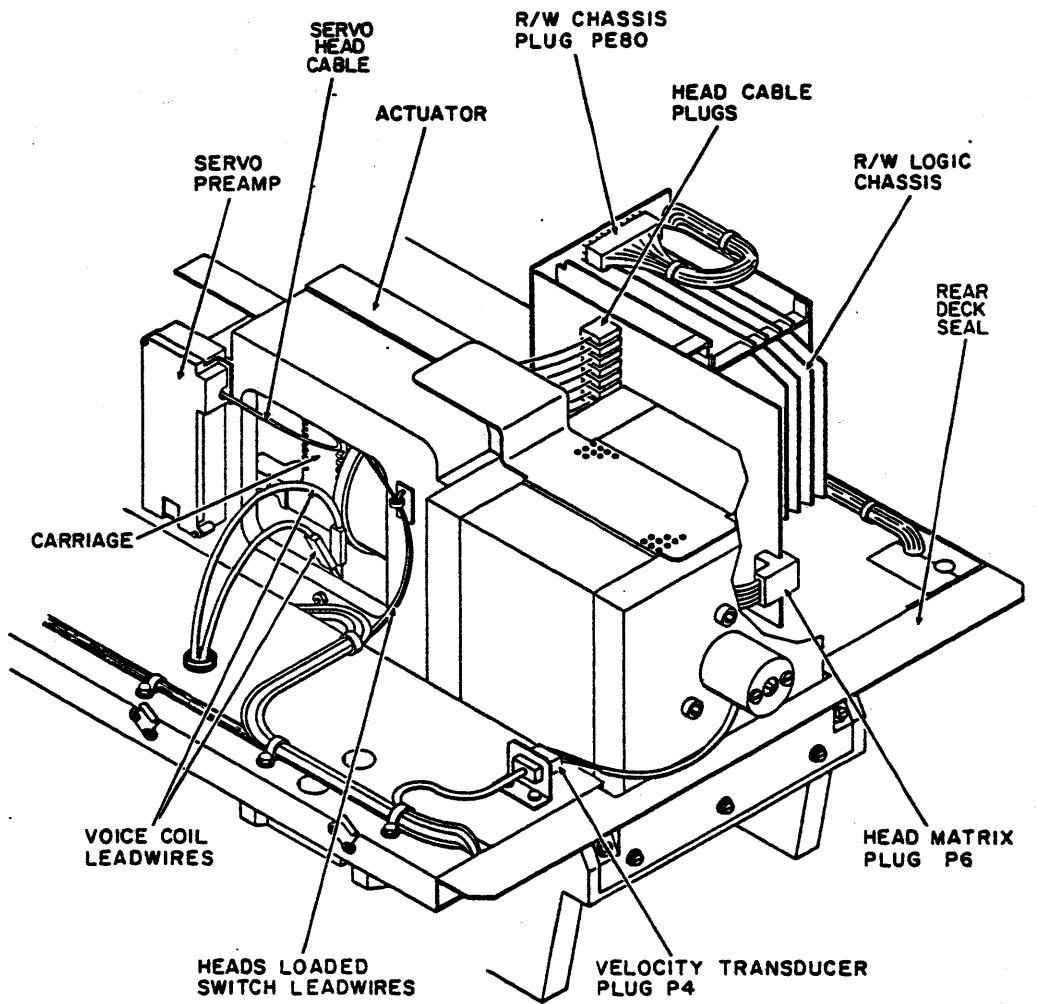
### CAUTION

When removing magnet assembly, use care not to damage voice coil. Do not place magnet on or near any metal because it will be almost impossible to separate the two. Preferably place magnet on a wooden table, free of any metal filings or metallic objects.

32. Remove magnet assembly from deck by sliding assembly straight back from voice coil.







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Figure 3-14. Main Deck Topside

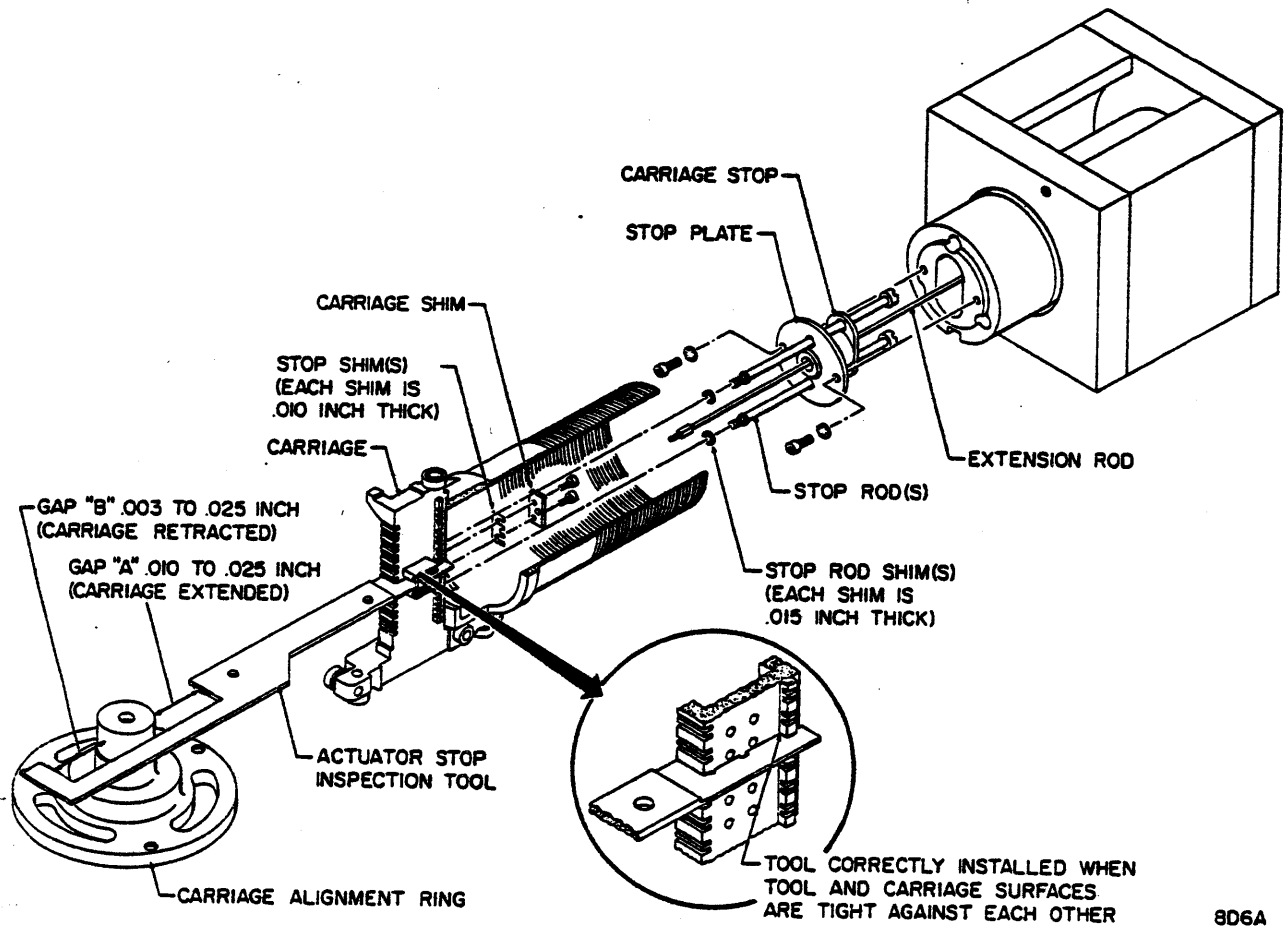


Figure 3-15. Carriage Stop Adjustment

33. Remove two screws securing servo preamp housing assembly to actuator. Remove servo preamp housing.
34. Remove nut, screw, and clip holding flexible conductor to actuator housing. Back carriage out of actuator housing.
35. Using a 3/16 inch ball ended hex driver remove five screws and washers securing actuator to deck.
36. The actuator is mounted on a dowel pin. Lift actuator off dowel pin, and pull back to remove.
37. Remove actuator assembly to a clean work area.
38. Prepare to install replacement actuator by removing screw, clip and nut securing flexible conductor to replacement actuator housing. Then back carriage out of housing.
39. Install replacement actuator housing on deck. Use five screws to loosely secure actuator to deck. Visually center front screw in its hole by rotating housing on its dowel pin.
40. Remove air supply according to Air Supply Removal Installation procedure to allow access to spindle mount screws.

41. Loosen spindle mounting screws. Use spindle adjustment tool (refer to Carriage/Spindle Alignment procedure) to adjust spindle so the two locating pins are centered in the spindle flange slots. Then tighten spindle mounting screws until they are snug.
42. Slide carriage into actuator housing.
43. Install carriage alignment arm on carriage at head 9 position (refer to Carriage/Spindle Alignment procedure). Torque head/arm clamp screw to 4 inch-pounds.
44. Install carriage alignment ring on spindle.
45. Slowly extend carriage until carriage alignment arm and ring are approximately as shown in Figure 3-15.

**NOTE**

Initial alignment of carriage to spindle is performed by moving actuator housing with reference to spindle.

46. Rotate the actuator housing on its dowel pin to obtain correct clearance between alignment ring and arm as specified in Figure 3-15.
47. Carefully remove carriage alignment arm and carriage.
48. Torque five screws securing the actuator assembly to deck to 60 inch-pounds.
49. Clean actuator rails and carriage bearings.
50. Install carriage into actuator housing from rear and attach flexible conductor to housing with insulated screw, clip, and nut (nut on outside of housing).
51. Install three carriage stop shims and tighten.
52. Insert a 1/16 inch allen wrench through hole in stop rod and use wrench as lever to unscrew stop rod.
53. Install two stop rod shims on each stop rod and lightly tighten stop rods.
54. Extend carriage forward, slide magnet assembly into position, and loosely secure magnet to deck using three screws.

55. Install two screws to secure stop plate to magnet assembly and tighten securely.
56. Move carriage back and forth to assure that stop rods do not rub on stop plate.
57. Loosely install screw through top of actuator into magnet assembly. Move voice coil in and out of magnet making sure voice coil is not contacting magnet assembly, then tighten screw to 60 ( $\pm 3$ ) inch-pounds. Insert 0.005 inch non-metallic feeler gage between coil and magnet to ensure 0.005 inch gap around coil. Then tighten three screws securing magnet to deck to 30 ( $\pm 1$ ) inch-pounds. Recheck 0.005 inch gap around coil.
58. Install actuator stop inspection tool in head position 9, hold tight against back carriage reference surface, and secure with head clamping hardware.
59. Fully extend carriage and hold firmly in place.
60. Using plastic feeler gage, measure gap "A" shown in Figure 3-15.

**NOTE**

Each stop rod shim is 0.015 inch thick. Refer to Table 3-2 and determine quantity of shims to be added or removed before removing stop rods. Add or remove an equal number of shims on each stop rod.

61. Unscrew stop rod using a 1/16 inch allen wrench through hole in stop rod.
62. Add or remove stop rod shims as required for each stop rod.
63. Apply one drop of Loctite, Grade C, to threads of each stop rod.

**TABLE 3-2. SHIMS FOR FORWARD ADJUSTMENT**

| Measurement at Gap "A" | Shims Added per Stop Rod |
|------------------------|--------------------------|
| 0.010 - 0.025          | 0                        |
| 0.026 - 0.039          | 1                        |
| 0.040 - 0.055          | 2                        |
| 0.056 - 0.069          | 3                        |

64. Install stop rods and tighten firmly using allen wrench.
65. Fully retract carriage and hold firmly in place.
66. Using plastic feeler gage, measure gap "B" shown in Figure 3-15.
67. If the requirements are met, apply one drop of Loctite, Grade C, to the threads of each carriage shim screw and re-tighten. If the requirements are not met, add or remove carriage stop shims as required (each carriage stop shim is 0.010 inch thick). Refer to Table 3-3.
68. Remove actuator stop inspection tool and install carriage alignment arm in head 9 position. Secure with head clamping hardware and torque head/arm clamp screw to 4 inch-pounds.
69. Using spindle adjustment tool, adjust spindle to obtain clearance specified in Figure 3-17.
70. Tighten three spindle mounting screws and recheck clearance.
71. Remove carriage alignment arm and carriage alignment ring.
72. Attach rear deck seal to deck.
73. Replace air supply.
74. Replace heads loaded switch.
75. Secure heads loaded switch leadwires to actuator side with cable tie.
76. Perform Heads Loaded Switch Adjustment procedure.
77. Install velocity transducer per Velocity Transducer Replacement procedure.
78. Connect velocity transducer cable plug P4.
79. Attach cable post to deck.
80. Slip read/write chassis into position under four screws and tighten screws.
81. Install logic card E0.
82. Install all heads per Head/Arm Replacement procedure.
83. Attach head cable plugs to card E0 in reverse of sequence removed.
84. Connect servo head plug and servo output plug P8 to servo preamp circuit board.
85. Install servo preamp housing cover.
86. Connect voice coil leadwires.
87. Install shroud and attach to deck.
88. Replace ground cable between shroud and operator control panel.
89. Replace both shroud side panels.
90. Replace access cover interlock switch and attach with two screws.
91. Replace parking brake access cover.
92. Attach both lower mounting brackets of gas cylinders to deck.
93. Perform Servo System Checks and Adjustments.
94. Perform Head/Arm Adjustment procedure.
95. Replace deck cover.
96. Close cabinet top cover.
97. Replace right side panel.

#### BRAKE PAWL ASSEMBLY

##### Check

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. With parking brake cover (Figure 3-16) in place, check that clearance between brake tooth and flat surface on underside of pack mounting plate is 0.005 - 0.020 inch.

TABLE 3-3. SHIMS FOR REVERSE ADJUSTMENT

| Measurement at Gap "B" | Stop Shims Required |
|------------------------|---------------------|
| 0.003 - 0.025          | 0                   |
| 0.026 - 0.035          | 1                   |
| 0.036 - 0.045          | 2                   |
| 0.046 - 0.055          | 3                   |

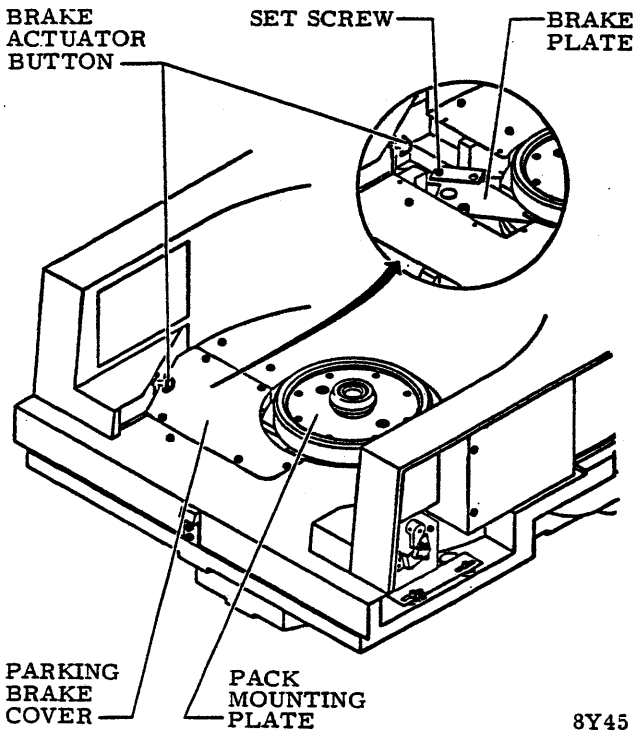


Figure 3-16. Brake Plate Replacement

5. Install a disk pack. Check distance between bottom metal disk of pack and brake actuator button with a plastic feeler gage. Clearance shall be 0.020 ( $\pm 0.005$ ) inch.

#### Adjustment

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Rotate spindle to a position where the brake tooth is not under a notch in the pack mounting plate (Figure 3-16).
5. Check distance between brake tooth and pack mounting plate with a feeler gage. Distance should be 0.015 ( $\pm 0.005$ ) inch. If necessary, adjust as follows:
  - a. Remove parking brake cover.

- b. Adjust set screw counterclockwise to increase distance or clockwise to decrease distance.

6. Install parking brake cover.
7. Install disk pack.

#### Replacement

1. Stop spindle motor.
2. Set UNIT POWER circuit breaker to OFF.
3. Remove disk pack. Leave pack cover open.
4. Remove five screws securing parking brake cover to shroud.
5. Remove two screws securing brake plate assembly and springs to deck casting.

#### NOTE

Insure that springs removed in Step 5 are saved for re-installation. Also inspect and note two hex screws which secure Parking Brake Plate to deck for they have a tendency to loosen. Apply a small quantity of "LOCTITE" to threads before installing.

6. Install replacement brake plate assembly to deck casting with two screws and springs (Figure 3-16).
7. Perform Brake Pawl Assembly Adjustment procedure.
8. Install disk pack and close pack cover.

#### CARRIAGE / SPINDLE ALIGNMENT

The carriage assembly is properly aligned to the spindle when carriage motion is along a radial line from the axis of rotation of the spindle assembly. The following adjustment is required whenever the spindle assembly is loosened from the deck casting.

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Head/Arm Replacement procedure and remove head just above the servo head (disk surface 9).

5. Install carriage alignment arm on carriage.
6. Torque head/arm clamp screw, clamp plate, washers, and alignment arm to 4 inch-pounds.
7. Install head cam tool.
8. Install carriage alignment ring on spindle.
9. Slowly extend carriage until carriage alignment arm and ring are approximately aligned as shown in Figure 3-17.
10. Check that clearance between ring and arm tools is as specified in Figure 3-17.
11. If adjustment is required, loosen three bolts securing the spindle assembly to deck.
12. Using spindle adjustment tool, move the spindle to obtain the clearance specified in Figure 3-17.
13. Tighten the three spindle screws and recheck clearance. If incorrect, repeat step 12.
14. Retract carriage. Remove head cam tool and carriage alignment arm.
15. Remove carriage alignment ring.
16. Refer to Head/Arm Replacement procedure and install head removed in step 4.
17. Perform Head/Arm Adjustment procedure.

#### FIRST SEEK INTERLOCK ASSEMBLY S/C 32 AND BELOW

The timing motor cam and the interlock switch are the only adjustable part of the first seek interlock assembly. Cam adjustment is performed during motor replacement and should not require further adjustment. Adjust the interlock switch as required.

#### Check

This procedure verifies correct operation of the first seek interlock assembly. Use a stopwatch or wristwatch with sweep second hand. With a pack installed and all covers closed, proceed as follows:

1. Set the LOCAL/REMOTE switch to LOCAL.
2. Set UNIT POWER circuit breaker to ON.

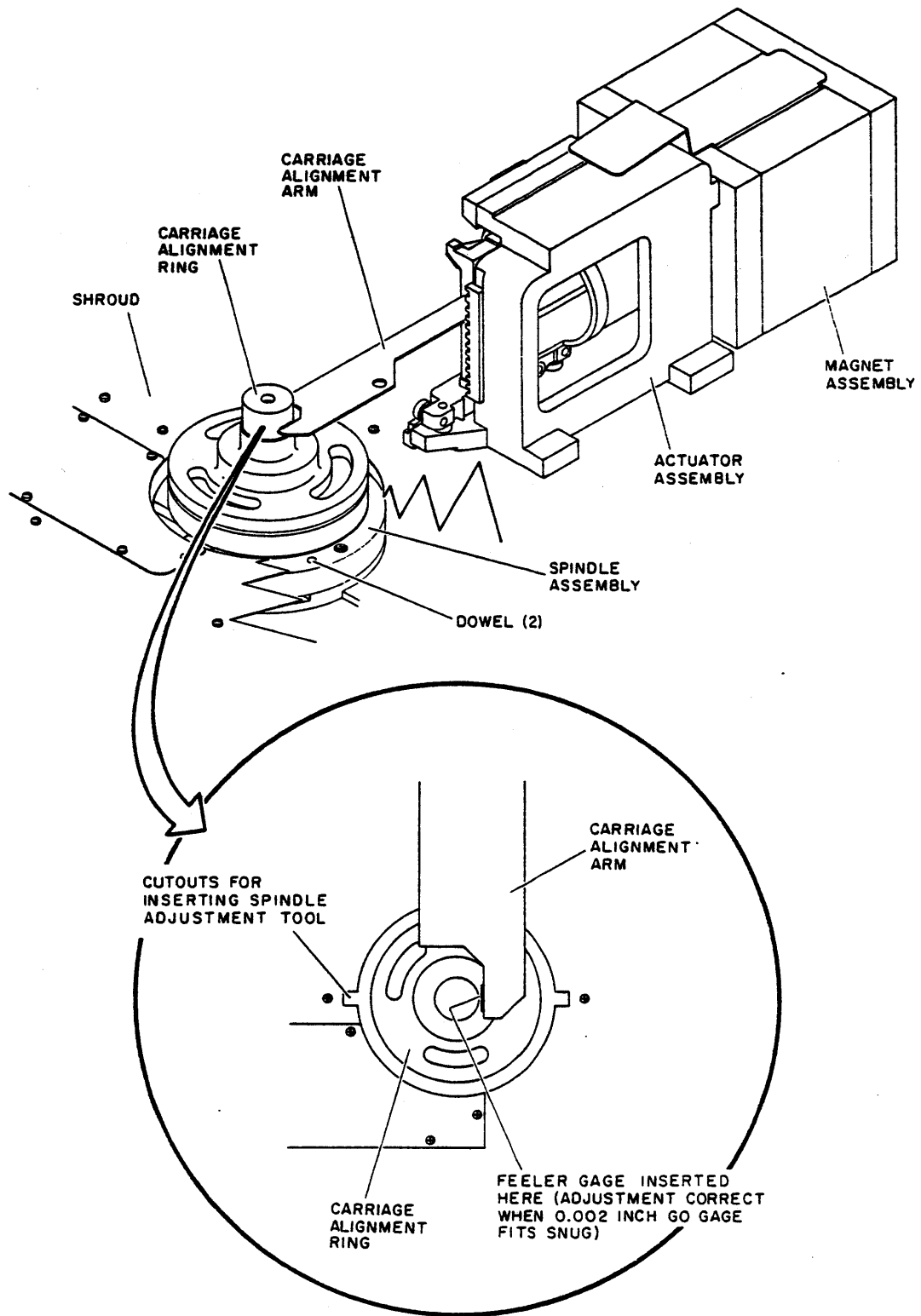
3. Press START switch and start timer. Indicator should light after about 15 seconds. If longer than about 17 seconds, check the following:
  - Timing motor cam adjustment
  - Interlock switch adjustment
  - Logic card at location A8.

#### Assembly Replacement

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Open top cover.
5. Disconnect timing motor cable plug (Figure 3-18).
6. Identify and disconnect interlock switch leadwires.
7. Remove two screws and washers securing interlock assembly to deck (Figure 3-20).
8. Slide assembly away from spindle while pulling assembly upwards through opening in shroud. Remove assembly from drive.
9. Connect timing motor cable plug to replacement interlock assembly.
10. Connect interlock switch leadwires.
11. Install replacement interlock assembly on deck. Secure assembly to deck using two screws and washers.
12. Perform First Seek Interlock Check procedure.

#### Switch Adjustment

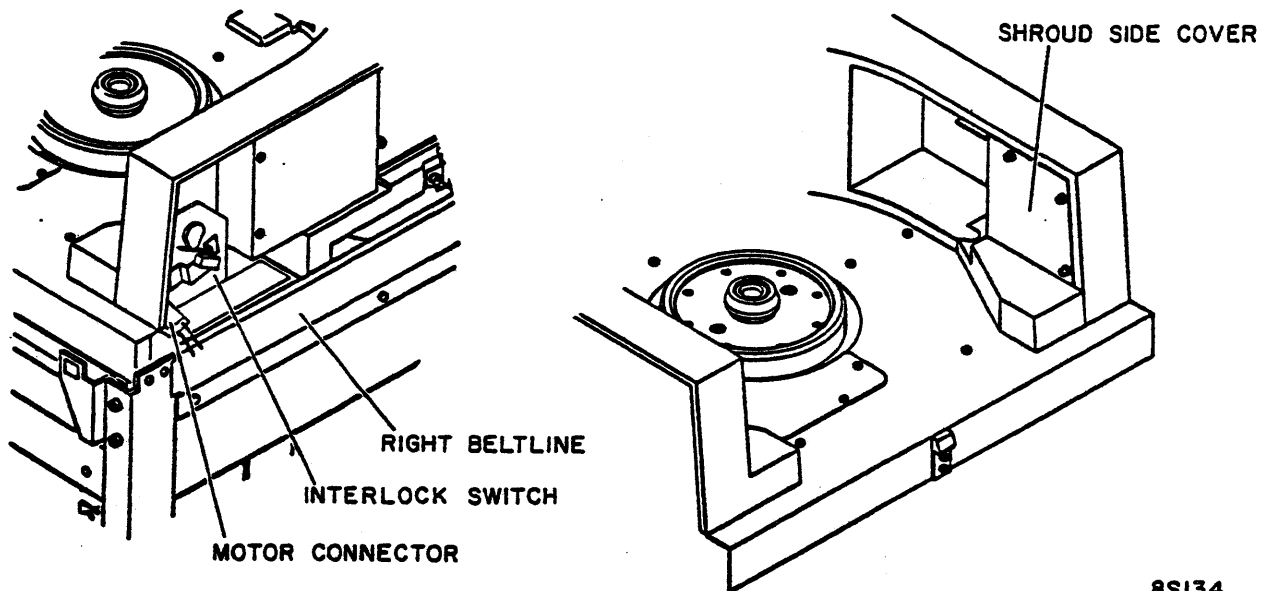
1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Open cabinet top cover.
5. Using a number 4 nutdriver, loosen the two nuts securing switch mounting bracket (Figure 3-19) to assembly bracket.



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Figure 3-17. Carriage/Spindle Alignment





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Figure 3-18. First Seek Interlock Assembly

6. Adjust switch mounting bracket so the switch activates when the timing motor cam is tangent with the switch actuator arm (Figure 3-19). Tighten the left nut (nut that is on adjustment slot in bracket) first, then tighten right nut.
7. Perform Interlock Switch Check procedure.

#### Switch Replacement

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Open top cover.
5. Identify and mark leadwires to interlock switch. Disconnect leadwire at switch terminals.

6. Remove two screws and washers securing switch to switch mounting bracket. Remove switch.
7. Position replacement switch on switch mounting bracket as shown in Figure 3-19. Secure switch using two screws and washers.
8. Perform Switch Adjustment procedure.

#### FIRST SEEK DELAY (S/C 33 AND ABOVE)

This procedure verifies the proper operation of the first seek delay circuits. Use a stopwatch or wristwatch with a sweep second hand. With a pack installed and all covers closed, proceed as follows:

1. Set ONLINE/NORMAL/WRITE PRO switch to NORMAL position.
2. Set UNIT POWER circuit breaker to ON.

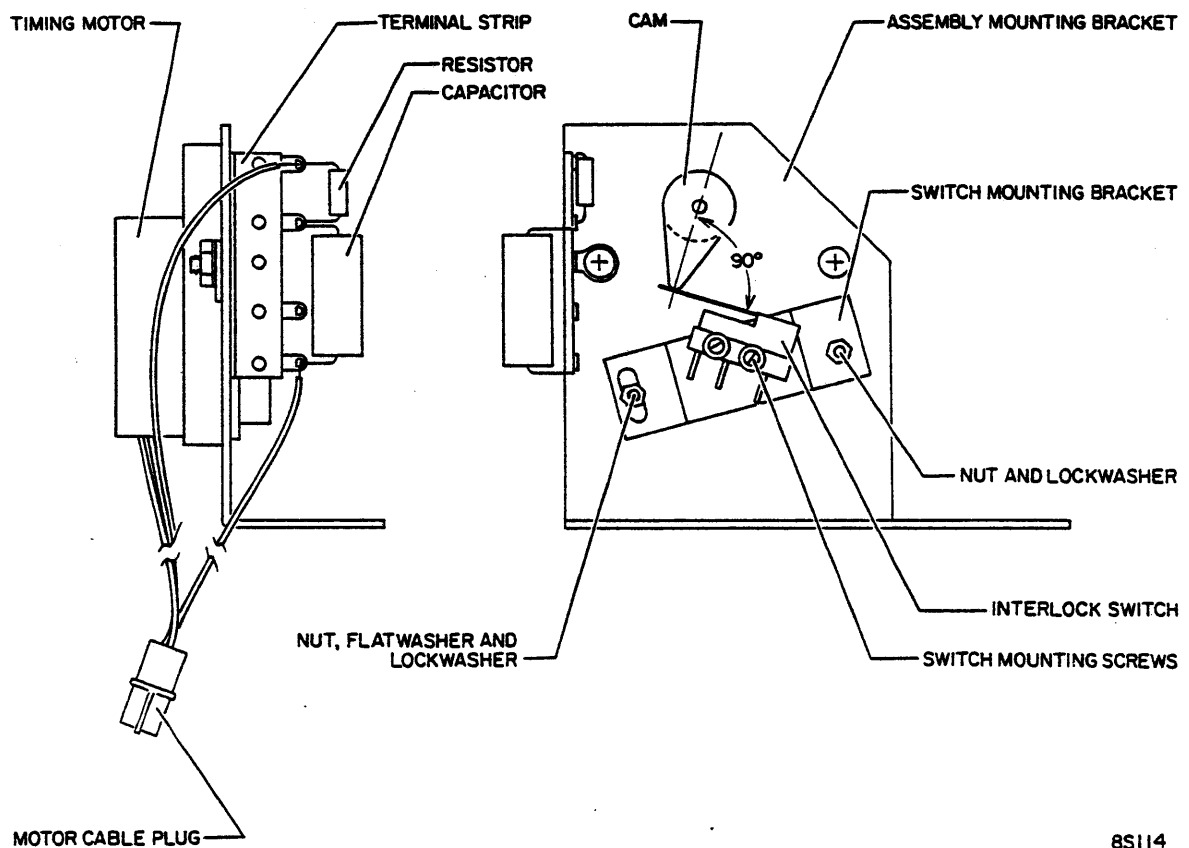
3. While observing READY indicator, press START switch and start timer. Indicator should light after about fifteen seconds. If longer than about seventeen seconds, check logic card at location A01, and replace if faulty.

2. Set UNIT POWER circuit breaker to OFF.
3. Open cabinet front panel.
4. Inspect drive belt for cracks or worn spots. If required, replace belt per Drive Belt Replacement procedure.

## DRIVE BELT

### Adjustment

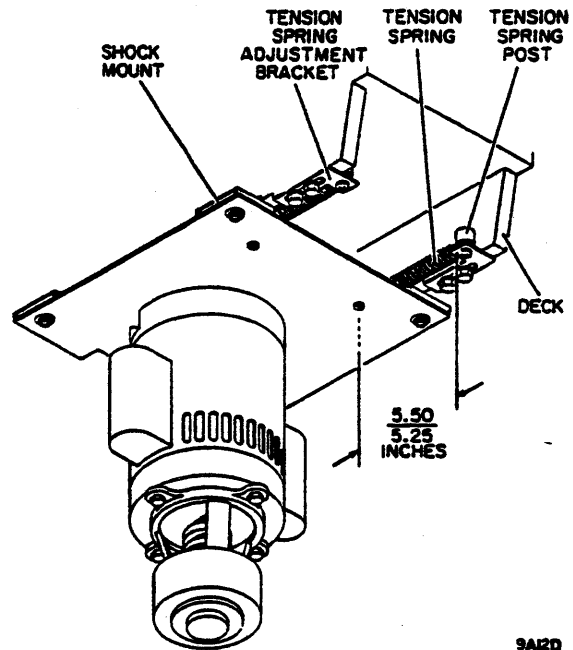
1. Stop spindle motor.



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Figure 3-19. Timing Motor/Switch Replacement

5. Open cabinet rear door.
6. Locate drive belt tension idler springs (Figure 3-20). Check distance between spring posts for correct adjustment as explained in step 7.
7. Inside dimension between idler spring posts must be between 5.25 and 5.50 inches. If adjustment is required, proceed to step 8, if not, proceed to step 12.
8. Remove idler springs.
9. Loosen two screws securing idler spring adjustment bracket to deck.
10. Reposition idler spring bracket until requirements are met. Tighten screws and recheck requirements.
11. Replace idler springs.
12. Close cabinet rear door.
13. Close cabinet front panel.



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#### Replacement

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Disconnect speed sensor plug P3.
5. Remove static ground spring leadwire from deck casting.
6. Make note of pack sensor switch leadwire connection scheme and disconnect leadwires at switch.

#### NOTE

Use care when removing drive belt not to damage pack sensor switch or static ground spring.

7. Remove idler springs.
8. Move drive motor toward spindle assembly and remove drive belt from drive motor pulley, then from spindle pulley. Remove belt from unit.
9. Install replacement belt around spindle pulley.

Figure 3-20. Drive Belt Adjustment

10. Move drive motor toward spindle assembly and slip drive belt around drive motor pulley.
11. Replace idler springs.
12. Reconnect speed sensor plug P3, pack sensor switch leadwires and static ground spring leadwires.
13. Perform Drive Belt Adjustment procedure.

#### DRIVE MOTOR REPLACEMENT

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Remove idler springs.
5. Move drive motor towards spindle assembly and slip drive belt off drive motor pulley.

6. Disconnect drive motor cable plug P7.
7. Disconnect hysteresis brake cable plug P2, speed sensor plug P3, and pack on switch connector.

### CAUTION

Do not support motor and brake assembly on hysteresis brake cup.

8. Support drive motor and brake assembly from below and remove four screws holding drive motor to motor mount. Note that there are two long and two short screws. Refer to Figure 3-21.
9. Loosen both setscrews in drive motor pulley. Remove pulley.
10. Remove hysteresis brake assembly as described in Hysteresis Brake Replacement procedure.
11. Install hysteresis brake assembly on replacement drive motor as described in Hysteresis Brake Replacement procedure.
12. Slide drive motor pulley onto replacement drive motor shaft until distance between the drive motor pulley and drive motor bell is as follows:

- a. On units S/C 37 and above w/39957C, distance is 0.165 (+0.015) inch.
- b. On units S/C 37 and below w/o 39957C, distance is 0.56 (+0.01) inch.

13. Support replacement drive motor from below and install on motor mount casting (orient air exhaust openings towards air supply). Secure drive motor to motor mount casting using two long and two short screws in their respective locations.
14. Position drive belt around spindle pulley, and slip other end of belt around drive motor pulley. Visually confirm that drive motor pulley is aligned with spindle pulley.
15. Replace idler springs.
16. Connect drive motor cable plug P7.
17. Connect hysteresis brake cable plug P2.
18. Set UNIT POWER circuit breaker to ON.
19. Install a scratch pack.
20. Start spindle motor. Observe drive motor for proper operation.
21. Stop drive motor.
22. Remove disk pack.

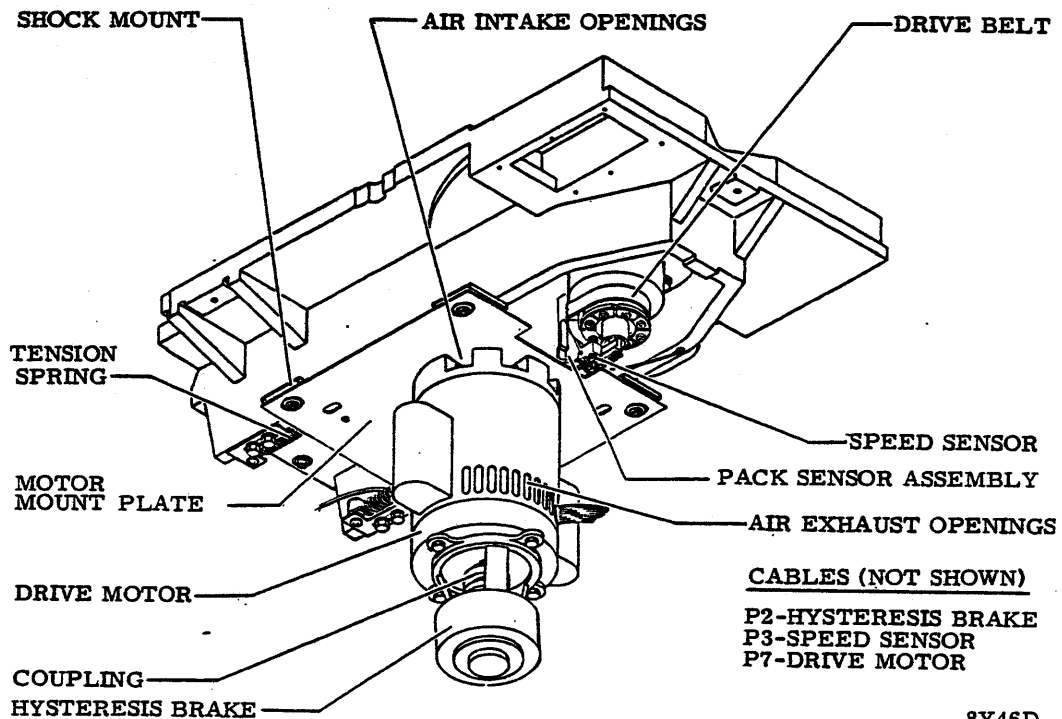


Figure 3-21. Drive Motor Replacement

## DISK PACK HANDLING/INSPECTION AND CLEANING

### Disk Pack Handling (CE and Data Packs)

The positive pressure filtration system of the drive eliminates the need for periodic inspection and cleaning of the disk pack (media). However, should improper operating conditions of the pack be indicated by any of the following symptoms, immediately remove the pack from the drive.

1. A sudden increase in error rates related to one or more heads is observed.
2. An unusual noise such as pinging or scratching is heard.
3. A burning odor is smelled.
4. Contamination of the pack from dust, smoke, oil or the like is suspected.

If any doubt about the pack's functional condition exists, return it to the vendor, enclosing a description of the known or suspected malfunction.

### CAUTION

Do not attempt to operate the media on another drive until full assurance is made that no damage or contamination has occurred to the media.

Do not attempt to operate the drive with another media until full assurance is made that no damage or contamination has occurred to the drive heads or to the shroud area.

### Disk Pack Inspection and Cleaning

In some cases, the user may attempt to inspect and clean the disk pack rather than return it to the vendor. This task must be performed by properly trained personnel only, using the following procedure.

#### NOTE

Inspection and cleaning of disk packs in the field can cause additional problems for the following reasons:

- Exposure of the pack to non-cleanroom conditions during inspection and cleaning may additionally contaminate the pack.

- Disk surfaces may be scratched by using contaminated or improper cleaning equipment.
- The pack may be damaged while the covers are removed.
- Deposits of cleaning solution residue may be left on disk surface if improperly cleaned or if commercial grade solutions are used.

### CAUTION

Disk pack cleaning should never be attempted with the pack mounted on the drive, since this setup can introduce contamination into the drive itself.

1. Mount the pack on a commercially available pack inspection fixture.
2. Dampen, but do not soak, a lint-free swab-paddle with media cleaning solution (refer to the list of Maintenance Tools and Materials), or with a solution of 91% reagent grade isopropyl alcohol and 9% deionized water by volume.
3. Using a sweeping motion, insert the damp swab-paddle between the disks and manually rotate the pack while applying the swab-paddle lightly to the disk surface to be cleaned.
4. After the swab-paddle has been applied for one full cleaning rotation, withdraw it with a sweeping motion while maintaining contact with the disk surface (do not lift the swab-paddle from the surface).
5. If oxide or contaminants are observed on the swab-paddle, repeat steps 2, 3, and 4, using a clean swab-paddle for each pass, until no oxide or contaminants are observed on the swab-paddle.
6. Repeat steps 3 and 4 using a dry swab-paddle to remove all cleaning solution residue.
7. Repeat steps 2 through 6 for each surface.

## HEAD ARM ASSEMBLIES

### General

The drive has a positive pressure filtration system that eliminates the need for periodic inspection and cleaning of heads. The heads should be inspected for the following reasons only:

1. A problem is traced to a specific head or heads; for example, excessive data errors.
2. Head to disk contact is suspected. This may be indicated by an audible ping, scratching noise, or a burning odor when the heads are over the disk area.
3. Concentric scratches are observed on the disk surfaces.
4. Contamination of pack is suspected (possibly due to improper storage of the pack).
5. The pack has been physically damaged (possibly due to dropping or bumping).

### CAUTION

Do not attempt to operate the media on another drive until full assurance is made that no damage or contamination has occurred to the media.

Do not attempt to operate the drive with another media until full assurance is made that no damage or contamination has occurred to the drive heads or to the shroud area.

### Head Inspection

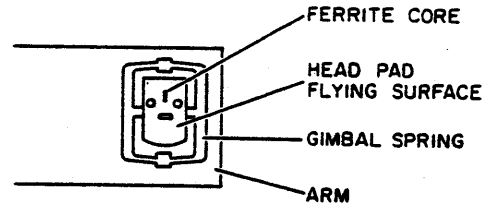
### CAUTION

Do not smoke when inspecting or cleaning heads. Use extreme care not to damage the head.

Do not touch the head pad or gimbal spring with fingers or tools.

If head must be laid down, do not allow the head pad or gimbal spring to touch anything.

Remove suspected head as described in the read write or servo head arm replacement procedure. Refer to figure 3-21.1, observe the head arm assembly, and perform the suggested remedy as follows:



8W41

Figure 3-21.1. Typical Head Arm Components

1. If reddish-brown oxide deposits exist on the head, replace or clean the head arm assembly.
2. If head appears scratched, replace or clean the head arm assembly.
3. If head appears damaged, replace the head arm assembly.
4. If the gimbal spring (it holds the head pad to the arm) is bent or damaged, replace the head arm assembly.

### Head Cleaning

### CAUTION

Head cleaning is a delicate procedure which is not recommended. It should not be undertaken unless it is absolutely necessary and then it should be performed by properly trained personnel only.

Refer to figure 3-21.2 if head cleaning is required and perform the following procedure. Use care not to damage any part of the head arm assembly.

### CAUTION

In the following step, hold the can of dust remover upright (vertical). If the can is not held upright, liquid propellant will be sprayed on the head.

1. Use super dry dust remover (see list of Maintenance Tools and Materials) to blow off all loose particles from the head pad (flying surface), from the edge of the head pad, and from the holes in the head pad. Hold the nozzle one-fourth to one-half inch (6 to 12 mm) from the head pad. Spray with a back and forth motion across the head pad, making certain to hold the can only in a vertical position.

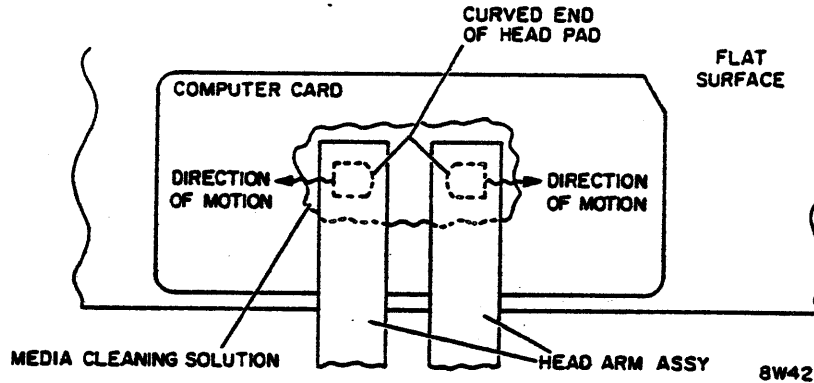


Figure 3-21.2. Head Cleaning Motion

2. Clean a smooth, flat working surface, for example, a glass or formica table top.
3. Place a new, unpunched, clean computer card with the back side up (printing down) on the clean flat working surface as shown in figure 3-21.2.

#### CAUTION

Care should be taken to avoid excess cleaning solution. Excess solution on the head cable may remove the plasticizer and make the cable stiff. A stiff cable reduces the flexibility of the head pad and could cause broken wires.

4. Moisten a small area in the center of the card with media cleaning solution. (Refer to the list of Maintenance Tools and Materials.)

#### CAUTION

Inspect the media cleaning solution for contamination, rust, dirt, etc. Do not use contaminated solution.

5. Very carefully place the head pad flying surface on moistened area and move head pad from moistened area to dry area in a zig-zag motion as shown in figure 3-21.2. Move head in a direction away from curved end of head pad. If it is moved in the opposite direction the sharp edge of the curved end will cut into the computer card and prevent movement and proper cleaning.
6. Blow off the head again using the super dry dust remover as in step 1.

#### NOTE

Discoloration of media cleaning solution and computer card in-

dicates that oxide particles are being removed from head pad flying surface.

7. Repeat steps 3, 4, 5 and 6 using a clean computer card and clean media cleaning solution each time until no discoloration on card is present.
8. After discoloration has ceased, inspect head to determine that oxide deposits were removed. If deposits remain but show signs of being removed, repeat cleaning procedure until deposits are removed.
9. If oxide deposits cannot be removed, replace head arm assembly.
10. If oxide deposits were removed and head passes inspection according to the Head Arm Replacement Criteria, reinstall head.
11. Follow read/write or servo head arm replacement procedure to install cleaned head or a replacement head as required.

#### Head Arm Replacement Criteria

A head arm assembly requires replacement if any of the following conditions exist:

1. Consistent oxide buildup on the same head, indicating repeated head to disk contact.
2. Appreciable oxide buildup which cannot be removed.
3. Scratches on the head flying surface.
4. Imbedded particles in the head pad flying surface.
5. Bent or damaged gimbal spring.
6. Any apparent physical damage to head arm assembly.

## Read/Write Head/Arm Replacement

1. Stop spindle motor.
2. Remove disk pack. Close pack cover.
3. Set UNIT POWER circuit breaker to OFF.
4. Open cabinet top cover.
5. Remove disk cover.
6. Remove five screws securing left (as viewed from front) shroud side panel. Remove shroud side panel by sliding forward and swinging out.
7. Open pack cover.
8. Using a 3/32 inch hex driver through opening created by removing left shroud side panel, remove four of the five screws securing head cable plate (top two screws and bottom two screws). Refer to Figure 3-22.
9. Loosen (but do not remove) center screw securing head cable plate. Remove head cable plate by pulling forward and unhooking from loosened screw.

### NOTE

To facilitate replacement of the bottom heads, the voice coil leads may be removed.

10. To determine location of faulty head, refer to either the head identification label on the actuator assembly or to Figure 3-23.
11. Remove clamp plate securing faulty head/arm to carriage (Figure 3-23) and set aside.

### CAUTION

Observe the following precautions during remainder of procedure:

- a. Do not touch head pad. Damage to the gimbal spring may result. Also, finger prints on flying surface of head will cause head crashes.
  - b. Use care when installing or removing a head/arm assembly. If assembly is allowed to unflex and contact the adjacent head, damage to itself and/or to an adjacent assembly may result.
12. With the left hand reaching into the shroud area, grasp front of head/arm firmly between index finger and thumb (avoiding head pad) and force head/arm in one of the following directions (Figure 3-24):
    - a. Down - if head pad is facing up.

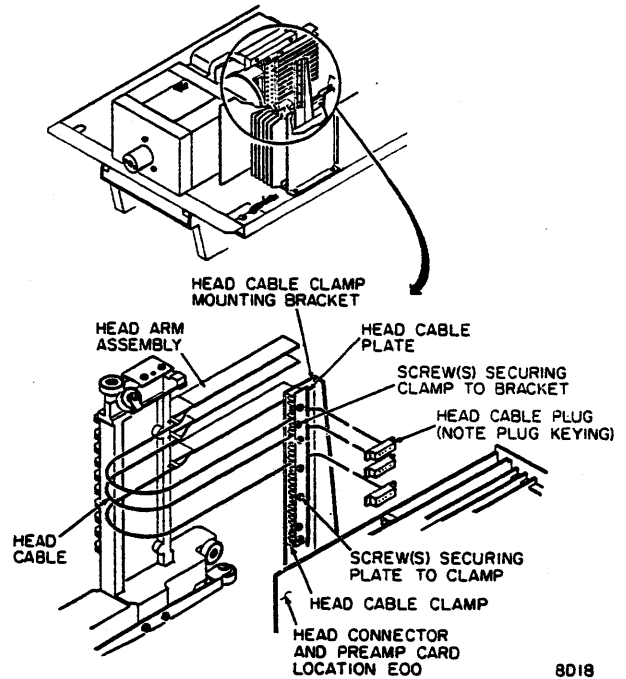


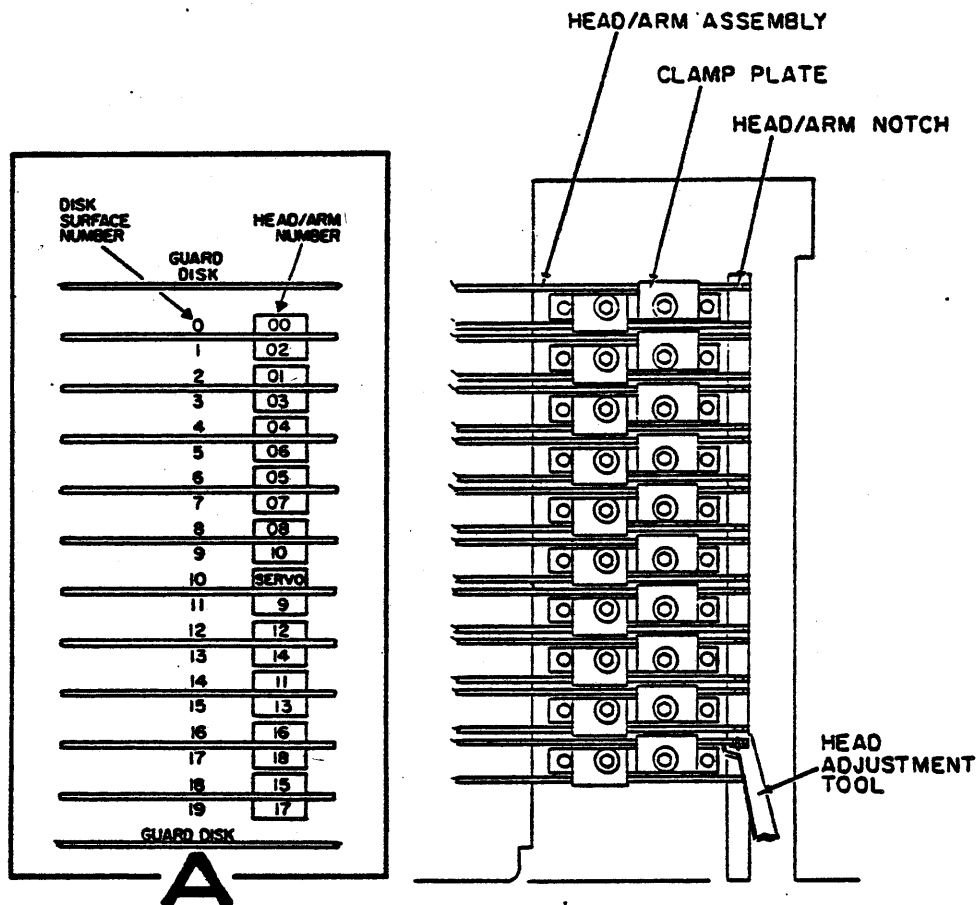
Figure 3-22. Head Cable Clamping/Connecting

- b. Up - if head pad is facing down.

This prevents head pad from contacting adjacent head/arm.

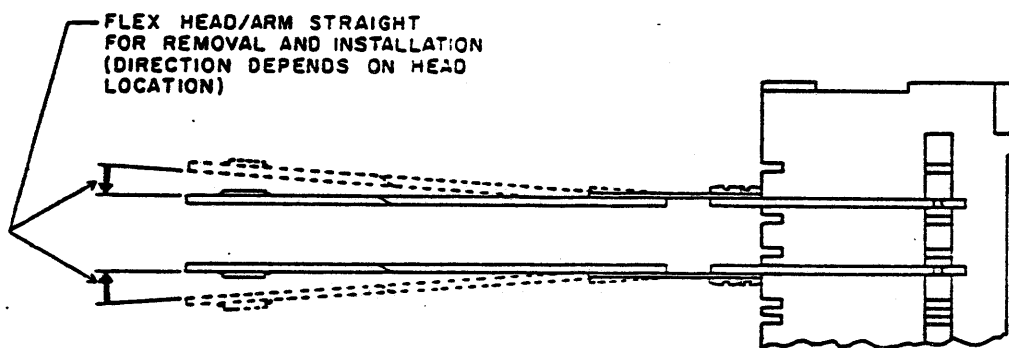
13. Move front of head/arm towards left side of drive (refer to Figure 3-25). Head/arm pivots to free rear notch of head/arm from slot in carriage rib.
14. While holding front of head/arm with left hand, grasp rear with right hand and wiggle head/arm back and forth (in a sideways motion) constantly pulling forward to disengage head/arm from front slot of carriage.
15. Lay head/arm in shroud area and disconnect head cable from logic card E0.
16. Remove cable spring from head cable clamp. Remove head/arm from drive taking care not to snag head cable connector.
17. Plug replacement head/arm cable connector onto proper pins of logic card E0.
18. Slide head/arm between existing head/arm cables at approximate place. Tip head/arm on its side and slide into shroud.





7M116

Figure 3-23. Head/Arm Assembly Identification



8Y58

Figure 3-24. Head/Arm Installation and Removal Profile

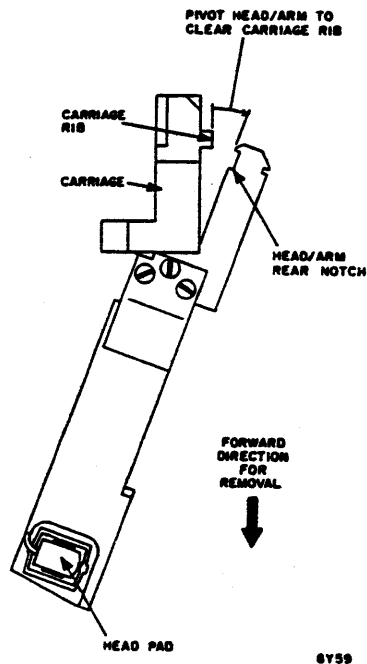


Figure 3-25. Head/Arm Installation and Removal Position

### CAUTION

Head/arm must be kept straight (see Figure 3-24) while inserting until it is completely in place to avoid damage to itself and adjacent head/arms.

19. Manually straighten head/arm as shown in Figure 3-24 and guide it into proper front slot of carriage (Figure 3-25).
20. Wiggle head/arm back and forth (in a sideways motion) constantly pushing toward the rear until the head/arm is firmly seated in the front slot of the carriage.
21. Push rear notch of head/arm tight against the carriage rib while guiding front of arm over cam surface. Visually check lateral alignment of head/arm with other head/arms as viewed from front of drive to determine that it is properly seated. Reseat if necessary.
22. Install clamp plate removed in step 11 and torque to 4 inch-pounds.

23. Press end of head cable spring into proper slot of head cable clamp.

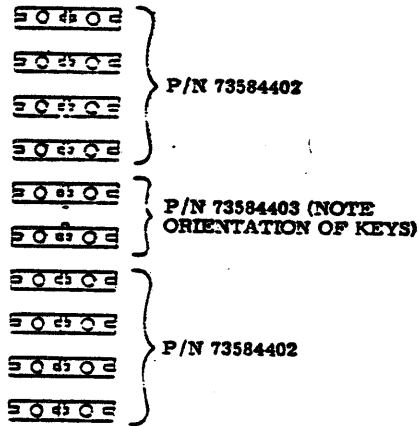
### NOTE

Before installing head cable plate make sure all head cables are properly placed. Also ensure that washer of screw loosened in step 9 is toward head of screw.

24. Place head cable plate into position. While pushing head cable plate toward rear of drive, tighten screw loosened in step 9.
25. Install remaining screws attaching head cable plate to head cable bracket.
26. Close pack cover.
27. Install left shroud side panel.
28. Perform Head/Arm Alignment procedure on replaced head/arm.

### Head Arm Clamp Base Replacement

1. Remove disk pack.
2. Open cabinet rear door and set UNIT POWER circuit breaker to OFF.
3. Open cabinet top cover and remove deck cover.
4. Disconnect head cable plugs from head connector and preamp card at location E00 (see figure 3-22).
5. Loosen the four screws securing the R/W pin and guide assembly to the deck.
6. Remove hardware such as cable ties, etc., as necessary, and slide R/W pin and guide assembly towards the rear of the drive and lay assembly over side of drive.
7. Remove the two head arm clamp plates attached to the clamp base to be replaced. Figure 3-26 illustrates the general locations of the head clamp bases on the carriage.
8. Remove the two adjacent heads, with cables attached, and carefully push heads into shroud cavity.
9. Remove two screws attaching clamp base to carriage and remove old base. Insert head cam tool and advance carriage as necessary to gain access to the mounting screws.



NOTE:  
TWO 4-40 x 3/8 SCREWS USED  
(P/N 10126213) PER BASE.

8H39

Figure 3-26. Orientation of Head Clamp Bases on Carriage

10. Clean entire exposed head mounting area on the carriage using a Q tip moistened with media cleaning solution. Wipe area dry using another Q tip.
11. Install the two heads in their proper slots.
12. Install the new clamp base on the carriage using two screws. Apply one drop of Grade 242 Loctite to the threads of the new screws before installation. Do not tighten screws.
13. Insert a 0.010 shim between the head fixed arm and the clamp base up to the head mounting surface of the carriage as shown in figure 3-27.
14. Push the clamp base up against the shim and tighten the two screws to 5 inch-pounds.
15. Remove the shim.
16. Check the clearance between the clamp base and the fixed head arms above and below the clamp base by inserting a 0.008 shim down to the head mounting surface. The shim must move freely along the length of both sides of the clamp base.
17. Install the two head arm clamp plates removed in step 7 and tighten the screws to 4 to 6 inch-pounds
18. Slide the R/W pin and guide assembly towards the front of the drive into place and install the miscellaneous hardware

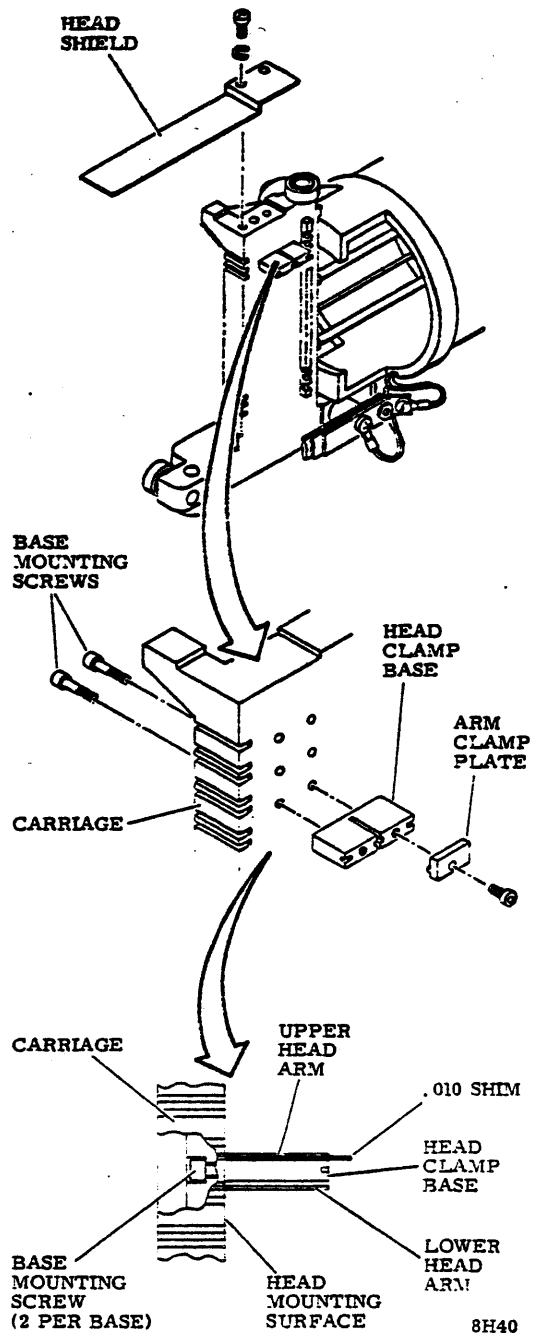


Figure 3-27. Installation of Replacement Clamp Base

removed in step 6. Tighten the four screws to secure the entire assembly to the deck.

19. Insert the head connector and preamp card at location E00 as shown in Figure 3-27.
20. Connect the head cable plugs to the head connector and preamp card in the same order as they were in step 4 before disconnection.
21. Perform the Head/Arm Alignment procedure outlined previously in this section.

#### Servo Head/Arm Replacement

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Open cabinet top cover.
5. Remove deck cover.
6. Remove five screws securing right (as viewed from front) shroud side panel. Remove shroud side panel by sliding forward and swinging out.
7. Open pack cover.
8. Using a 1/4 inch nut driver through the opening created by removing right shroud side panel, remove two screws securing servo preamp housing cover.
9. Remove servo preamp housing cover.

#### NOTE

To facilitate replacement of servo head, the voice coil leads may be removed.

10. To determine location of servo head, refer to either the head identification label on the actuator assembly or to Figure 3-23.

#### CAUTION

Observe the following precautions during remainder of procedure:

- a. Do not touch head pad. Damage to the gimbal spring may result. Also, finger prints on flying surface of head will cause head crashes.

- b. Use care when installing or removing a head/arm assembly. If assembly is allowed to unflex and contact the adjacent head, damage to itself and/or to an adjacent assembly may result.

11. Remove clamp plate securing servo head/arm to carriage (Figure 3-23) and set aside.
12. Disconnect servo head/arm cable connector from servo preamp.
13. With the left hand reaching into the shroud area, grasp front of head/arm firmly between index finger and thumb (avoiding head pad) and force head/arm in an upward direction. This prevents head pad from contacting adjacent head/arm.
14. Move front of head/arm towards left side of drive (refer to Figure 3-25). Head/arm pivots to force rear notch of head/arm from slot in carriage rib.
15. While holding front of head/arm with left hand, grasp rear with right hand and wiggle head/arm back and forth (in a sideways motion) constantly pulling forward to disengage head/arm from front slot of carriage.
16. Move freed head/arm into shroud area. Guide head/arm cable and connector carefully into shroud area and remove head/arm from drive.

#### CAUTION

Head/arm must be kept straight (see Figure 3-24) while inserting until it is completely in place to avoid damage to itself and adjacent head/arms.

17. Guide head/arm cable and connector between existing head/arms.
18. Manually straighten head/arm as shown in Figure 3-24 and guide it into proper front slot of the carriage (Figure 3-25).
19. Wiggle head/arm back and forth (in a sideways motion) constantly pushing toward the rear until the head/arm is firmly seated in the front slot of the carriage.
20. Push rear notch of head/arm tight against the carriage rib while guiding front of arm over cam surface. Visually check lateral alignment of head/arm with

other head/arms as viewed from front of drive to determine that it is properly seated. Reseat if necessary.

21. Install clamp plate removed in step 11 and torque to 4 inch-pounds.
22. Connect servo head/arm cable connector to servo preamp.
23. Replace servo preamp housing cover.
24. Close pack cover.
25. Install right shroud side panel.
26. Perform Head/Arm Alignment procedure on all head/arms.

#### Head/Arm Check and Alignment

Head/arm check and alignment is performed by using the Off Line Tester and head alignment card. The following procedure uses the Off Line Tester for alignment operation. Refer to the Reference manual for installation and familiarization of tester operation.

The CE disk pack and Off Line Tester must be temperature stabilized before the following procedure is performed. Pack, drive, and Off Line Tester must be in the same temperature environment for a minimum 60 minute period immediately preceding head alignment. In addition, the CE pack must be purged on the drive a minimum of 30 minutes and the Off Line Tester must be plugged into the drive a minimum of 10 minutes before performing head alignment procedure. These last two time periods (30 and 10) are included in the 60-minute drive warm-up.

#### NOTE

If head alignment is being performed on more than one drive, the CE pack needs only a 15 minute purge per drive after head alignment has been performed on the preceding drive.

1. Install CE disk pack: Press START switch to stop spindle drive motor. Open pack access cover and remove customer disk pack. Install CE disk pack and close pack access cover.

#### CAUTION

The CE disk pack contains special recorded tracks of data. Extreme care must be taken so that this data is not modified or destroyed.

2. Open cabinet rear door, remove deck cover, and raise top cover.
3. Set UNIT POWER circuit breakers to OFF.
4. Set POSITIONER OFFSET switch on maintenance panel to NORMAL.

5. Set READ CLOCK switch on maintenance panel to NORMAL.
6. Set ON LINE/OFF LINE WRITE PROTECT switch on maintenance panel to WRITE PROTECT.
7. Set DISPLAY SELECT switch on maintenance panel to CYLINDER.
8. Remove logic chassis card cover and connect Off Line Tester to drive in location C27.
9. Install head alignment card in location A21.
10. Set Off Line Tester switches as follows:
  - MODE SELECT switch to DIRECT
  - READ/ACCESS/WRITE switch to ACCESS (neutral)
  - R/W ONLY/RESET switch to NEUTRAL
  - REPEAT/SINGLE switch to REPEAT
  - START/STOP switch to STOP
  - INPUT switches to down position
11. Connect null meter to test points X and Z of head alignment card.
12. Connect oscilloscope channel A to TPY of head alignment card. Set controls as follows:
  - CH 1: .1 V/DIV
  - A TIME DIV: 1  $\mu$ SEC/DIV
  - A TRIGGERING: Positive/Internal
13. Set UNIT POWER circuit breaker to ON.
14. Load Heads: Press START switch to start spindle drive motor and allow heads to load.
15. Command a seek to cylinder 491.
16. Set R/W-SERVO switch S2 on head alignment card to SERVO position.

#### NOTE

In the next step the dibit pattern is that of the servo head at cylinder 491. The dibit pattern need only be a recognizable dibit pattern. The read/write head pattern may change during thermal stabilization; however, the servo head pattern does not. After thermal stabilization the dibit pattern will be checked for proper servo alignment.

17. Observe oscilloscope to ensure that dibit pattern is displayed (refer to figure 3-28). Pattern need not be perfect match to figure 3-28 only recognizable. If unable to get recognizable dibit pattern go to Servo System Checks in this section for troubleshooting servo logic. If pattern is recognizable, go to step 18.
18. Perform thermal stabilization in accordance with table 3-4.
19. Perform continuous seek between cylinders 481 and 491 for 30 seconds.
20. Allow three minutes warm up with heads positioned at cylinder 491. This eliminates inaccurate readings caused by unequal thermal expansion of heads after long seeks.

**NOTE**

The next step checks the servo head alignment. If the reading obtained in the following step is incorrect, the problem must be diagnosed and corrected before this procedure can be completed. Refer to Servo System Checks procedure.

21. Set N/P switch S1 on head alignment card first to P position (note null meter reading) then to N position (note null meter reading). Algebraically subtract N from P and record reading. P-N reading should be  $0 \pm 15$  mv. If requirement is met proceed to step 22, if not, perform Servo Fine Position Offset Check/Adjustments.

**NOTE**

The following steps refer to Read/Write head alignment check.

**TABLE 3-4. THERMAL STABILIZATION TIME**

| Prior Running Time-Minutes |                 | Stabilization Time-Minutes (additional running time required for stabilization) |
|----------------------------|-----------------|---|
| Drive                      | CE Disk Pack    |   |
| 0                          | Does not matter | 60  |
| 30                         | Does not matter | 30  |
| 45                         | 15 or more      | 15  |

22. Set R/W - SERVO switch S2 on head alignment card to R/W position. Check that MODE light on card is off.
23. Select head to be checked:
  - a. Set DISPLAY SELECT on maintenance panel to HEAD.
  - b. Select desired head with Offline Tester (first head should be 00).
  - c. Ensure that correct head is selected by displayed head address bits on the maintenance panel.
24. Observe oscilloscope for a recognizable dibit pattern (refer to figure 3-28). If not recognizable, note that head is out of alignment. If dibit pattern is correct go to step 25.
25. Record null meter reading with head alignment card switch S1 first in P position; then to N position. Algebraically subtract P minus N and record result. P-N should be less than  $\pm 20$  mv.

**OSCILLOSCOPE SETTINGS**

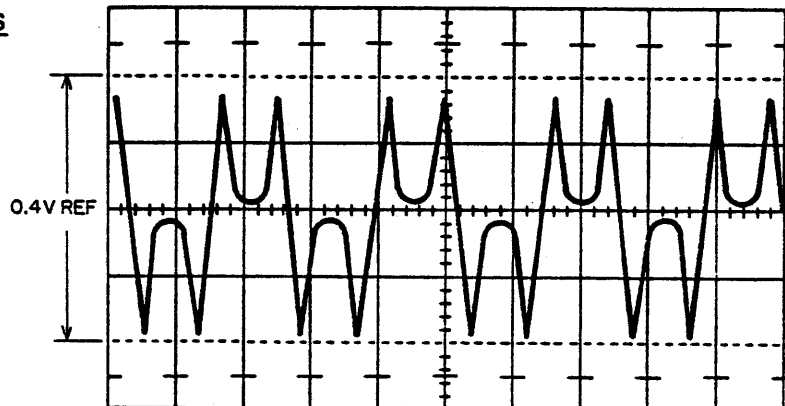
LOGIC GND TO SCOPE GND

VOLTS / DIV  
 CH 1 - .1V / DIV  
 CH 2 - NOT USED

TIME / DIV  
 A -  $1\mu$  SEC / DIV  
 B - NOT USED

TRIGGERING  
 A - POS / INT  
 B - NOT USED

PROBE CONNECTIONS  
 CH 1 TO A-21 TPY  
 CH 2 NOT USED



8P65C

Figure 3-28. Balanced Dibit Pattern

26. If P-N exceeds  $\pm 200$  mv, note that head is out of alignment and go to step 27.
27. Repeat steps 23, 24, 25 and 26 for all heads to be checked.
28. If all heads are within specifications, go to step 42. If any head is noted to be out of specification, go to step 29.

**NOTE**

The following steps refer to Read/Write head adjustment.

29. Install Carriage Blocking tool.

**CAUTION**

If power is lost with heads loaded, damage to heads and/or disk pack will occur unless blocking tool is removed and heads retracted before pack rotation stops.

30. Check the R/W - SERVO switch S2 on head alignment card is set to R/W position and that **MODE** light on card is off.
31. Loosen clamp screw of selected head (1/8-1/4 turn) and torque screw to 4 inch-pounds using torquemeter.
32. Refer to Figure 3-23 and position head adjustment tool so that tips of tool straddle carriage ridge and tool pin engages head/arm notch.
33. Adjust head to obtain a dibit pattern as shown in Figure 3-28 on the oscilloscope.
34. Position head (using head alignment tool) until the algebraic difference or P-N meter reading is 20 mv or less.
35. Measure P-N readings as follows:
  - a. Set switch S1 on head alignment card to position P.
  - b. Record P reading.
  - c. Set switch S1 on head alignment card to position N.
  - d. Record null meter reading of N.
  - e. Algebraically subtract recorded reading N from P.
  - f. If P-N result exceeds  $\pm 20$  mv, repeat steps 34 through 35 until result is  $\pm 20$  mv or less.
36. Repeat steps 31 through 35 for all heads requiring alignment adjustment.
37. Remove Carriage Blocking tool.

38. Unload heads a minimum of two times by stopping spindle.
39. Press START switch to start spindle drive motor and allow heads to load.
40. Perform continuous seeks between tracks 481 and 491 for 30 seconds minimum.

**NOTE**

In the following step insure that heads are positioned at cylinder 491 by displayed cylinder address register bits on maintenance panel. Allow three minutes warmup with heads positioned at cylinder 491. This eliminates inaccurate readings caused by unequal thermal expansion of heads after long seeks.

41. Perform step 35 on all aligned heads with this exception: The algebraic difference in step 35 must not exceed 100 mV. Realign those heads exceeding this limit by performing steps 34 thru 41. All heads meet alignment criteria, go to step 42.
42. Stop spindle motor.
43. Remove disk pack.
44. Disconnect test equipment: Set UNIT POWER MAIN POWER circuit breakers to OFF. Disconnect null meter, oscilloscope, Off Line Tester, and head alignment card.
45. Replace logic chassis card cover.
46. Replace deck cover and close top cover.
47. Set ON LINE/OFF LINE/WRITE PROTECT switch to ON LINE.
48. Set UNIT MAIN POWER circuit breaker to ON and close cabinet rear door.

**HEADS LOADED SWITCH**

**Adjustment**

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Open cabinet top cover and remove deck cover.
5. Make note of heads loaded switch leadwire connection scheme and disconnect leadwires.
6. Connect a multimeter (set to Rx1) across switch leadwire terminals.

## CAUTION

Do not move carriage so far as to cause heads to load. Switch transfer will occur before head loading.

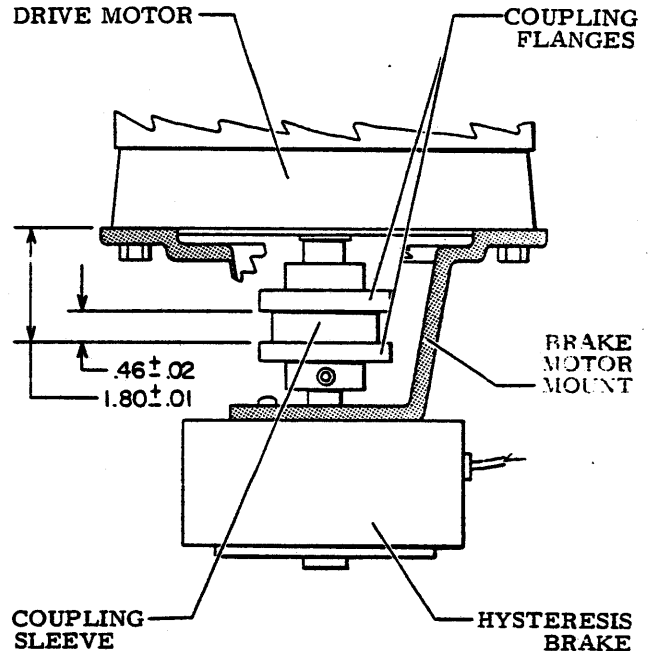
- Carefully move carriage about one-half inch forward from retracted stop.
- Slowly retract carriage. Stop carriage at point where switch transfer occurs.
- Using a steel scale, measure distance that carriage travels before contacting retracted stop. Switch transfer must occur when carriage is between 0.100 and 0.180 inch of encountering retracted stop.
- If requirement is not met, loosen two screws securing switch mounting bracket to actuator housing. Reposition switch and bracket until requirement is met and tighten screws.
- Remove multimeter and connect heads loaded switch leadwires.
- Install deck cover.
- Close cabinet top cover.

### Replacement

No special instructions are required for removal and replacement except, when replacing switch, use one drop of Loctite, Grade C, on threads of each screw securing switch to mounting bracket. Perform Heads Loaded Switch Adjustment procedure following switch replacement.

### HYSTERESIS BRAKE REPLACEMENT

- Stop spindle motor.
- Set UNIT POWER circuit breaker to OFF.
- Remove side panel, or if drive is in line, remove front panel and air supply.
- Disconnect hysteresis brake cable P2.
- Remove four screws attaching hysteresis brake assembly to drive motor.
- Remove hysteresis brake assembly, observing orientation of brake power cable.
- Remove rubber coupling sleeve. Refer to Figure 3-29.
- Loosen two setscrews securing coupling flange to hysteresis brake shaft. Remove flange.
- Remove three screws attaching hysteresis brake to brake motor mount and remove brake.



8Y52

Figure 3-29. Hysteresis Brake Assembly

- If necessary to remove coupling flange from drive motor shaft, loosen two setscrews and slide off.
- Install replacement hysteresis brake on brake motor mount with three screws.
- Install coupling flange on hysteresis brake shaft to meet the requirements of Figure 3-29. Tighten two setscrews.
- Loosely install coupling flange on motor shaft.
- Install rubber coupling sleeve.
- Install hysteresis brake assembly on drive motor using four screws. (Orient brake power cable to connect to P2.)
- Tighten setscrews in coupling flange on motor shaft so that flange position meets the requirements of Figure 3-29.
- Connect hysteresis brake cable P2.
- Install air supply and front panel.
- Perform power down check.

### PACK SENSOR SWITCH

#### Check

- Stop spindle motor.



2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Remove cabinet front panel.
5. Identify pack sensor switch leadwires (Figure 3-30). Disconnect leadwires at switch.
6. Connect a multimeter (set to Rx1) across switch terminals.
7. Install a disk pack. Multimeter should indicate 0 ohms.
8. Remove disk pack. Multimeter should indicate infinity.
9. If requirements of steps 7 and 8 are not met, perform Pack Sensor Switch Adjustment procedure. If requirements are met, go to step 10.
10. Disconnect multimeter leadwires.
11. Connect pack sensor switch leadwires to pack sensor switch terminals.
12. Install cabinet front panel.

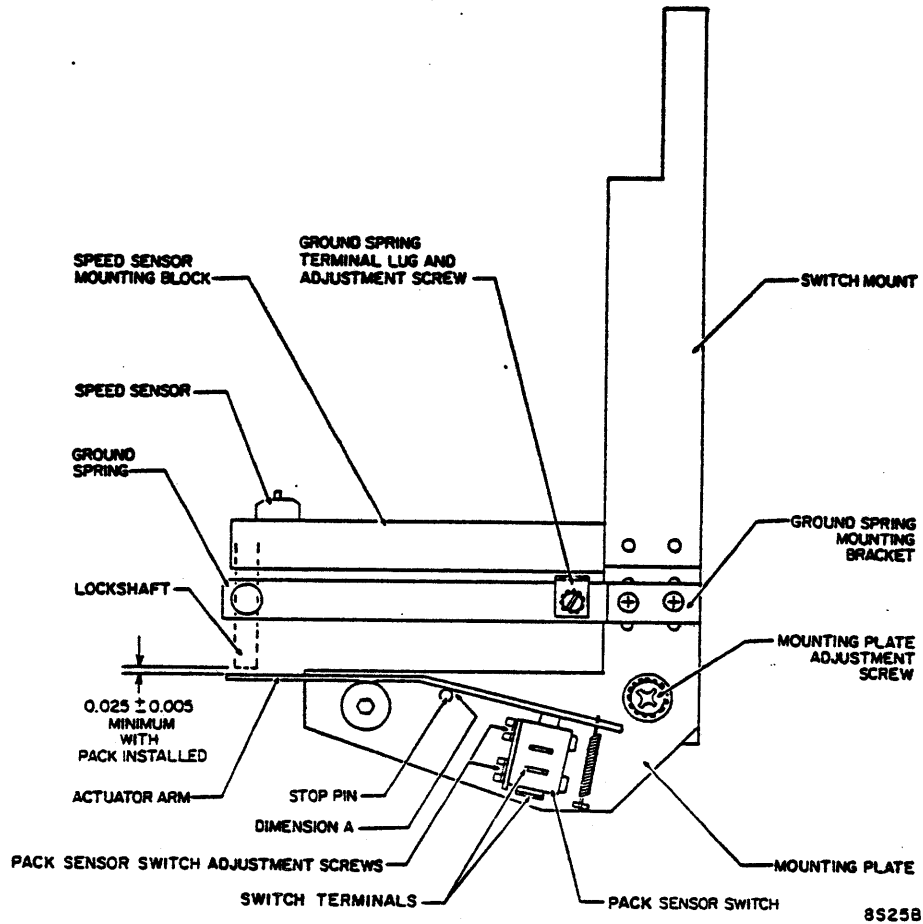


Figure 3-30. Pack Sensor Assembly (Pack Installed)  
(S/C 22 And Below)

NOTE

The series code notation in the next several procedures is an approximation. Compare the appropriate illustrations with the actual unit to determine the correct procedure.

Adjustment (S/C 22 And Below)

1. Stop spindle motor.
2. Install a disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove right (viewed from front) side panel.
5. Identify pack sensor switch leadwires (Figure 3-30). Disconnect wires at switch terminals.
6. Dimension between actuator arm and lockshaft must be as specified in Figure 3-30. If dimension is as specified, go to step 10. If adjustment is required, go to step 7.
7. Loosen mounting plate adjustment screw (Figure 3-30).
8. Loosen two screws securing ground spring mounting bracket to switch mount.
9. Position mounting plate until dimension between actuator arm and lockshaft is as specified in Figure 3-30. Tighten screws.
10. Connect a multimeter (set to Rx1) to pack sensor switch terminals (Figure 3-30). Meter must indicate 0 ohms. If correct go to step 12, if not go to step 11.
11. Loosen pack sensor switch adjustment screws and position switch until multimeter just indicates 0 ohms. Tighten screws.
12. Insert an 0.015 inch thick feeler gage between actuator arm and stop pin (dimension A of Figure 3-30).
13. Multimeter must indicate infinity. If not, go to step 14. If correct, remove feeler gage and go to step 17.
14. Loosen pack sensor switch adjustment screws and position switch until multimeter just indicates infinity. Tighten screws.
15. Remove feeler gage. Multimeter must indicate 0 ohms. If correct, go to step 16. If not, repeat procedure starting at step 11.

16. If requirements of step 15 are met, go to step 17. If not, and further adjustments are required, repeat the entire adjustment procedure.
17. Disconnect multimeter from switch terminals.
18. Connect pack sensor switch leadwires to switch terminals.
19. Perform Ground Spring Adjustment procedure if mounting plate screws were loosened.
20. Install side panel.

Adjustment (S/C 23 And Above )

NOTE

The following adjustment procedure applies to units with serial numbers 23 and above. The new pack sensor assembly is interchangeable; but the adjustment varies.

1. Stop spindle motor.
2. Install a disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove right (viewed from front) side panel.
5. Identify pack sensor switch leadwires (Figure 3-31). Disconnect wires at switch terminals.
6. Dimension between actuator arm and lockshaft must be as specified in Figure 3-31. If dimension is as specified, go to step 9. If adjustment is required, go to step 7.
7. Loosen two screws on switch base bracket (Figure 3-31).
8. Position switch base bracket until dimension between actuator arm and lockshaft is as specified in Figure 3-31. Tighten screws.
9. Connect a multimeter (set to Rx1) to pack sensor switch terminals (Figure 3-31). Meter must indicate 0 ohms. If correct go to step 11, if not go to step 10.
10. Loosen pack sensor switch adjustment screws and position switch until multimeter just indicates 0 ohms. Tighten screws.
11. Insert 0.015 inch thick feeler gage between actuator arm and stop pin (dimension A of Figure 3-31).

12. Multimeter must indicate infinity. If not, go to step 13. If correct, remove feeler gage and go to step 16.
13. Loosen pack sensor switch adjustment screws and position switch until multimeter just indicates infinity. Tighten screws.
14. Remove feeler gage. Multimeter must indicate 0 ohms. If correct, go to step 15. If not, repeat procedure starting at step 10.
15. If requirements of step 14 are met, go to step 16. If not, and further adjustments are required, repeat the entire adjustment procedure.

16. Disconnect multimeter from switch terminals.
17. Connect pack sensor switch leadwires to switch terminals.
18. Perform Ground Spring Adjustment procedure if mounting plate screws were loosened.
19. Install side panel.

Replacement (S/C 22 And Below)

1. Stop spindle motor.
2. Remove disk pack.

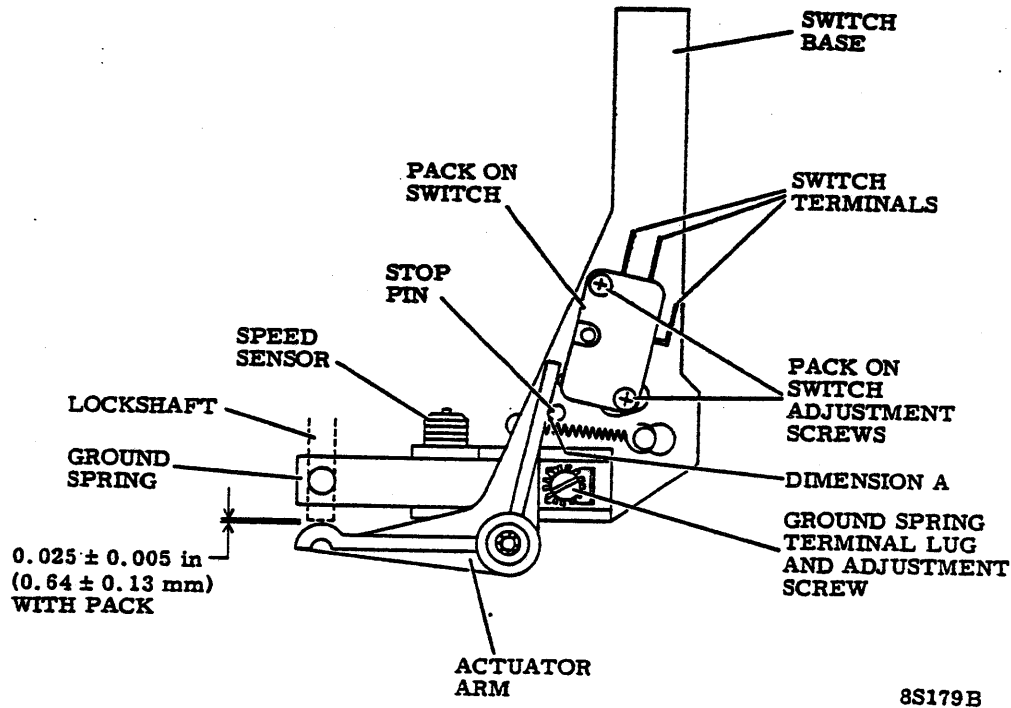


Figure 3-31. Pack Sensor Assembly (Pack Installed)  
(S/C 23 and Above)

3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove right (viewed from front) side panel.
5. Identify pack sensor switch leadwires. Disconnect wires at switch (Figure 3-30)
6. Remove two screws, washers and nuts securing switch to mounting plate bracket. Remove faulty switch.
7. Install replacement switch to mounting plate bracket using two screws, washers, and nuts. Do not tighten screws.
8. Perform Pack Sensor Switch Adjustment procedure.
9. Remove two screws securing faulty preamp circuit board to preamp housing.
10. Install replacement preamp circuit board to preamp housing with two hex head screws. Tighten screws.
11. Install preamp housing on actuator using two socket head screws. Tighten screws.
12. Connect servo head cable plug and output plug P8 to preamp circuit board.
13. Using two screws, secure preamp housing cover to preamp housing. Tighten screws.
14. Install right shroud side cover using five screws. Tighten screws.
15. Install deck cover and close top cover.

#### Replacement (S/C 23 And Above)

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove right (viewed from front) side panel.
5. Identify pack sensor switch leadwires. Disconnect wires at switch (Figure 3-31)
6. Remove two screws, washer, and nut securing switch to switch base bracket. Remove faulty switch.
7. Install replacement switch to switch base bracket using two screws, washer, and nut. Do not tighten screws.
8. Perform Pack Sensor Switch Adjustment procedure.

#### SERVO PREAMP PC BOARD REPLACEMENT

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Open top cover and remove deck cover.
5. Remove five screws securing right shroud side cover.
6. Remove two screws securing servo preamp cover (Figure 3-14). Remove cover.
7. Disconnect servo head cable plug and output plug P8 from servo preamp board.
8. Remove two socket head screws inside preamp housing. Remove preamp housing from unit.

#### SPEED SENSOR ASSEMBLY

##### Adjustment (S/C 22 And Below)

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Use feeler gages to check that the gap between sensor tip and pin is 0.0125 inch for GO condition and 0.014 inch for the NO-GO condition (Figure 3-32).
5. If requirement of step 4 is not met adjust speed sensor as follows:
  - a. Check speed sensor lateral alignment per requirements of view A-A of Figure 3-32. If required, loosen mounting block adjustment screw and position assembly. Tighten screws.
  - b. Loosen locknut on speed sensor assembly.
  - c. Adjust sensor assembly (clockwise rotation closes gap, counterclockwise rotation widens gap) to meet the requirements of step 4.

#### CAUTION

To avoid damage to the plastic threads do not over tighten locknut in next step.

- d. Torque locknut to 5 ( $\pm 1$ ) inch-pounds.
- e. Recheck dimension of gap.
6. Perform Speed Sensing procedure of Miscellaneous Logic Checkout.

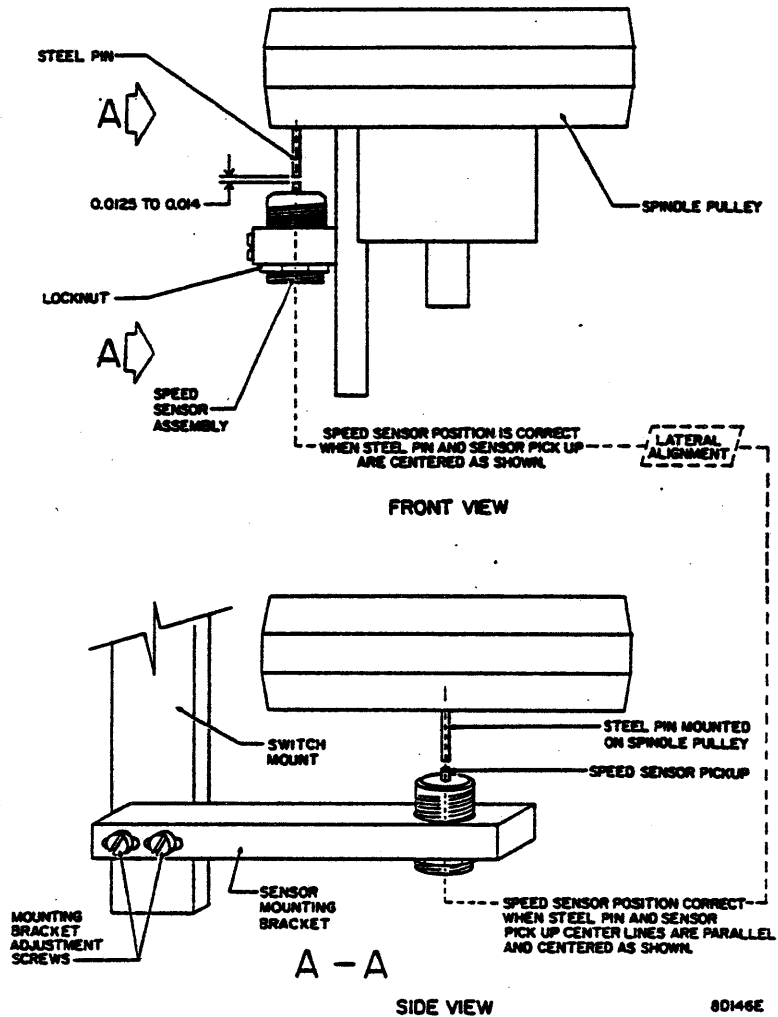


Figure 3-32. Speed Sensor Adjustment (S/C 22 and Below)

Adjustment (S/C 23 And Above )

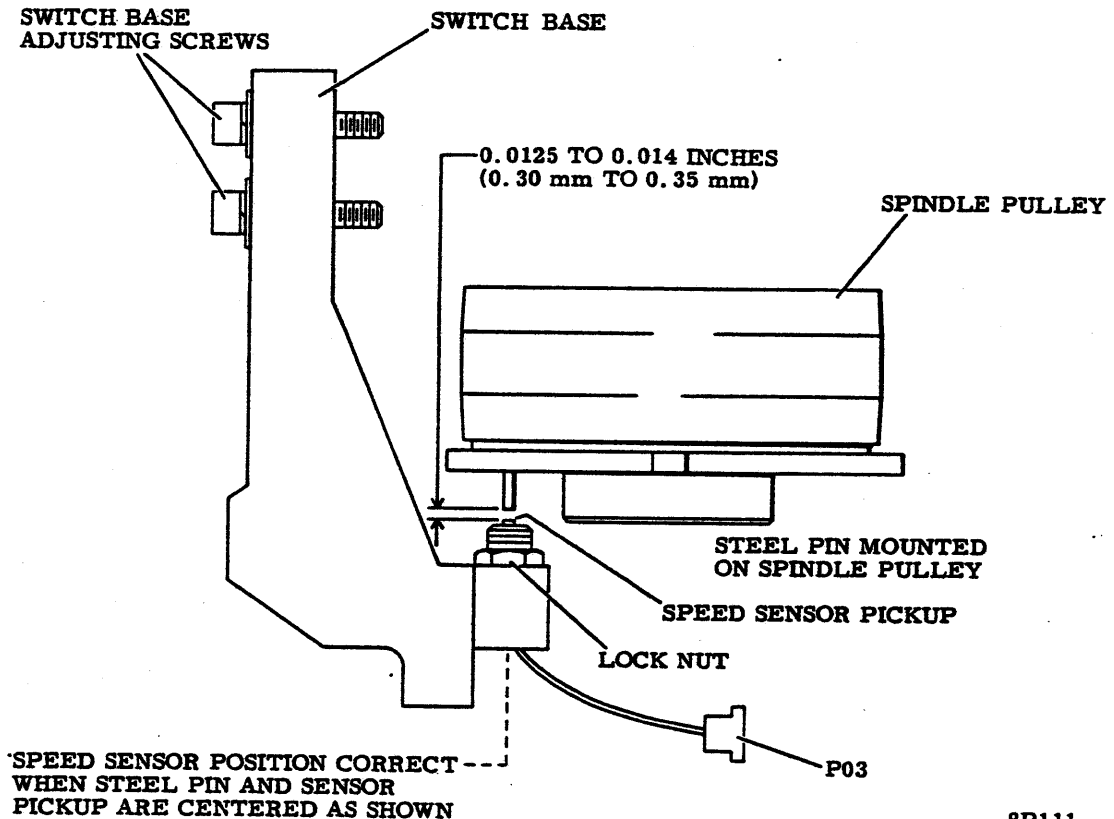
1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Use feeler gages to check that the gap between sensor tip and pin is 0.0125 inch for the GO condition and 0.014 inch for the NO-GO condition (Figure 3-33).
5. If requirement of step 4 is not met adjust speed sensor as follows:
  - a. Loosen locknut on speed sensor assembly.

- b. Adjust sensor assembly (clockwise rotation closes gap, counterclockwise rotation widens gap) to meet the requirements of step 4.

**CAUTION**

To avoid damage to the plastic threads do not over tighten locknut in next step.

- c. Torque locknut to 5 ( $\pm 1$ ) inch-pounds.
- d. Recheck dimension of gap.
6. Perform Speed Sensing procedure of Miscellaneous Logic Checkout.



8P111

Figure 3-33. Speed Sensor Adjustment (S/C 23 and Above)

**Replacement (S/C 22 And Below)**

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Disconnect speed sensor cable plug P3.
5. Cut cable tie securing speed sensor leadwires to speed sensor mounting bracket.
6. Loosen locknut on faulty speed sensor assembly (Figure 3-32). Remove assembly from unit.
7. Install replacement speed sensor on speed sensor mounting bracket.
8. Perform step 5 of Speed Sensor Adjustment procedure.
9. Connect speed sensor cable plug P3.
10. Secure speed sensor leadwires to mounting bracket with two cable ties.
11. Perform Speed Sensing procedure described in Miscellaneous Logic Checkout.

**Replacement (S/C 23 And Above)**

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove left (viewed from front) side panel.
5. Disconnect speed sensor cable plug P3.
6. Loosen locknut on faulty speed sensor assembly (Figure 3-33). Remove assembly from unit.
7. Install replacement speed sensor on switch base bracket.
8. Perform step 5 of Speed Sensor Adjustment procedure.
9. Connect speed sensor cable plug P3.
10. Perform Speed Sensing procedure described in Miscellaneous Logic Checkout.

## SPINDLE AND LOCKSHAFT ASSEMBLY

Field repair of this assembly is limited to replacing the lockshaft. If replacing lockshaft does not correct problem, replace entire spindle assembly. Return faulty assembly to factory.

### Lockshaft Replacement (S/C 22 And Below)

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove either side panel.
5. Disconnect ground spring leadwire.
6. Identify leadwires to pack sensor switch.
7. Remove two screws securing ground spring mounting block to switch mounting block (Figure 3-30).
8. Remove mounting plate adjustment screw (Figure 3-32). Remove mounting plate.

#### NOTE

In the following step do not remove retaining ring securing springs in spindle assembly (this retaining ring holds a flat washer to spindle shaft and is located behind the washer removed in next step.

9. Remove retaining ring and flat washer from lower end of lockshaft (Figure 3-34). Do not reuse old retaining ring.
10. Carefully raise faulty lockshaft out of top of spindle assembly.
11. Lower replacement lockshaft into top of spindle assembly.

#### CAUTION

Before proceeding, make certain that lockshaft does not bind. Lockshaft must be free to move downward against internal spring force. When installing new retaining ring, use special care not to over stress it.

12. Install flat washer and retaining ring on lower end of lockshaft.
13. Position mounting plate on switch mount as shown in Figure 3-30 and loosely secure plate to mount with mounting plate adjustment screw.

#### NOTE

Position ground spring mounting bracket so that contact on end of spring is contacting lockshaft.

14. Position ground spring mounting block on switch mounting block. (Figure 3-30) and loosely secure block with two screws.

15. Perform Pack Sensor Switch Adjustment procedure.
16. Perform Static Ground Spring Adjustment procedure.
17. Perform Clean and Lubricate Lockshaft procedure (refer to Section 2 of this manual).

### Lockshaft Replacement (S/C 23 And Above)

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove either side panel.
5. Disconnect ground spring leadwire.
6. Identify leadwires to pack sensor switch and remove.
7. Disconnect speed sensor at P03.
8. Remove two screws, plain washers and lockwashers securing switch base to spindle housing (Figure 3-33).

#### NOTE

In the following step do not remove retaining ring securing springs in spindle assembly (this retaining ring holds a flat washer to the spindle shaft and is located behind the washer removed in next step.

9. Remove retaining ring and flat washer from lower end of lockshaft (Figure 3-34). Do not reuse old retaining ring.
10. Carefully raise faulty lockshaft out of top of spindle assembly.
11. Lower replacement lockshaft into top of spindle assembly.

#### CAUTION

Before proceeding, make certain that lockshaft does not bind. Lockshaft must be free to move downward against internal spring force. When installing new retaining ring, use special care not to over stress it.

12. Install flat washer and retaining ring on lower end of lockshaft.

#### NOTE

Position switch base bracket so that contact on end of the ground spring is contacting lockshaft.

13. Position and secure switch base to spindle housing with two screws, plain washers and lockwashers.

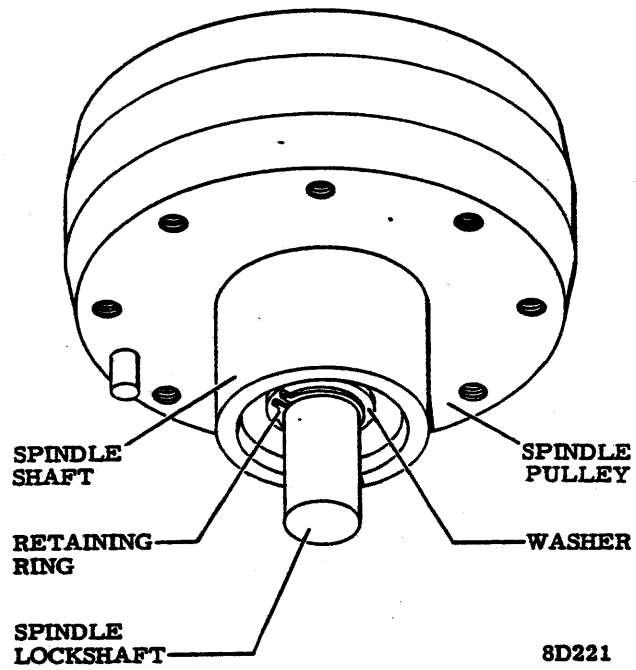


Figure 3-34. Spindle Lockshaft



14. Connect all leadwires to pack sensor assembly and ground spring.
15. Perform Pack Sensor Switch Adjustment procedure.
16. Perform Static Ground Spring Adjustment procedure.
17. Perform Clean and Lubricate Lockshaft procedure (refer to Section 2 of this manual).

#### Spindle and Lockshaft Replacement

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Remove side panel, or if drive is in line, remove front panel and air supply.
5. Identify leadwires to pack sensor switch and ground spring. Disconnect leadwires.
6. Disconnect speed sensor cable plug P3. Slide air supply forward several inches if it was not removed in step 4.
7. Remove idler spring.
8. Move motor mounting plate towards spindle to relieve drive belt tension. Remove belt from drive motor pulley. Release motor mounting plate.
9. Remove drive belt from spindle pulley.
10. Open cabinet pack access cover.
11. Remove five screws securing parking brake cover to shroud (Figure 3-16). Remove parking brake cover.

#### NOTE

While removing assembly in next step observe mounting technique used to secure brake plate assembly to deck.

12. Remove two screws securing brake plate assembly and springs to deck casting (Figure 3-16). Remove and set assembly aside.
13. Remove three screws (under deck) securing spindle assembly to deck.

#### CAUTION

When removing the replacement spindle assembly from the shipping container, do not allow the spindle assembly to rest vertically on the pulley end of the spindle assembly. Either gently lay the spindle assembly on its side or set it vertically on the disk pack mounting plate. Resting

spindle assembly vertically on pulley end, may cause vertical misalignment between the disk pack mounting plate and spindle housing. This misalignment may cause heads to crash.

14. Grasp spindle drive pulley and alternately push and pull on assembly while applying upward force to free spindle assembly from two round pins driven through spindle flange and into deck.
15. Lift spindle assembly up away from deck being careful not to damage shroud or pack sensor assembly.

#### NOTE

Check replacement spindle assembly for foreign materials, burrs, etc.

16. Install pack sensor assembly from old spindle and install on replacement spindle.
17. Place replacement spindle assembly on deck. Position spindle assembly on pins protruding from deck and press down on spindle so that pins begin entering spindle.
18. Install three screws and washers to secure spindle to deck. Tighten screws so that lateral movement of the spindle is possible.
19. Perform Spindle Alignment procedure.
20. Install drive belt on spindle pulley.
21. Move drive motor mounting plate towards spindle assembly and slip drive belt around drive motor pulley.
22. Replace idler springs.
23. Position pack sensor assembly on spindle assembly (see Figure 3-30 for S/C 22 and below and Figure 3-31 for S/C 23 and above).
24. Secure brake plate assembly and springs to deck using two screws.
25. Perform Brake Pawl Assembly check.
26. Install brake plate cover to shroud using five screws. Tighten screws.
27. Connect ground spring and pack sensor switch leadwires.
28. Connect speed sensor cable plug P3.
29. Perform the following procedures.
  - a. Pack Sensor Switch Adjustment
  - b. Static Ground Spring Adjustment

- c. Speed Sensor Adjustment
- d. Head/Arm Alignment
- e. Perform Clean and Lubricate Lockshaft procedure (refer to Section 2 of this manual).

#### STATIC GROUND SPRING

##### Adjustment (S/C 22 And Below)

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove left (viewed from front) side panel.
5. Visually check that ground spring is approximately centered on lockshaft (Figure 3-30).
6. If required, loosen screw securing ground spring to mounting bracket and center spring as required. Tighten screw.
7. Place a 0.025  $\pm$ 0.005 inch non-metallic feeler gage between ground spring and lockshaft.
8. Hook a push-pull gage to outer end of ground spring.
9. Force (applied perpendicular to spring) required to allow feeler gage to fall free should be 125 ( $\pm$ 25) grams.
10. If required, carefully bend spring to adjust spring tension.
11. Install side panel per Side Panel Removal/Installation procedure.

##### Adjustment (S/C 23 And Above)

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove left (viewed from front) side panel.
5. Visually check that ground spring is approximately centered on lockshaft (Figure 3-31).
6. If required, loosen screw securing ground spring to mounting bracket and center spring as required. Tighten screw.

7. Place a 0.025  $\pm$ 0.005 inch non-metallic feeler gage between ground spring and lockshaft.
8. Hook a push-pull gage to outer end of ground spring.
9. Force (applied perpendicular to spring) required to allow feeler gage to fall free should be 125 ( $\pm$ 25) grams.
10. If required adjust set screw in switch base bracket for proper spring tension.
11. Install side panel per Side Panel Removal/Installation procedure.

##### Replacement (S/C 22 And Below)

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove left (viewed from front) side panel.
5. Remove static ground spring leadwire.
6. Remove screw, nut, three washers, terminal lug and ground spring from contact mounting bracket (Figure 3-30).
7. Install replacement ground spring on contact mounting bracket using one screw, one nut, three washers, and terminal lug.
8. Perform Static Ground Spring Adjustment procedure.
9. Connect ground spring leadwire.
10. Install side panel per Side Panel Removal/Installation procedure.

##### Replacement (S/C 23 And Above)

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Refer to Side Panel Removal/Installation procedure and remove left (viewed from front) side panel.
5. Remove static ground spring leadwire.
6. Remove self threaded screw, lockwasher, terminal lug, and ground spring from switch base bracket (Figure 3-31).
7. Install replacement ground spring on switch base bracket using screw, lockwasher, and terminal lug.

8. Perform Static Ground Spring Adjustment procedure.
9. Connect ground spring leadwire.
10. Install side panel per Side Panel Removal/Installation procedure.

#### VELOCITY TRANSDUCER OR VELOCITY MAGNET REPLACEMENT

1. Stop spindle motor.
2. Remove disk pack.
3. Set UNIT POWER circuit breaker to OFF.
4. Open cabinet top cover.
5. Remove deck cover.
6. Disconnect velocity transducer cable plug P4 (Figure 3-35).
7. Remove two screws and washers securing velocity transducer end cap to magnet assembly. Retain cap, screws, and spring (located inside cap).

#### CAUTION

Use care in the following steps so that extension rod is not damaged.

8. Unthread extension rod at point where it enters rear of head/arm receiver.
9. Carefully pull transducer magnet and extension rod out of cap end of transducer coil/housing.

#### NOTE

Omit steps 10 and 15 if only the magnet is being replaced.

10. Remove transducer coil/housing from magnet assembly.

#### CAUTION

Replacement velocity transducer magnet can be rendered unuseable if it comes in contact with a ferro magnet object. Assembly must be moved out of magnet at least 18 inches before changing direction. New assembly must not approach the magnet closer than 18 inches except from center rear. Do not place transducer magnet on any metal surface.

11. Carefully remove replacement transducer magnet from shipping container.

12. Place replacement magnet alongside old magnet to determine correct polarity (like poles repel). Note which end should connect to extension rod and return magnet to shipping container.

13. Carefully unthread extension rod from old transducer magnet. Moderate force may be required since Loctite is on rod threads.

14. Apply one drop of Loctite, Grade C, to extension rod threads that mate with transducer magnet. Observing polarity that was determined in step 12, thread rod into end of new transducer magnet.

15. Slide replacement transducer coil/housing into magnet assembly.

16. Insert free end of extension rod into bore of coil/housing. Slide assembly into coil/housing until threads of extension rod are visible behind head/arm receiver.

17. Apply one drop of Loctite, Grade C, to extension rod threads. Using a pliers and only moderate force, install extension rod in head/arm receiver.

18. Install head cam tool and fully extend carriage.

19. Assemble spring and transducer end cap to magnet assembly using two screws and washers.

20. Connect velocity transducer plug P4.

21. Remove voice coil yellow leadwire.

22. Remove head cam tool.

23. Install pack, power up drive, and manually load heads to check transducer polarity.

#### NOTE

Transducer polarity is correct when A27, TP-F swings in negative direction while actuator is manually moved in forward direction.

24. Retract heads, then connect voice coil and load heads by clearing Select Lock.

25. Perform Integrator Gain Check and Adjustment procedure.

26. Perform Velocity Transducer Gain Uniformity procedure (Velocity Logic Checks).

27. Perform Velocity Gain Adjustment procedure.

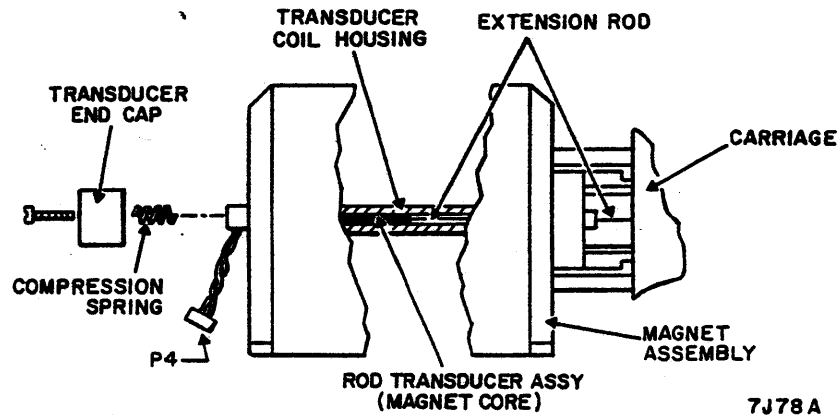


Figure 3-35. Velocity Transducer Replacement

**PACK ACCESS COVER SWITCH (S/C 30 AND ABOVE ONLY)**

**Adjustment**

1. Stop spindle motor.
2. Set UNIT POWER circuit breaker to OFF.
3. Open top cover assembly.
4. Torque nylon screw all the way into switch plunger.
5. With pack access cover in closed position, loosen and position switch clamp such that roller on switch detent arm is resting in position shown in figure 3-36.
6. Tighten clamp in this position.
7. With pack access cover open, observe that roller now rests in notch and switch is open.
8. Close top cover assembly.
9. Set UNIT POWER circuit breaker to ON.

**Replacement**

1. Stop spindle motor.
2. Set UNIT POWER circuit breaker to OFF.
3. Open top cover assembly.
4. Remove leads from switch quick connect terminals.
5. Remove screws attaching switch assembly to gas spring bracket.
6. Install replacement switch assembly by inserting and tightening screws attaching switch assembly to gas spring bracket.
7. Install leads to switch quick connect terminals.
8. Close top cover assembly.
9. Set UNIT POWER circuit breaker to ON.

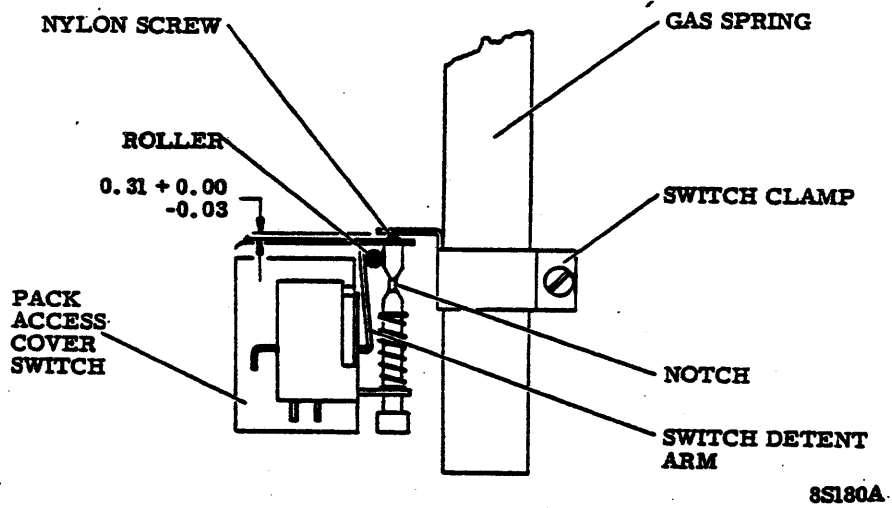
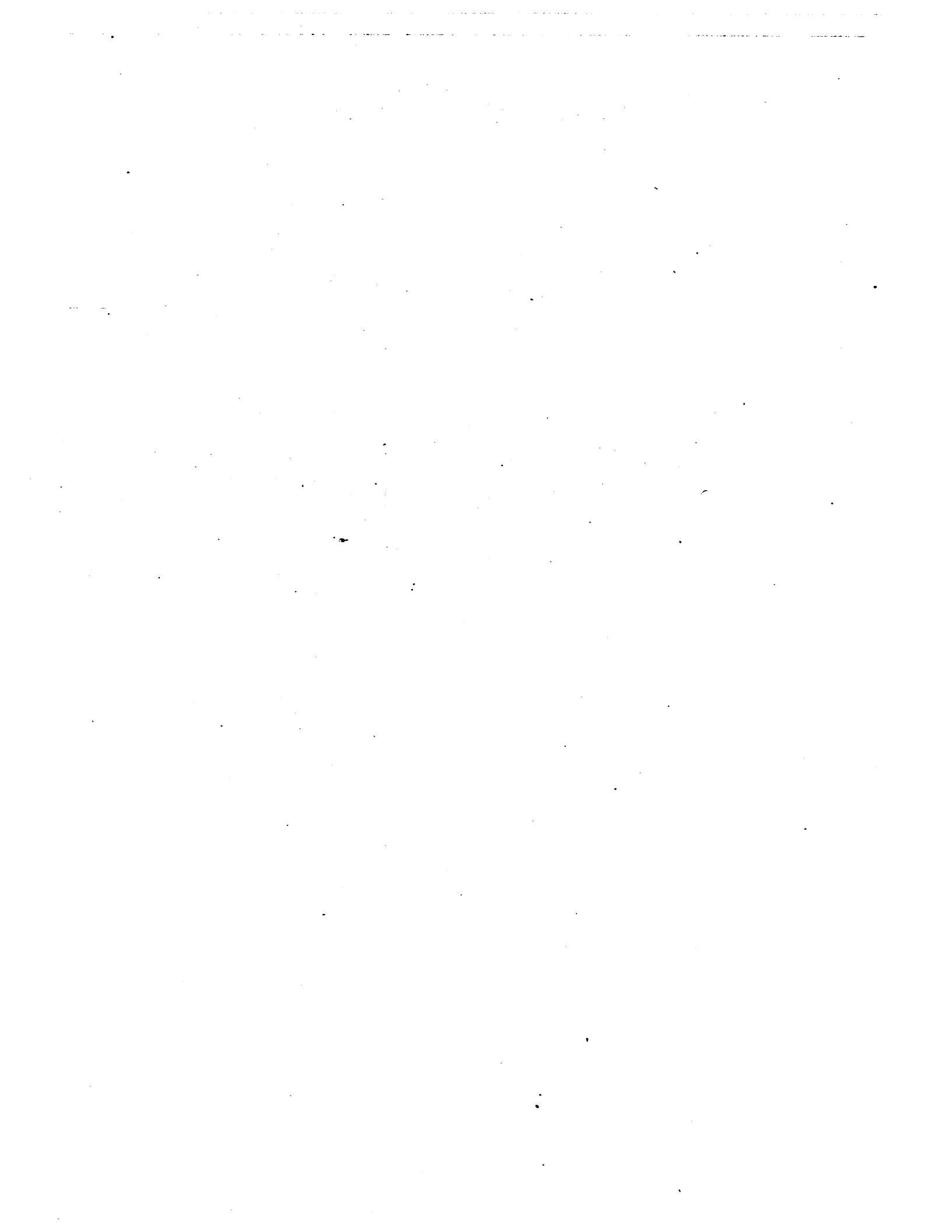


Figure 3-36. Pack Access Cover Switch

**SECTION 4**

**DIAGRAMS**



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## INTRODUCTION

This section contains diagrams that logically describe the drive in terms of the functions which the unit performs. It also contains schematics that show the wiring of the various assemblies.

Descriptions of the Integrated and discrete component circuits, unique card schematic and component layouts are found in Publication No. 83318200.

Functional descriptions, flow charts, simplified circuits and timing diagrams are also found in Publication No. 83318200.

Logic sheets 1 and 2 and sheet 1 of all assembly schematics (located at end of section) are for factory use only and are not included in this manual.

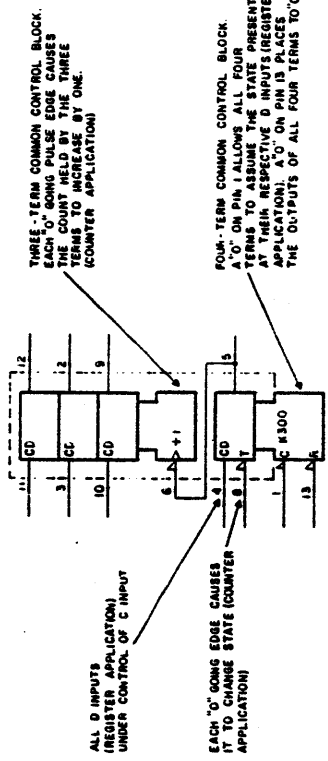




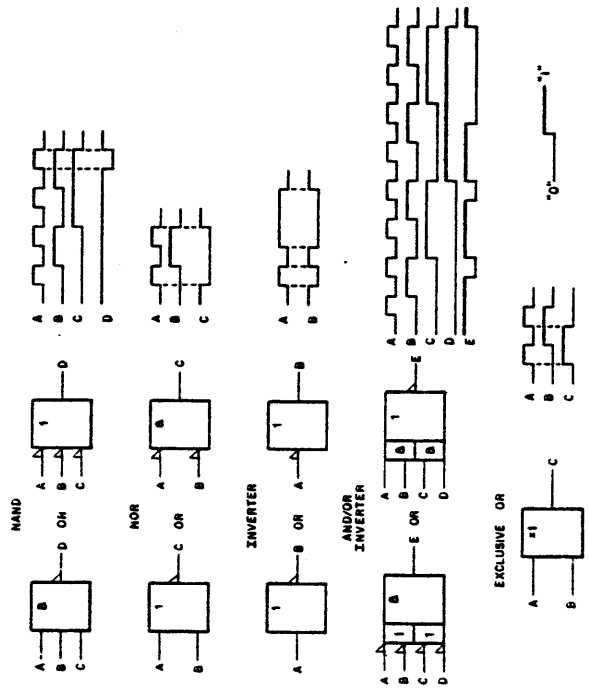
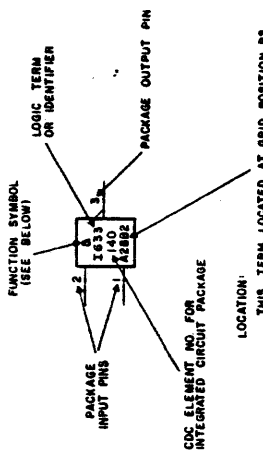
GENERAL SIGNAL ANNOTATION, GATING, AND INHIBITING INFORMATION

- S<sup>B</sup> SET INPUT TO BISTABLE DEVICE
- R<sup>B</sup> RESET (CLEAR) INPUT TO BISTABLE DEVICE
- G<sup>B</sup> GATE INPUT. HAS NO DIRECT ACTION ON CIRCUIT, BUT MUST BE PRESENT BEFORE INPUTS AND/OR OUTPUT(S) ARE ABLE TO FUNCTION IF MORE THAN ONE IS USED. A NUMERICAL SUFFIX IS ADDED (01, 02, ETC.).
- D<sup>B</sup> IDENTIFIES AN INPUT SIGNAL WHOSE ACTION IN THE BLOCK REQUIRES THE PRESENCE OF ANOTHER SIGNAL(S).
- S<sup>C</sup> STROBE PULSE USUALLY USED TO GATE D INPUTS INTO A BISTABLE DEVICE
- T<sup>B</sup> TOGGLE INPUT. BISTABLE DEVICE CHANGES STATE EACH TIME T ASSUMES ITS SPECIFIED STATE.
- J<sup>B</sup> SET SIDE INPUT TO J-K FF
- K<sup>B</sup> CLEAR SIDE INPUT TO J-K FF

THE SIGNAL STATE REQUIRED FOR THIS SIGNAL. NORMALLY ASSUMED FUNCTION IS ADDITIONALLY DESCRIBED BY SIGNAL STATE ENTERS THE LOGIC TERM BOX. SEE ADJACENT EXAMPLE.



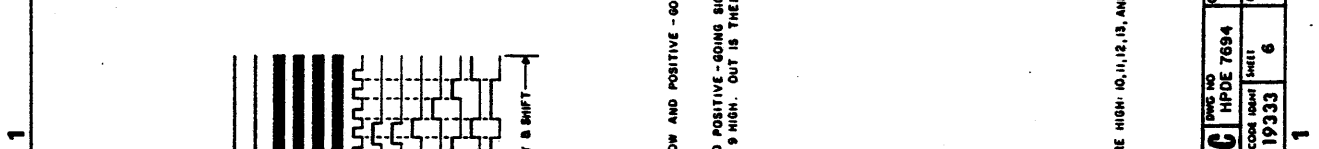
INTEGRATED CIRCUIT (GATES) INFORMATION EXAMPLE



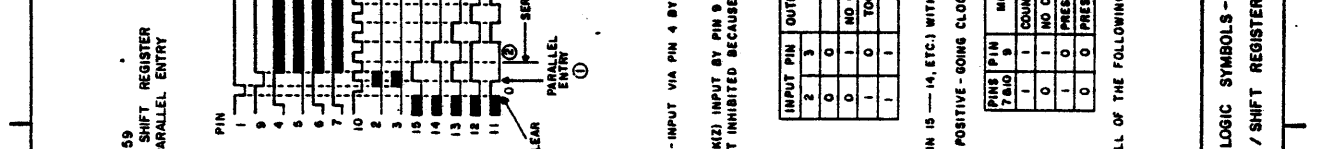
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|------------------------|--|------------|------|
| KEY TO LOGIC SYMBOLS - |  | CD         | REV  |
| GATES                  |  | HPDE 7694  | A    |
| NORMANDALE DIVISION    |  | COOR IDENT | DATE |
|                        |  | 1933       | 4    |



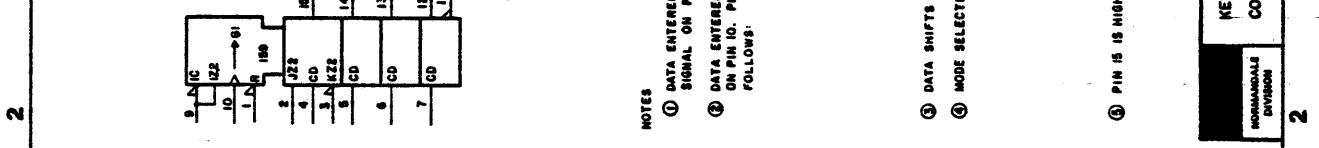
TYPE 182  
4-BIT COUNTER/STORAGE ELEMENT



TYPE 182  
4-BIT COUNTER/STORAGE ELEMENT



TYPE 159  
4-BIT SHIFT REGISTER WITH PARALLEL ENTRY



TYPE 159  
4-BIT SHIFT REGISTER WITH PARALLEL ENTRY



TYPE 156  
SYNCHRONOUS PRESETTABLE UP COUNTER



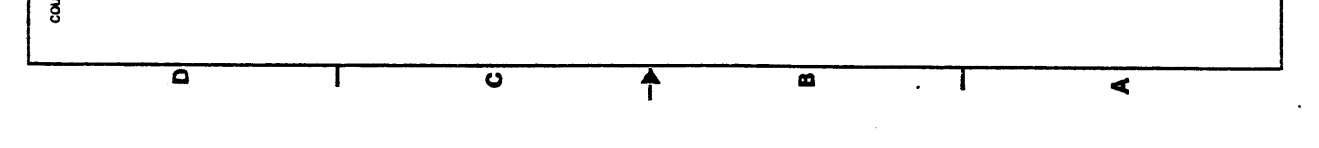
TYPE 156  
SYNCHRONOUS PRESETTABLE UP COUNTER



TYPE 158  
HEXADECIMAL PRESETTABLE UP COUNTER



TYPE 158  
HEXADECIMAL PRESETTABLE UP COUNTER



NOTES

- DATA ENTERED INTO D-INPUT VIA PIN 4 BY PIN 9 LOW AND POSITIVE-GOING SIGNAL ON PIN 10.
- DATA ENTERED INTO JK123 INPUT BY PIN 9 HIGH AND POSITIVE-GOING SIGNAL ON PIN 10. PIN 4 INPUT INHIBITED BECAUSE OF PIN 9 HIGH. OUT IS THEN AS FOLLOWS:

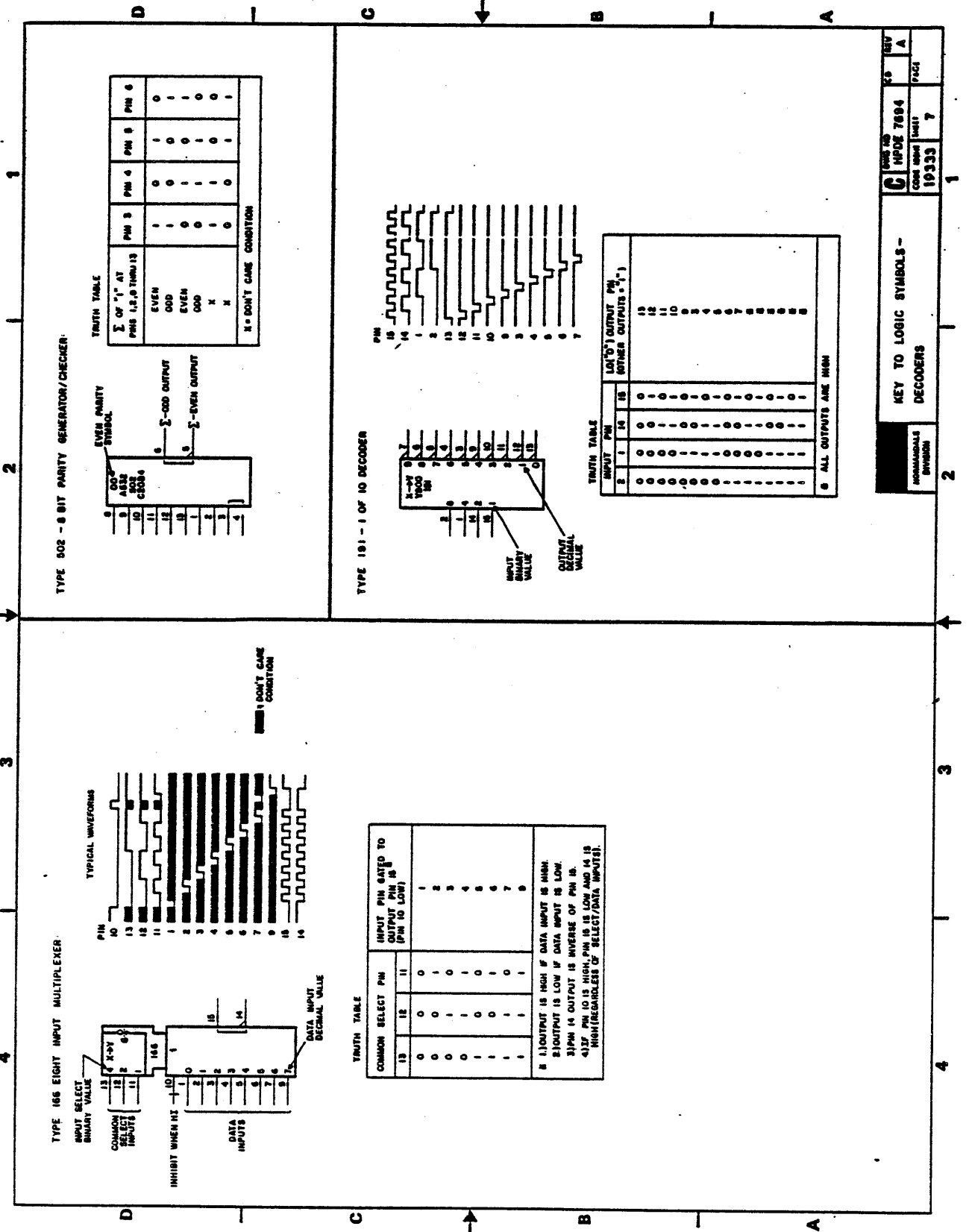
| INPUT PIN | OUTPUT PIN |
|-----------|------------|
| 2         | 3          |
| 0         | 0          |
| 0         | 1          |
| 1         | 0          |
| 1         | 1          |

DATA SHIFTS DOWN (PIN 15 — 14, ETC.) WITH CLOCK.  
MODE SELECTION WITH POSITIVE-GOING CLOCK IS:

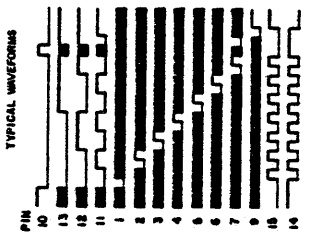
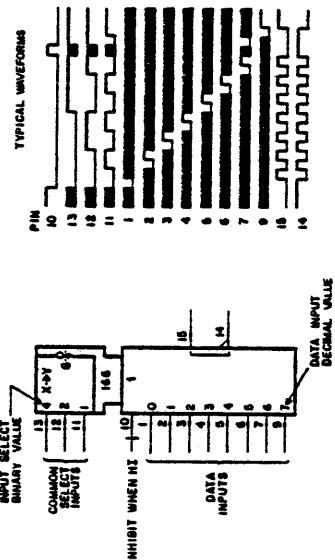
| PIN 7 MODE | PIN 9 | MODE      |
|------------|-------|-----------|
| 1          | 1     | COUNT UP  |
| 0          | 1     | NO CHANGE |
| 1          | 0     | PRESET    |
| 0          | 0     | PRESET    |

PIN 15 IS HIGH WHEN ALL OF THE FOLLOWING PINS ARE HIGH: 10, 11, 12, 13, AND 14.

KEY TO LOGIC SYMBOLS -  
COUNTERS / SHIFT REGISTER



TYPE 168 EIGHT INPUT MULTIPLEXER

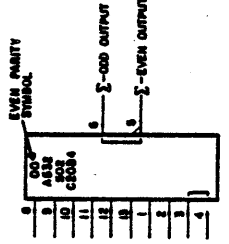


TRUTH TABLE

| COMMON SELECT PIN | INPUT PIN GATED TO OUTPUT PIN IS (PIN 10 LOW) |
|-------------------|---|
| 13                | 0 0 1 1                                       |
| 12                | 0 1 0 1                                       |
| 11                | 0 1 1 0                                       |
| 10                | 0 0 0 0                                       |
| 9                 | 1 0 0 0                                       |
| 8                 | 1 0 1 0                                       |
| 7                 | 1 1 0 0                                       |
| 6                 | 1 1 1 0                                       |

0 1 OUTPUT IS HIGH IF DATA INPUT IS HIGH.  
 1 0 OUTPUT IS LOW IF DATA INPUT IS LOW.  
 3) PIN 14 OUTPUT IS INVERSE OF PIN 10.  
 4) PIN 10 IS HIGH, PIN 15 IS LOW AND 14 IS HIGH (REGARDLESS OF SELECT/DATA INPUTS).

TYPE 502 - 8 BIT PARITY GENERATOR/CHECKER

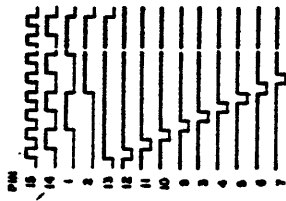
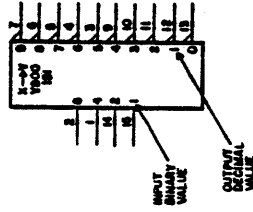


TRUTH TABLE

| Σ OF "1" AT PINS 1,2,3 TURN 13 | PIN 3 | PIN 4 | PIN 8 | PIN 9 | PIN 16 |
|--------------------------------|-------|-------|-------|-------|--------|
| EVEN                           | 1     | 0     | 0     | 1     | 0      |
| ODD                            | 0     | 0     | 0     | 0     | 1      |
| EVEN                           | 0     | 0     | 1     | 0     | 0      |
| ODD                            | 0     | 1     | 0     | 0     | 0      |
| X                              | X     | 0     | 0     | 0     | 0      |

X = DON'T CARE CONDITION

TYPE 181 - 1 OF 10 DECODER



TRUTH TABLE

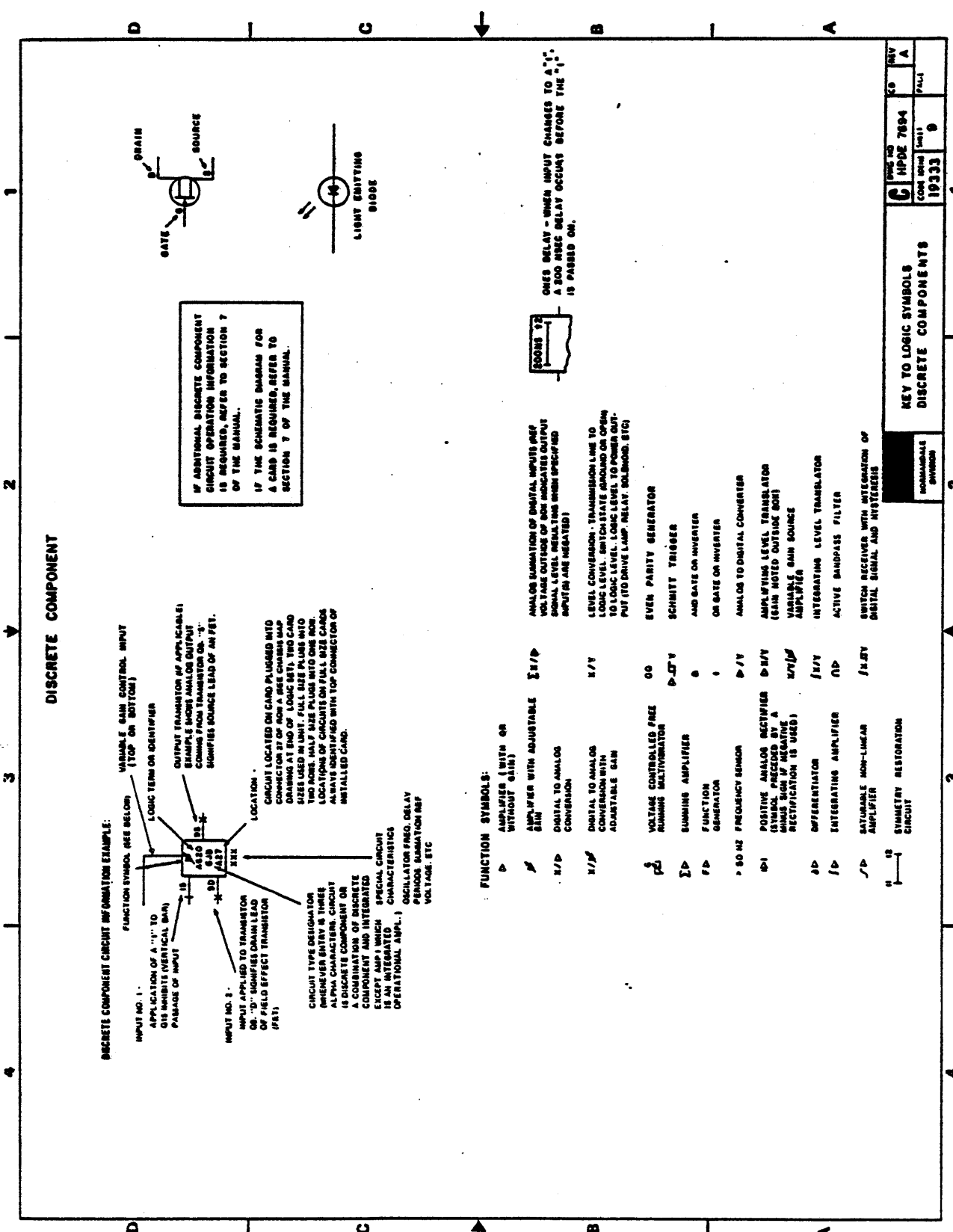
| INPUT PIN | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|-----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| 1         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 2         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 3         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 4         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 5         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 6         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 7         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 8         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 9         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 10        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 11        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 12        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 13        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 14        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 15        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |
| 16        | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0  | 0  | 0  | 0  | 0  | 0  | 0  |

1) OUTPUT 15 IS HIGH IF DATA INPUT IS HIGH.  
 2) OUTPUT 15 IS LOW IF DATA INPUT IS LOW.  
 3) PIN 14 OUTPUT IS INVERSE OF PIN 10.  
 4) PIN 10 IS HIGH, PIN 15 IS LOW AND 14 IS HIGH (REGARDLESS OF SELECT/DATA INPUTS).

KEY TO LOGIC SYMBOLS - DECODERS

|       |   |
|-------|---|
| 19333 | 7 |
| 19333 | 7 |
| 19333 | 7 |





**DISCRETE COMPONENT**

DISCRETE COMPONENT CIRCUIT INFORMATION EXAMPLE:

FUNCTION SYMBOL (SEE BELOW)

INPUT NO. 1: VARIABLE GAIN CONTROL INPUT (TOP OR BOTTOM)

LOGIC TERM OR IDENTIFIER

OUTPUT TRANSMITTER (IF APPLICABLE) SAMPLE FROM ANALOG OUTPUT SIGNALS FROM TRANSMITTER ON "1" SIGNIFIES SOURCE LEAD OF AN SET.

LOCATION: CIRCUIT LOCATED ON CARD PLUGGED INTO CONNECTOR 37 OF NON A SEE CHAIN MAP DRAWING AT END OF LOGIC SET. TWO CARD SIZES USED IN UNIT. FULL SIZE PLUG INTO TWO MORE. HALF SIZE PLUG INTO ONE MORE. LOCATION OF CIRCUIT ON FULL SIZE CARDS ALWAYS CORRELATED WITH TOP CONNECTOR OF INSTALLED CARD.

INPUT NO. 2: INPUT APPLIED TO TRANSMITTER OR "D" SIGNIFIES DRAIN LEAD OF FIELD EFFECT TRANSMITTER (FET).

CIRCUIT TYPE DESIGNATION (WHETHER INTEGRATED OR DISCRETE COMPONENT OR A COMBINATION OF DISCRETE COMPONENT AND INTEGRATED EXCEPT AMP) WHICH IS AN INTEGRATED OPERATIONAL APPL.) CHARACTERISTICS (OSCILLATOR FREQ. DELAY TIME, SENSITIVITY REF. VOLTAGE, ETC)

**FUNCTION SYMBOLS:**

- ▷ AMPLIFIER WITH OR WITHOUT GAIN
- ◁ AMPLIFIER WITH ADJUSTABLE GAIN
- N/D DIGITAL TO ANALOG CONVERSION
- N/V DIGITAL TO ANALOG CONVERSION WITH ADJUSTABLE GAIN
- V/V VOLTAGE CONTROLLED FREE RUNNING MULTIVIBRATOR
- Σ SUMMING AMPLIFIER
- ∇ FUNCTION GENERATOR
- ∞ 50 HZ FREQUENCY SENSOR
- ∅ POSITIVE ANALOG RECTIFIER (SYMBOL PRECEDED BY A MINUS SIGN IF NEGATIVE RECTIFICATION IS USED)
- ∂ DIFFERENTIATOR
- ∫ INTEGRATING AMPLIFIER
- ∫ SATURABLE NON-LINEAR AMPLIFIER
- ∩ SYMMETRY RESTORATION
- ∩ LOGIC TERM OR IDENTIFIER
- ∩ ANALOG SUMMATION OF DIGITAL INPUTS DEF VOLTAGE OUTSIDE OF BOX INDICATES OUTPUT SIGNAL LEVEL MEANS THIS WHEN SPECIFIED INPUTS ARE NEGATED
- ∩ LEVEL CONVERSION - TRANSMISSION LINE TO LOGIC LEVEL. SWITCH STATE GROUND OR OPEN TO LOGIC LEVEL. LOGIC LEVEL TO POWER OUT. PUT (TO DRIVE LAMP RELAY SOLENOID, ETC)
- ∩ EVEN PARITY GENERATOR
- ∩ SCHMITT TRIGGER
- ∩ AND GATE OR INVERTER
- ∩ OR GATE OR INVERTER
- ∩ ANALOG TO DIGITAL CONVERTER
- ∩ ANALOGING LEVEL TRANSLATOR (GAIN NOTED OUTSIDE BOX)
- ∩ VARIABLE GAIN SOURCE APPLIER
- ∩ INTEGRATING LEVEL TRANSLATOR
- ∩ ACTIVE BANDPASS FILTER
- ∩ SWITCH RECEIVER WITH INTEGRATION OF DIGITAL SIGNAL AND HYSTERESIS

IF ADDITIONAL DISCRETE COMPONENT IS REQUIRED, REFER TO SECTION 7 OF THE MANUAL.

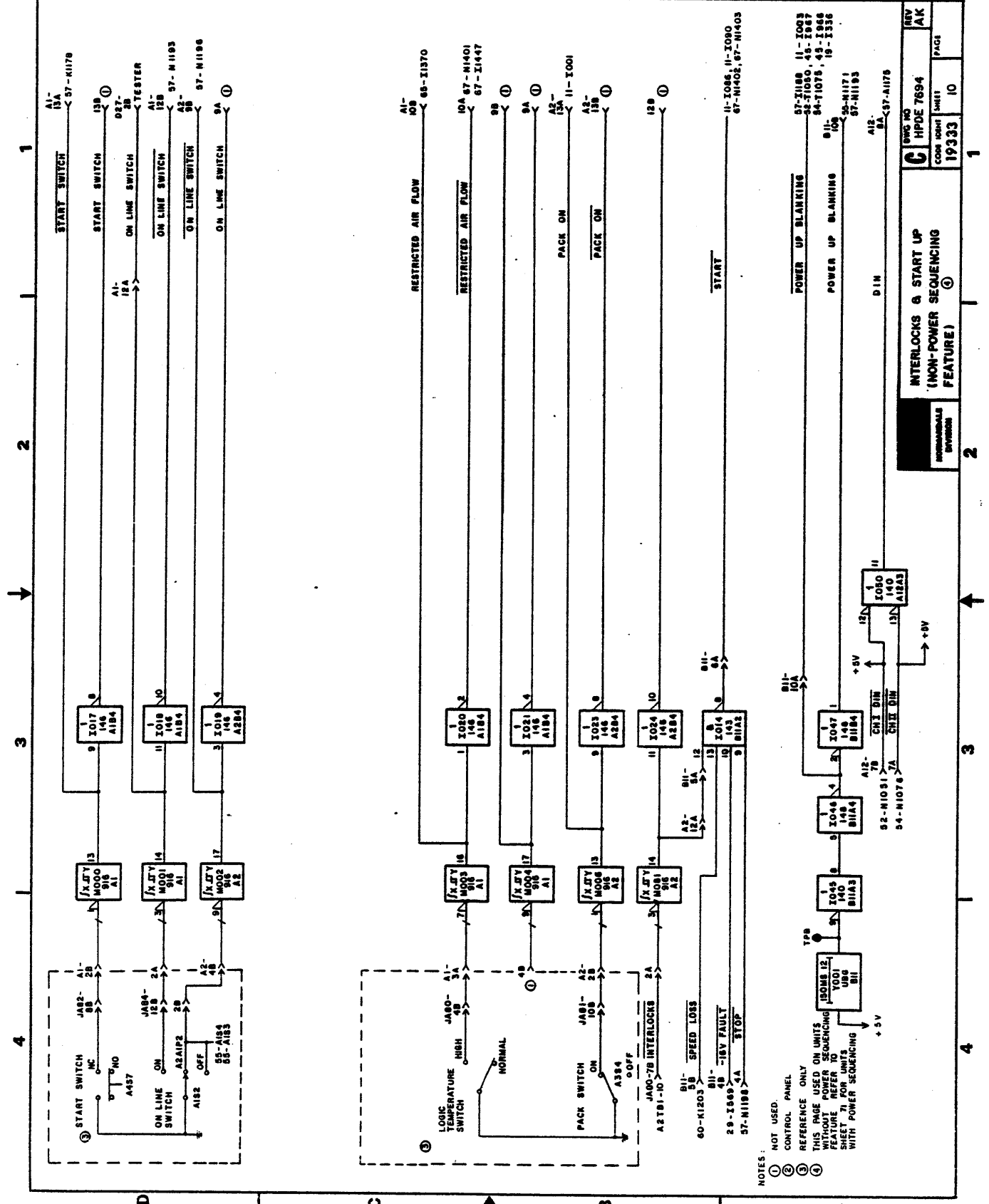
IF THE SCHEMATIC DIAGRAM FOR A CARD IS REQUIRED, REFER TO SECTION 7 OF THE MANUAL.

ONES DELAY - WHEN INPUT CHANGES TO A "1" A 500 NSEC RELAY OCCURS BEFORE THE "1" IS PASSED ON.

|             |    |     |    |
|-------------|----|-----|----|
| REV         | NO | REV | NO |
| 1           | 1  | 1   | 1  |
| C HPDE 7694 |    | A   |    |
| CONV 19333  |    | 9   |    |
| 19333       |    | 9   |    |

KEY TO LOGIC SYMBOLS  
DISCRETE COMPONENTS

NON-ADJUSTABLE DIVIDERS



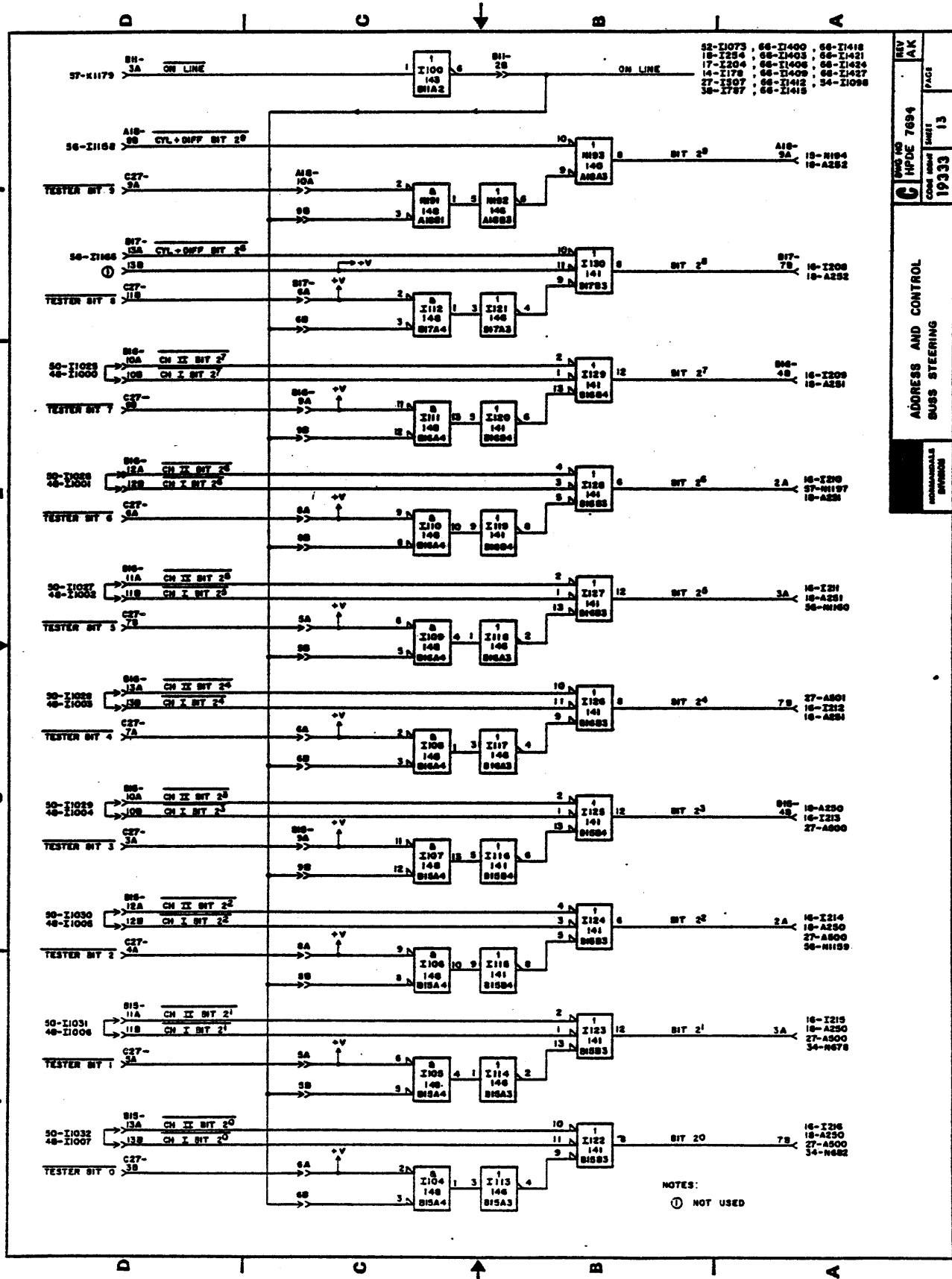
NOTES:  
 ① NOT USED.  
 ② CONTROL PANEL  
 REFERENCE ONLY  
 THIS PAGE USED ON UNITS  
 WITHOUT POWER SEQUENCING  
 FEATURE REFER TO  
 INTERLOCKS & START UP  
 WITH POWER SEQUENCING

|  |      |
|--|------|
| REV  | AK   |
| HPDE 7694  | PAGE |
| 19333  | 10   |
| INTERLOCKS & START UP<br>(NON-POWER SEQUENCING<br>FEATURE) | ①    |
| HPDE 7694  | 10   |
| 19333  | 10   |





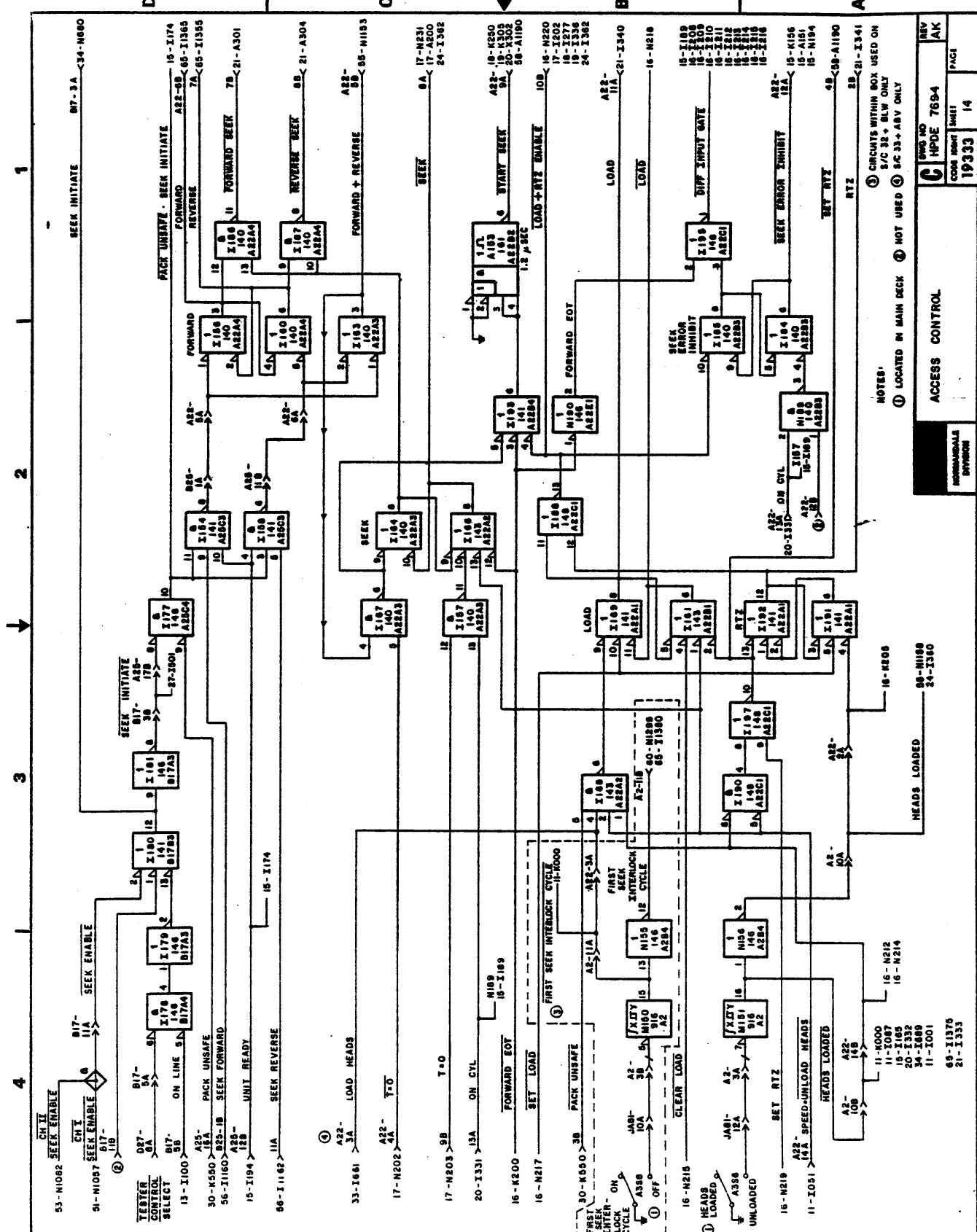




REV  
AK  
PAGE  
HPDE 7694  
CONS SHEET  
19333 13  
ADDRESS AND CONTROL  
BUS STEERING  
MICROCHANNELS  
INSTRUMENTS

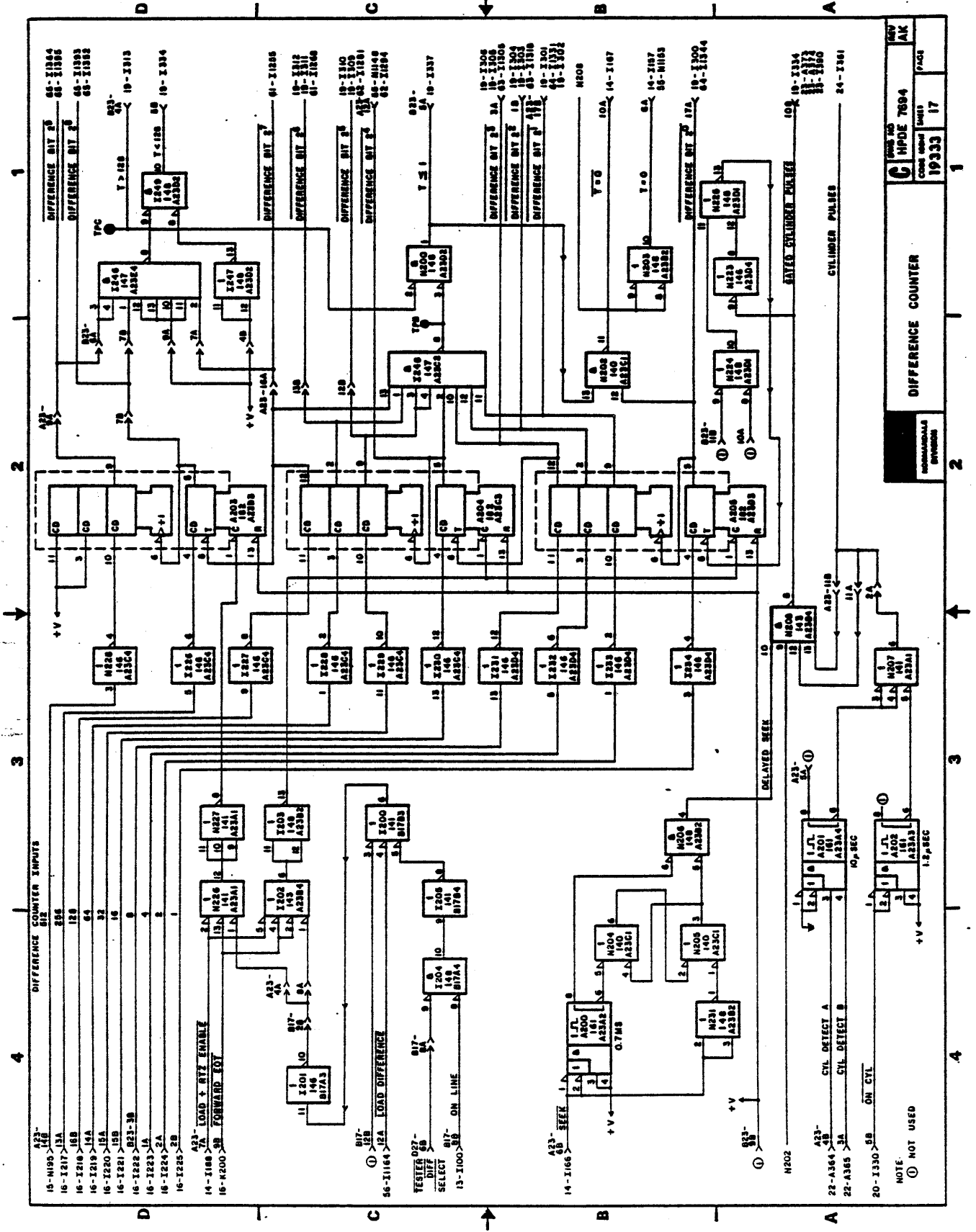
32-11073, 66-11400, 66-11418  
15-1234, 66-11403, 66-11421  
17-1204, 66-11406, 66-11424  
14-1178, 66-11408, 66-11427  
27-1307, 66-11412, 34-11098  
30-1737, 66-11415

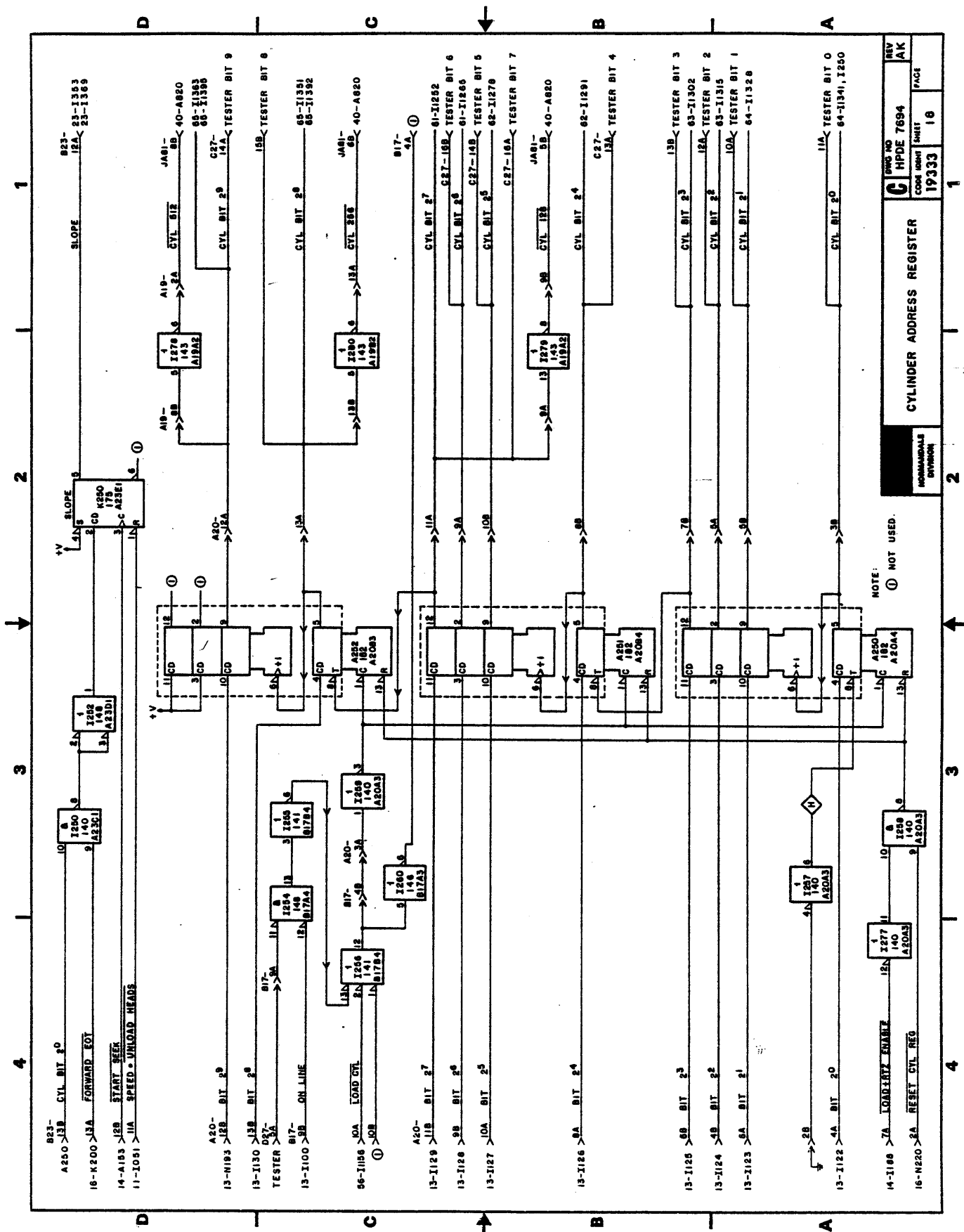
NOTES:  
⊙ NOT USED





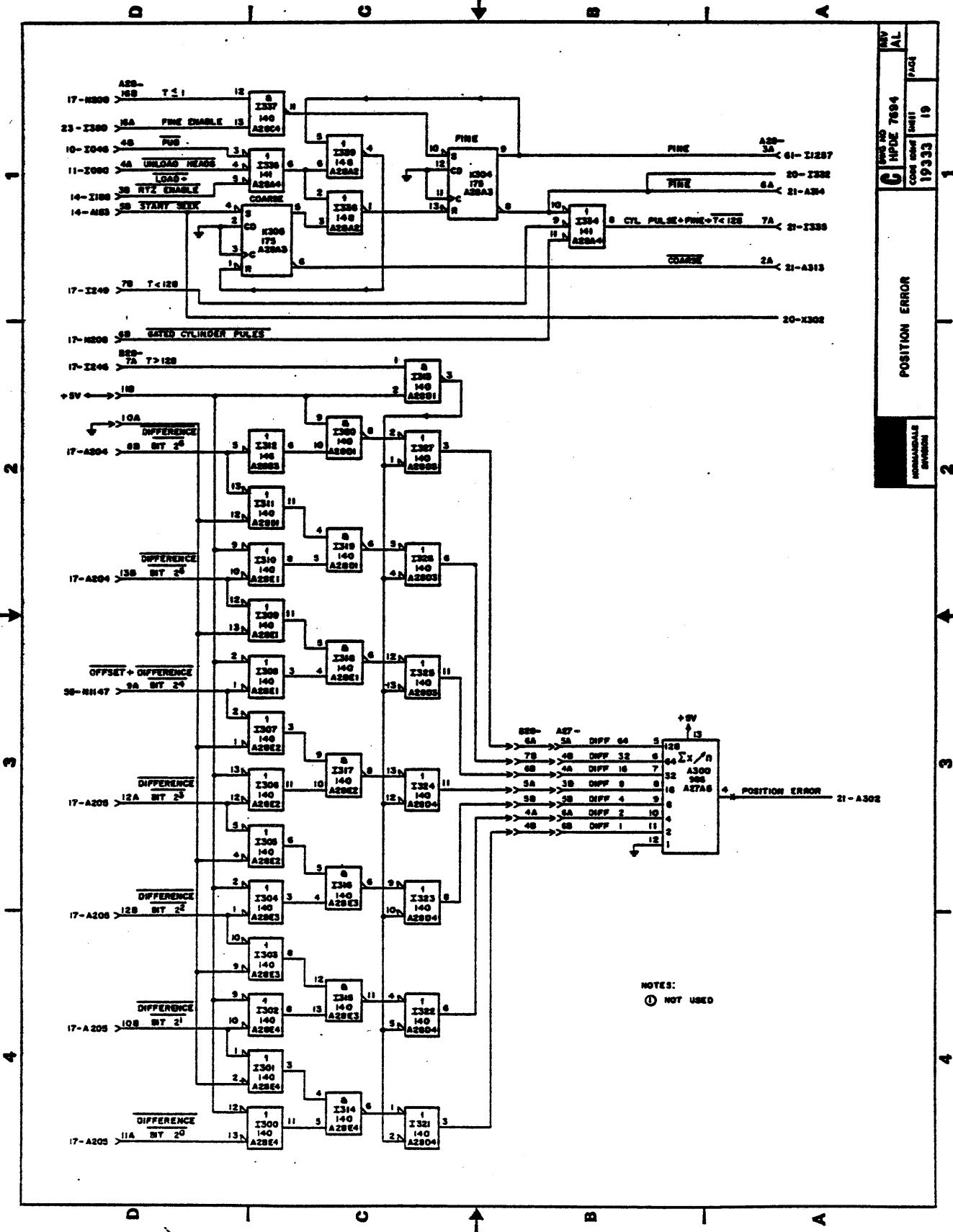






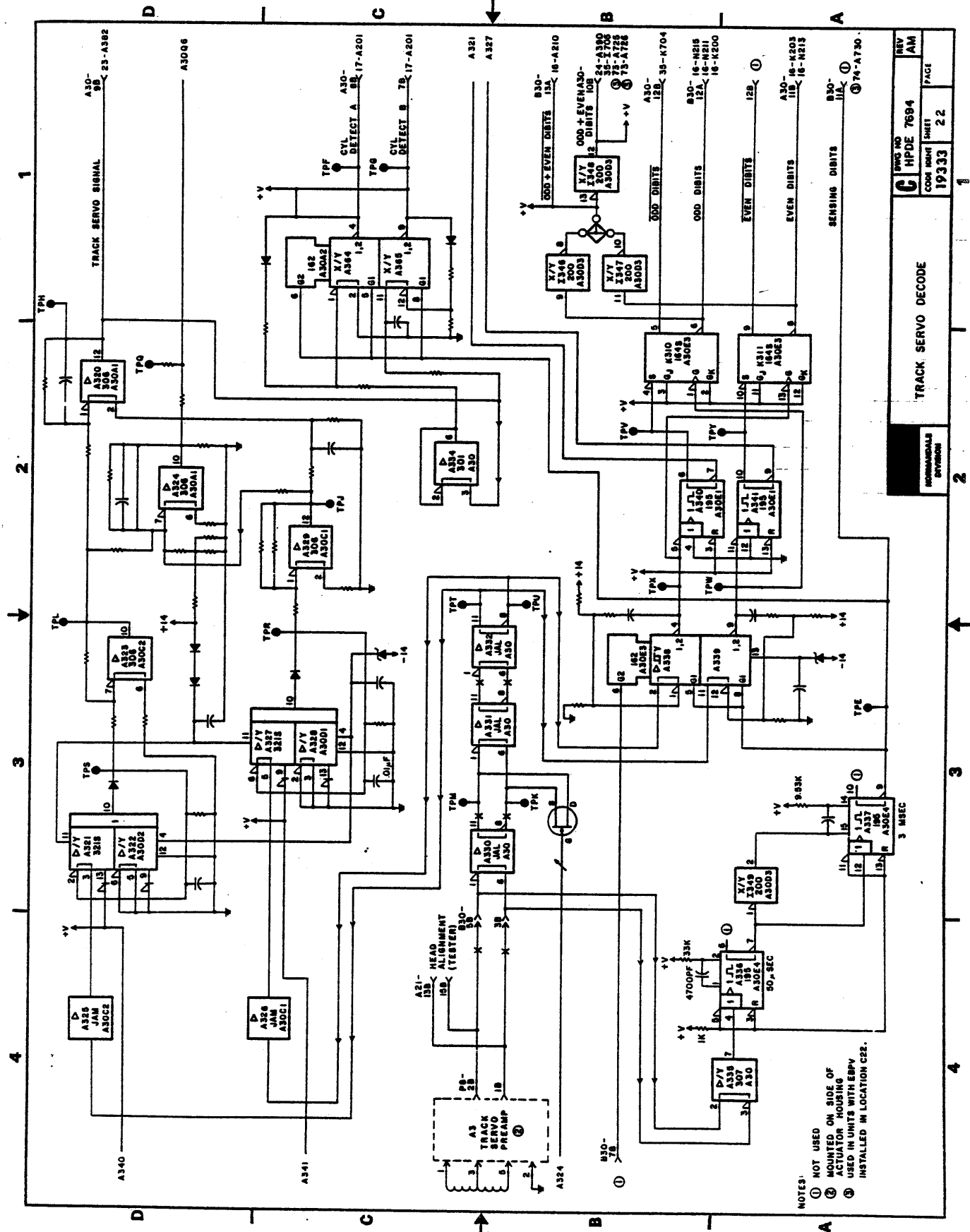
|                           |           |       |    |
|---------------------------|-----------|-------|----|
| CYLINDER ADDRESS REGISTER |           | REV   | AK |
| FORM NO                   | NPDE 7694 | CODE  | 18 |
| MANUFACTURE               | 19333     | SHEET | 18 |
| DIVISION                  |           | PAGE  |    |





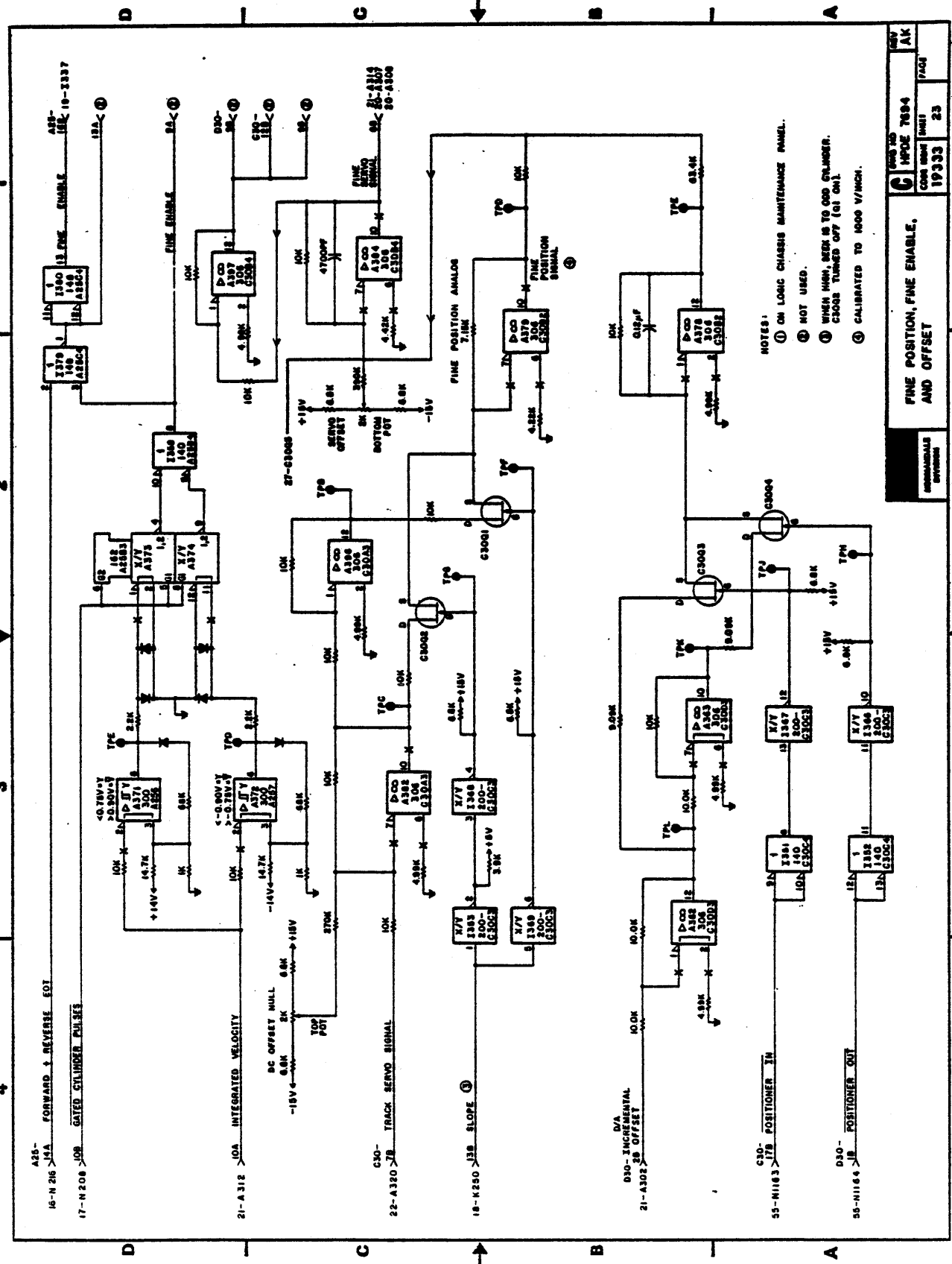






NOTES:  
 ① NOT USED  
 ② MOUNTED ON SIDE OF ACTUATOR HOUSING  
 ③ USED IN UNITS WITH EPV INSTALLED IN LOCATION C52.

|                    |            |           |         |
|--------------------|------------|-----------|---------|
| REV 00             |            | HPDE 7694 | REV AM  |
| CODE               | WORK SHEET | 19333     | PAGE 22 |
| TRACK SERVO DECODE |            |           |         |
| COMMERCIAL SYSTEMS |            |           |         |

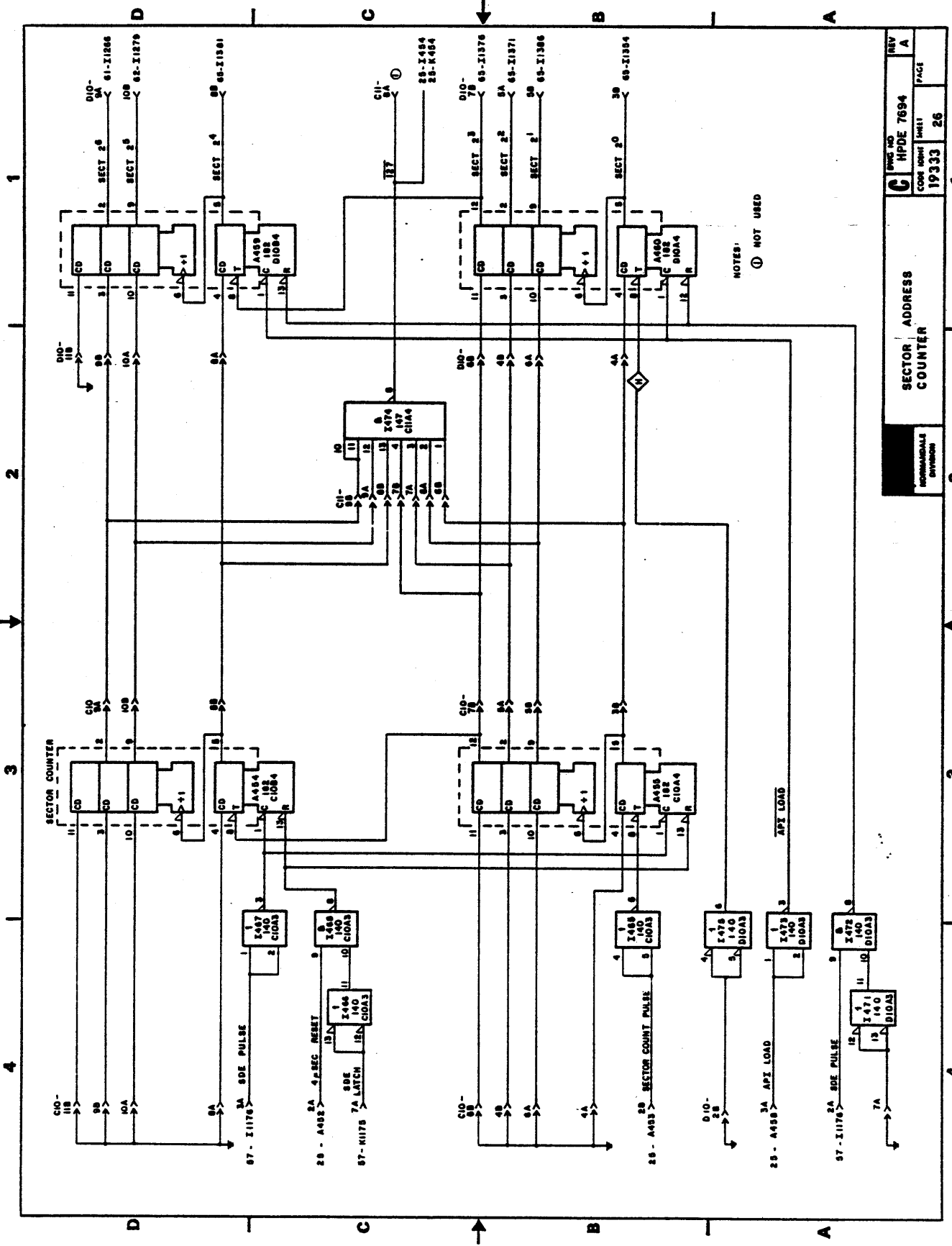


- NOTES:
- ① ON LOGIC CHASSIS MAINTENANCE PANEL.
  - ② NOT USED.
  - ③ WHEN HIGH, SEEK IS TO COO CYLINDER. CROSS TURNED OFF (01 OH).
  - ④ CALIBRATED TO 1000 V/INCH.

|  |      |           |       |
|--|------|-----------|-------|
| FINE POSITION, FINE ENABLE, AND OFFSET |      | REV       | AK    |
| REV                                    | DATE | REV       | DATE  |
| 19333                                  | 23   | 6         | 17/03 |
| MATERIALS                              |      | MATERIALS |       |
| REVISED                                |      | REVISED   |       |
| BY                                     |      | BY        |       |
| DATE                                   |      | DATE      |       |
| 19333                                  |      | 17/03     |       |



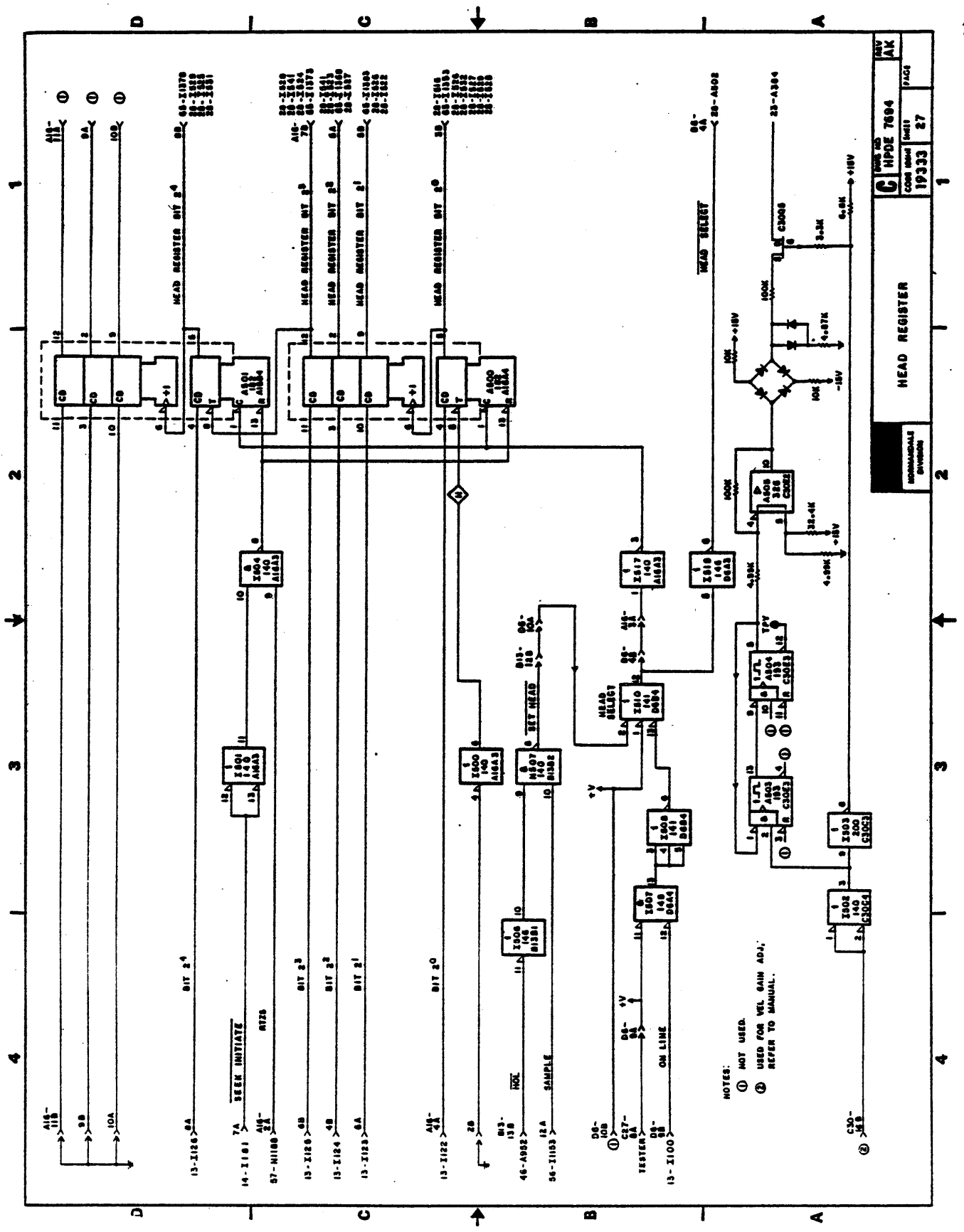




NOTES:  
 ① NOT USED

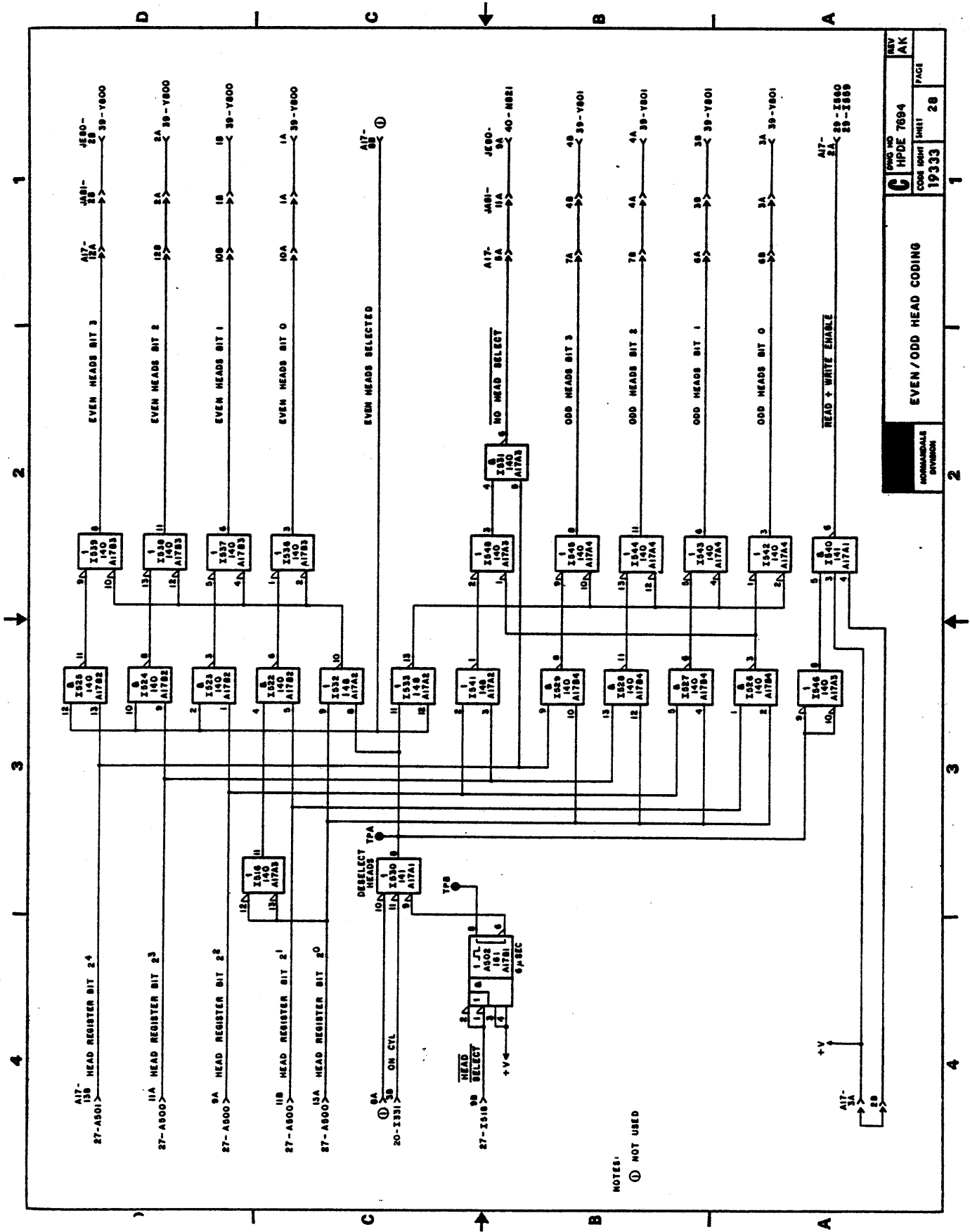
|                        |           |                     |
|------------------------|-----------|---------------------|
| REV A                  | HPDE 7694 | REV                 |
|                        | 19333     | 26                  |
| SECTOR ADDRESS COUNTER |           | COORDINATE DIVISION |





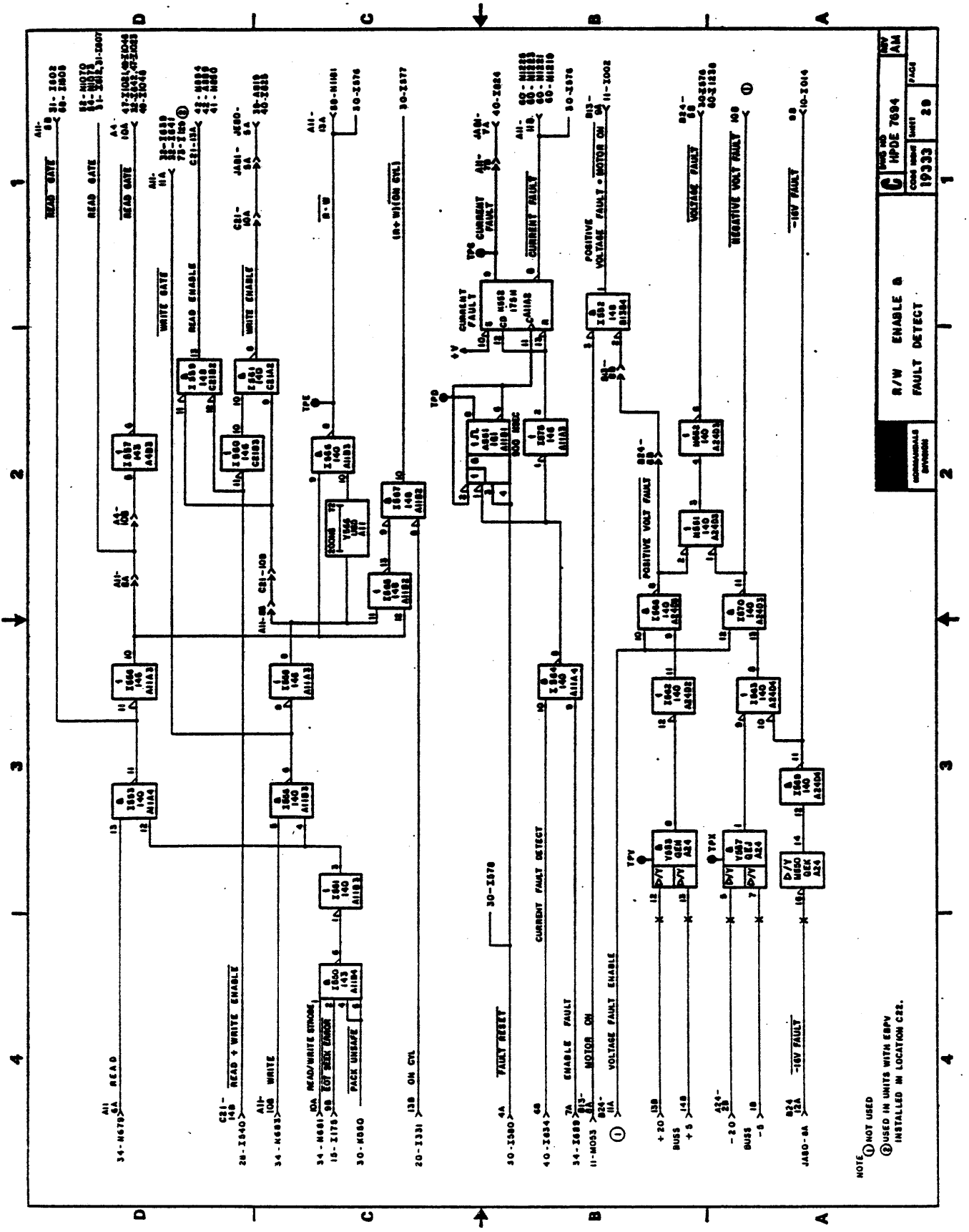
|                      |           |
|----------------------|-----------|
| REV                  | AK        |
| DATE                 | 7/67      |
| WORK NO              | HPDE 7804 |
| COORD                | 19333     |
| DESIGN               | 27        |
| HEAD REGISTER        |           |
| NORMANVILLE DIVISION |           |

NOTES:  
 ① NOT USED.  
 ② USED FOR VEL GAIN ADJ., REFER TO MANUAL.



1  
2  
3  
4

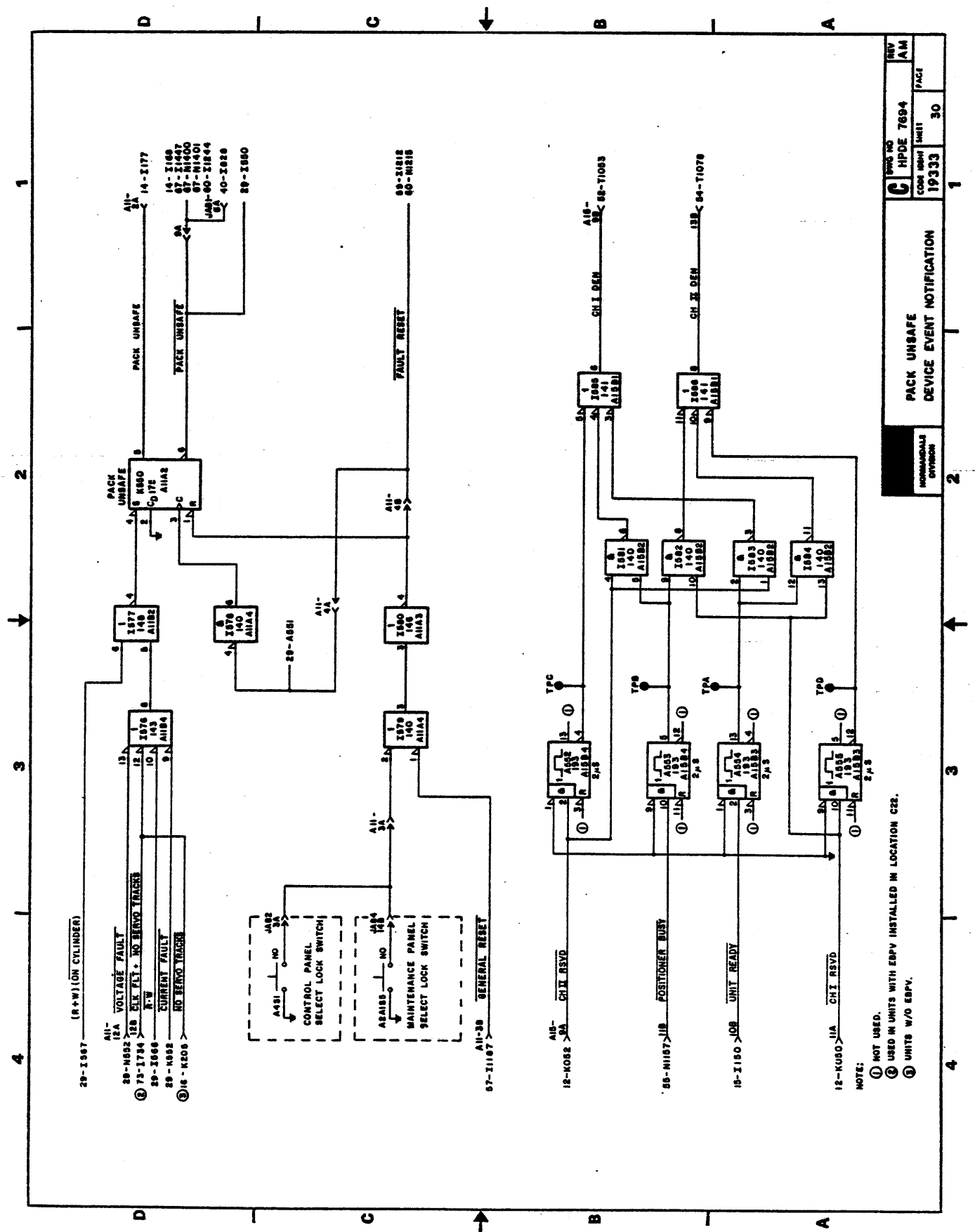
|                        |    |
|------------------------|----|
| REV                    | AK |
| HPDE 7694              | 28 |
| 19333                  | 28 |
| EVEN / ODD HEAD CODING |    |
| COMMERCIAL DIVISION    |    |



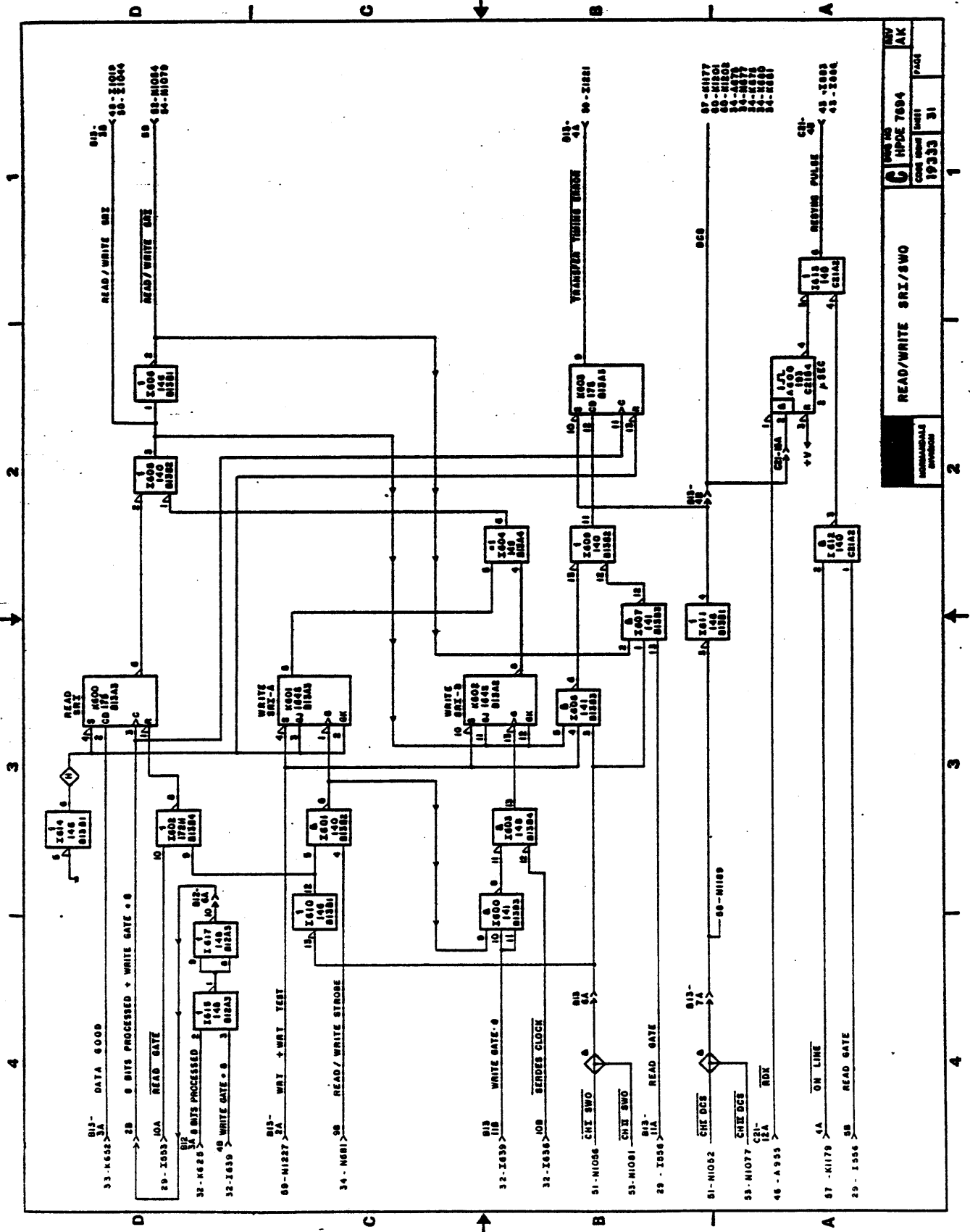
|       |           |
|-------|-----------|
| REV   | AM        |
| 6     | HPDE 7894 |
| 19333 | 28        |

R/W ENABLE &  
FAULT DETECT

NOTE  
 ① NOT USED  
 ② USED IN UNITS WITH EPV  
 INSTALLED IN LOCATION C2E.

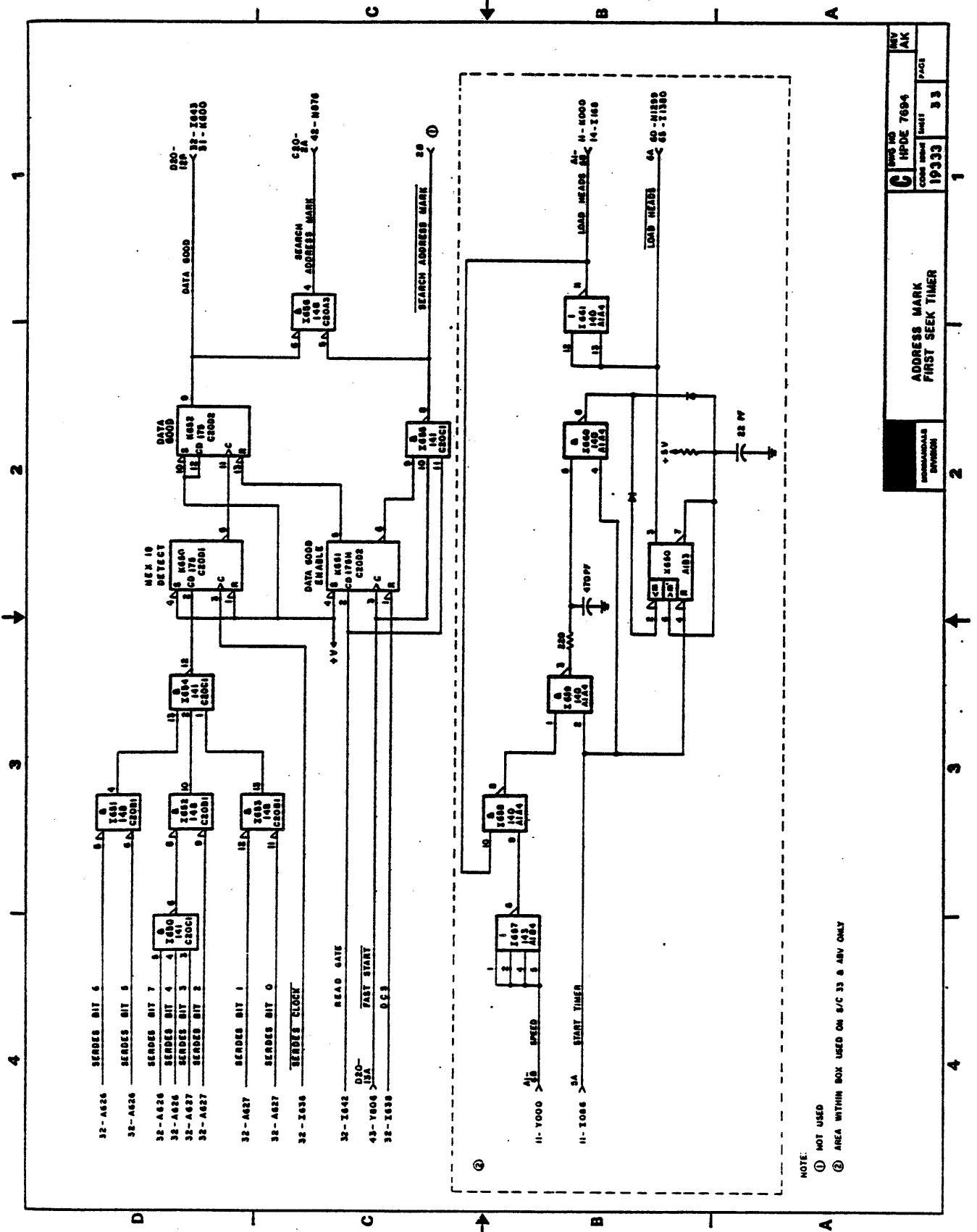


|                                       |  |                     |            |
|---------------------------------------|--|---------------------|------------|
| PACK UNSAFE DEVICE EVENT NOTIFICATION |  | REV NO<br>HPDE 7694 | REV<br>A M |
| INDIVIDUALLY DIVISION                 |  | COS UNIT UNIT       | PAGE       |
|                                       |  | 19333               | 30         |



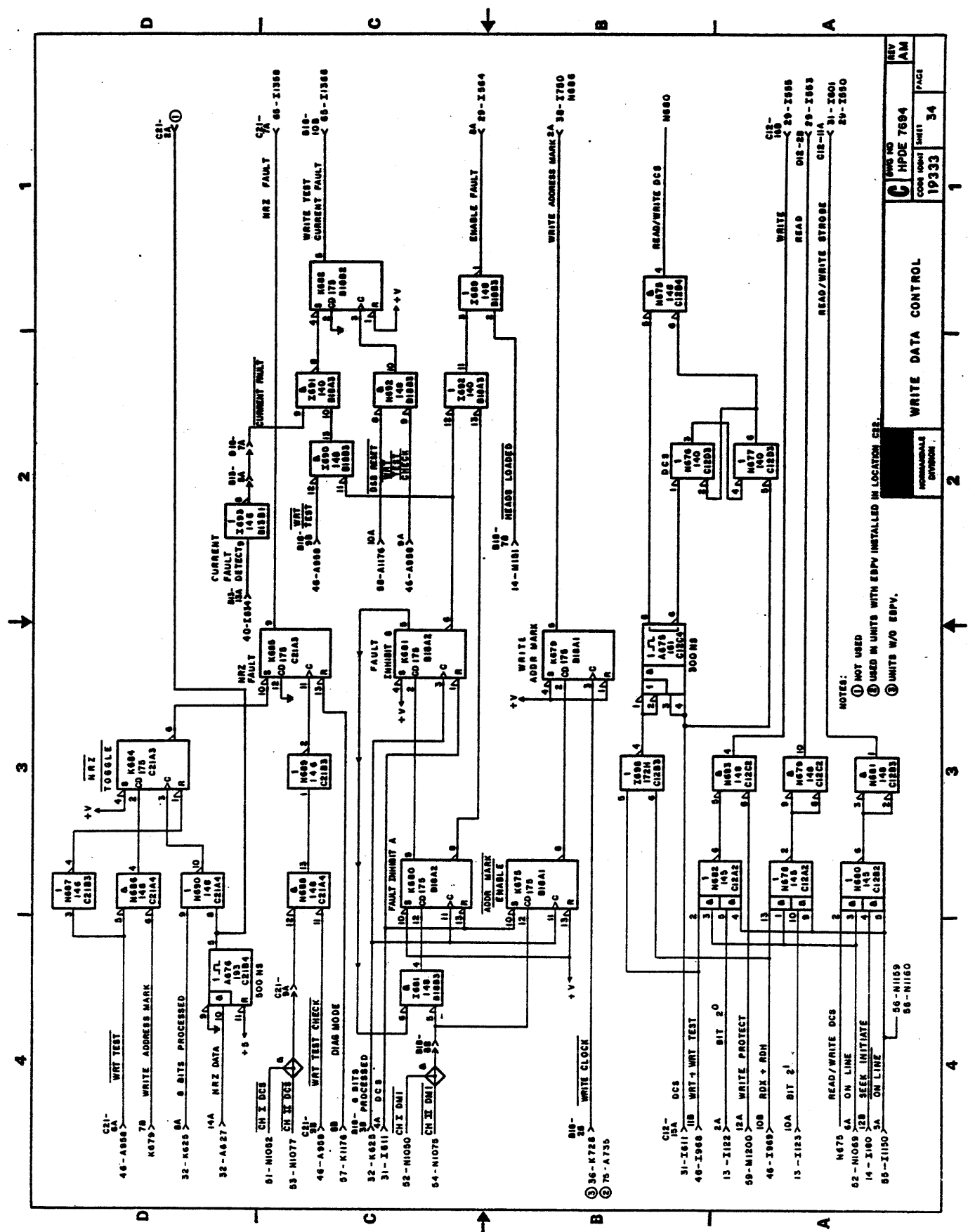
|                    |    |      |
|--------------------|----|------|
| HPDE 7894          |    | REV  |
| 19333              |    | AK   |
| DATE               | 31 | PAGE |
| READ/WRITE SRZ/SWO |    |      |





NOTE:  
 ① NOT USED  
 ② AREA WITHIN BOX USED ON S/C 33 & 48V ONLY

|                                  |      |
|----------------------------------|------|
| REV                              | AK   |
| HPDE 7694                        | PAGE |
| CODE MARK                        | 33   |
| 19333                            | 1    |
| ADDRESS MARK<br>FIRST SEEK TIMER |      |
| NON-QUALIFIED<br>BY DIVISION     |      |



46-A898 WRT TEST  
 K879 WRITE ADDRESS MARK  
 32-K825 9 BITS PROCESSED  
 32-A827 NRZ DATA  
 51-N1082 CH X DCS  
 53-N1077 CH X DEE  
 46-A898 WRT TEST CHECK  
 57-K1176 9 BITS  
 32-K825 30 PROCESSED  
 31-I811 CH X DCS  
 52-N1080 CH X DMI  
 54-N1078 CH X DMI  
 36-K728 WRITE CLOCK  
 75-A735  
 31-I811 WRT + WRT TEST  
 48-I966 SA  
 13-I182 SA BIT 2<sup>0</sup>  
 59-N1200 12A WRITE PROTECT  
 46-I989 10B RDX + RDH  
 13-I123 10A BIT 2<sup>1</sup>  
 52-N1069 4A ON LINE  
 14-X180 12B SEEK INITIATE  
 55-I1190 3A ON LINE  
 56-N1159  
 56-N1160

46-A898 WRT TEST  
 K879 WRITE ADDRESS MARK  
 32-K825 9 BITS PROCESSED  
 32-A827 NRZ DATA  
 51-N1082 CH X DCS  
 53-N1077 CH X DEE  
 46-A898 WRT TEST CHECK  
 57-K1176 9 BITS  
 32-K825 30 PROCESSED  
 31-I811 CH X DCS  
 52-N1080 CH X DMI  
 54-N1078 CH X DMI  
 36-K728 WRITE CLOCK  
 75-A735  
 31-I811 WRT + WRT TEST  
 48-I966 SA  
 13-I182 SA BIT 2<sup>0</sup>  
 59-N1200 12A WRITE PROTECT  
 46-I989 10B RDX + RDH  
 13-I123 10A BIT 2<sup>1</sup>  
 52-N1069 4A ON LINE  
 14-X180 12B SEEK INITIATE  
 55-I1190 3A ON LINE  
 56-N1159  
 56-N1160

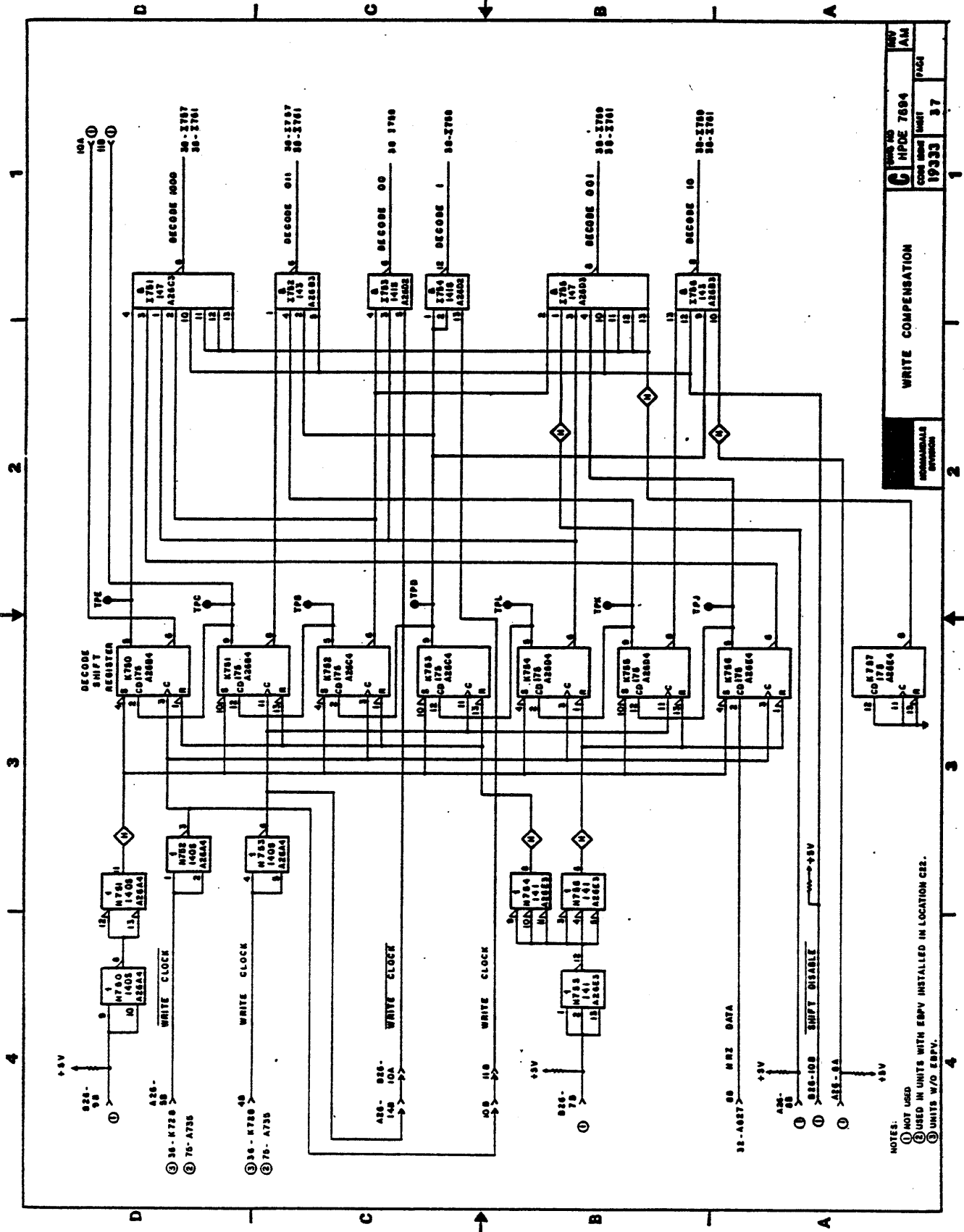
NOTES:  
 ① NOT USED  
 ② USED IN UNITS WITH EPY INSTALLED IN LOCATION 5E1.  
 ③ UNITS W/O EPY.

WRITE DATA CONTROL  
 HPDE 7694  
 19333  
 REV AM  
 PAGE 34



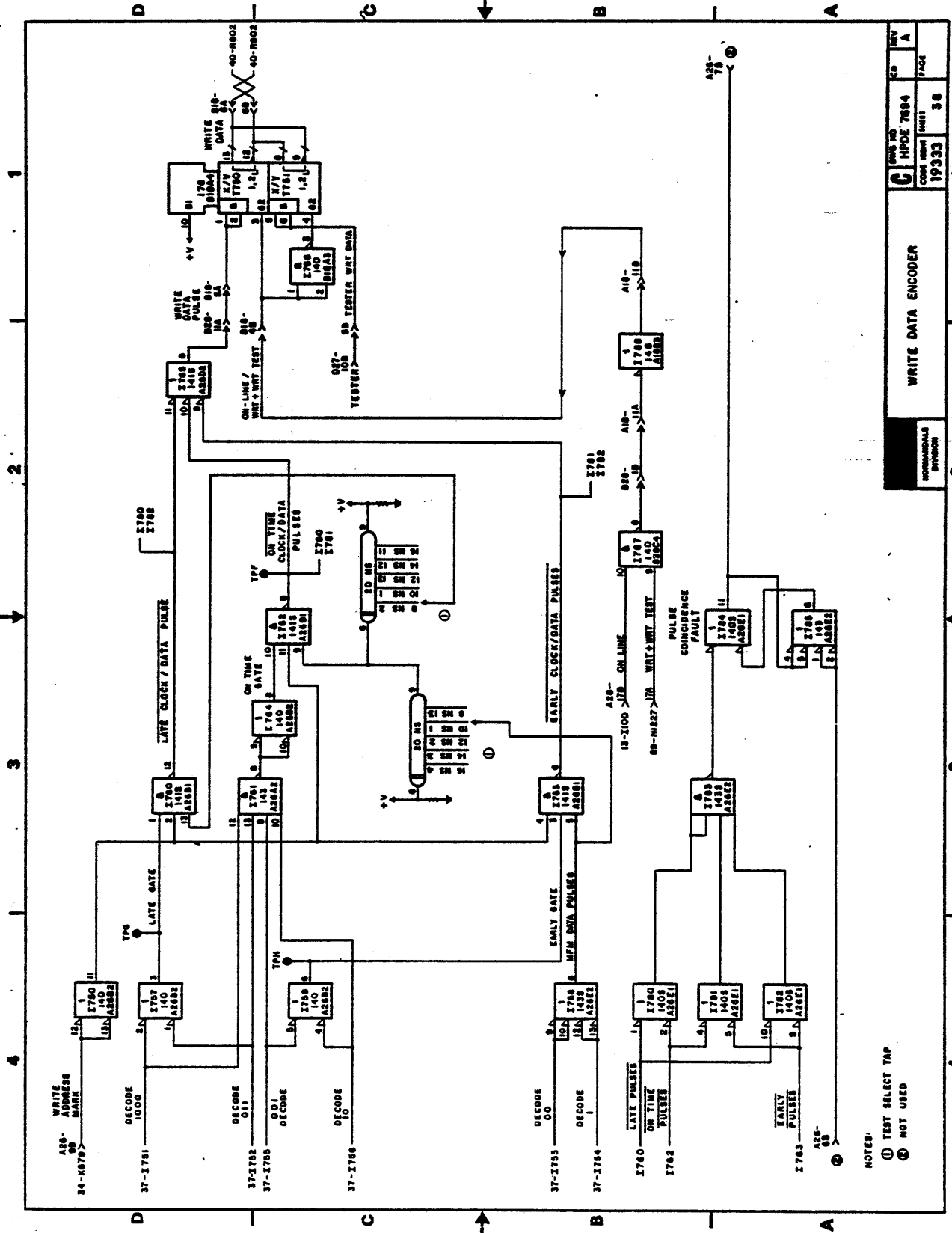






|                     |    |      |
|---------------------|----|------|
| WRITE COMPENSATION  |    | REV  |
| FORMALDALE DIVISION |    | AM   |
| 19333               | 37 | 7/62 |
| 19333               | 37 | 7/62 |

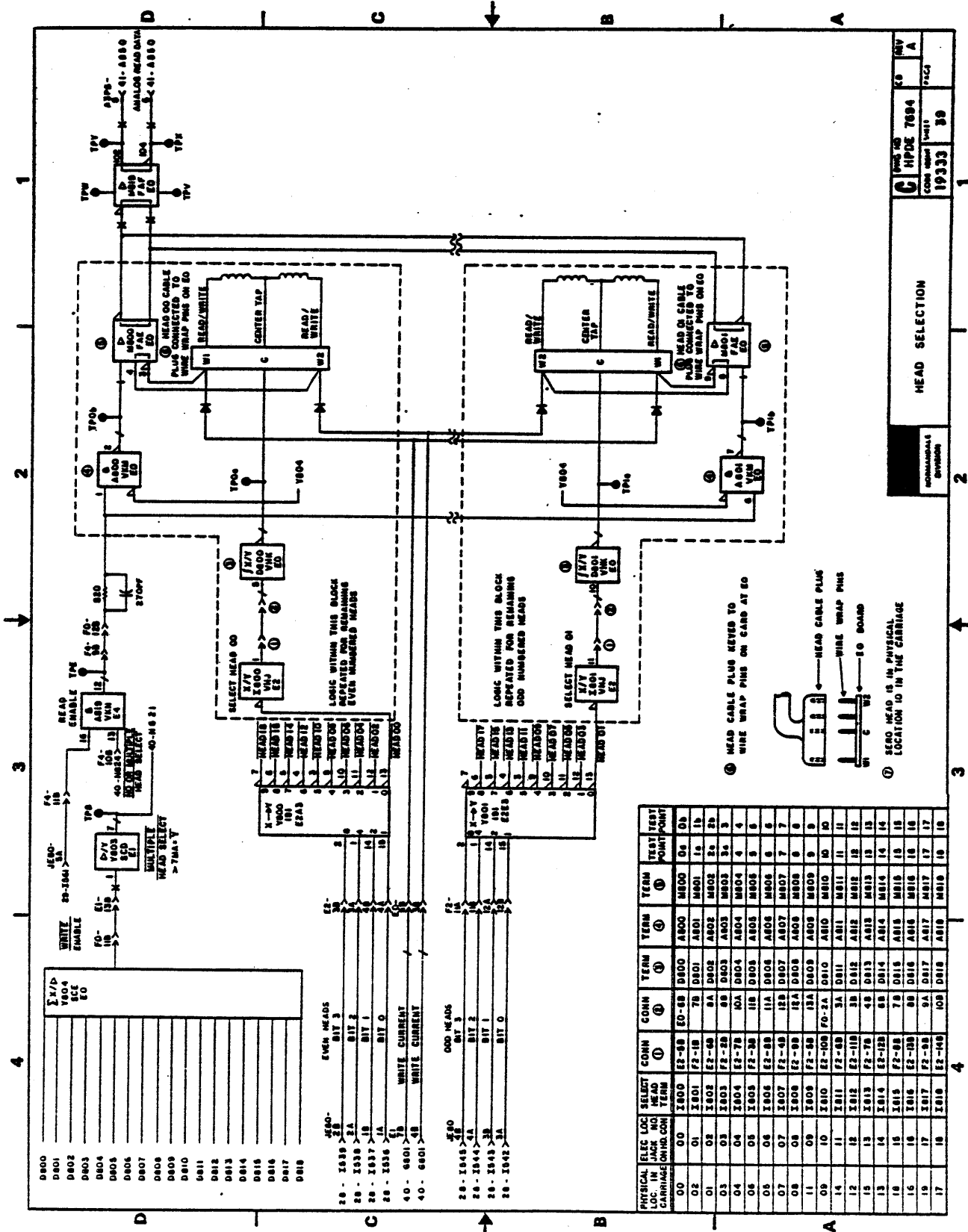
NOTES:  
 ① NOT USED  
 ② USED IN UNITS WITH ESPV INSTALLED IN LOCATION CER.  
 ③ UNITS W/O ESPV.



|        |       |
|--------|-------|
| REV    | A     |
| CD     | 1     |
| REV NO | C     |
| HPDE   | 7894  |
| CODE   | 19333 |
| DATE   | 38    |
| PAGE   | 1     |

WRITE DATA ENCODER

TEST SELECT TAP  
NOT USED



| PHYSICAL CARRIAGE | ELEC LOC | LOC SELECT | CONN   | CONN  | TERM | TERM | TERM | TEST POINT |
|-------------------|----------|------------|--------|-------|------|------|------|------------|
| 00                | 00       | X800       | E2-88  | EO-88 | D800 | AR00 | M800 | 06         |
| 01                | 01       | X801       | F2-18  | 78    | D801 | AR01 | M801 | 16         |
| 02                | 02       | X802       | E2-68  | 8A    | D802 | AR02 | M802 | 26         |
| 03                | 03       | X803       | F2-28  | 8B    | D803 | AR03 | M803 | 36         |
| 04                | 04       | X804       | E2-78  | 8A    | D804 | AR04 | M804 | 46         |
| 05                | 05       | X805       | F2-38  | 18    | D805 | AR05 | M805 | 56         |
| 06                | 06       | X806       | E2-88  | 1A    | D806 | AR06 | M806 | 66         |
| 07                | 07       | X807       | F2-48  | 1B    | D807 | AR07 | M807 | 76         |
| 08                | 08       | X808       | E2-88  | 1A    | D808 | AR08 | M808 | 86         |
| 09                | 09       | X809       | F2-88  | 1A    | D809 | AR09 | M809 | 96         |
| 10                | 10       | X810       | E2-108 | FO-2A | 0810 | AR10 | M810 | 106        |
| 11                | 11       | X811       | F2-68  | 3A    | 0811 | AR11 | M811 | 116        |
| 12                | 12       | X812       | E2-118 | 3B    | 0812 | AR12 | M812 | 126        |
| 13                | 13       | X813       | E2-78  | 4B    | 0813 | AR13 | M813 | 136        |
| 14                | 14       | X814       | E2-128 | 8B    | 0814 | AR14 | M814 | 146        |
| 15                | 15       | X815       | F2-88  | 7B    | 0815 | AR15 | M815 | 156        |
| 16                | 16       | X816       | E2-128 | 8B    | 0816 | AR16 | M816 | 166        |
| 17                | 17       | X817       | F2-98  | 9A    | 0817 | AR17 | M817 | 176        |
| 18                | 18       | X818       | E2-108 | 10B   | 0818 | AR18 | M818 | 186        |

|                     |       |     |   |
|---------------------|-------|-----|---|
| HPD NO              | 19333 | REV | A |
| HPD NO              | 19333 | REV | A |
| COMP NO             | 19333 | REV | A |
| HEAD SELECTION      |       |     |   |
| INSTRUMENT DIVISION |       |     |   |





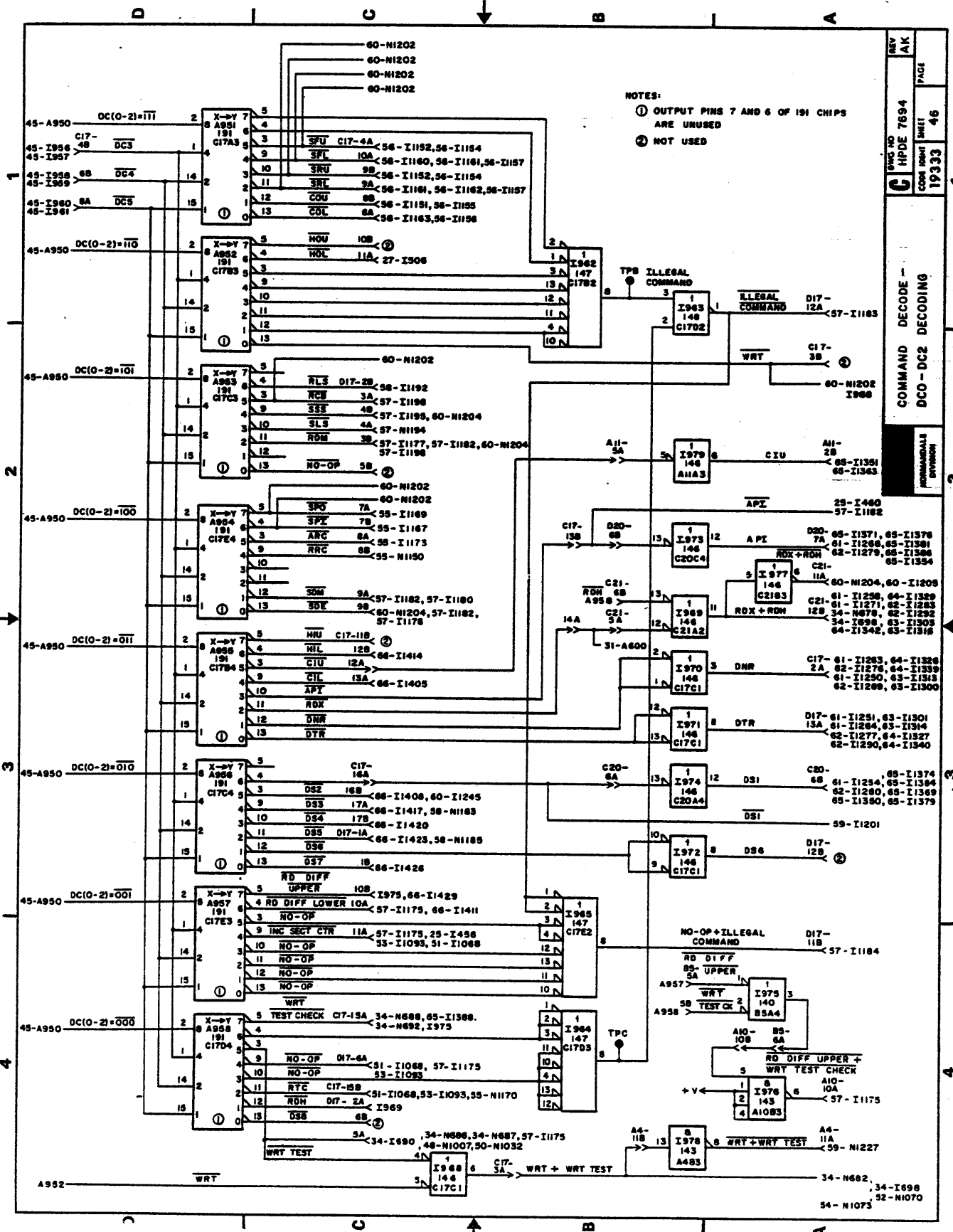






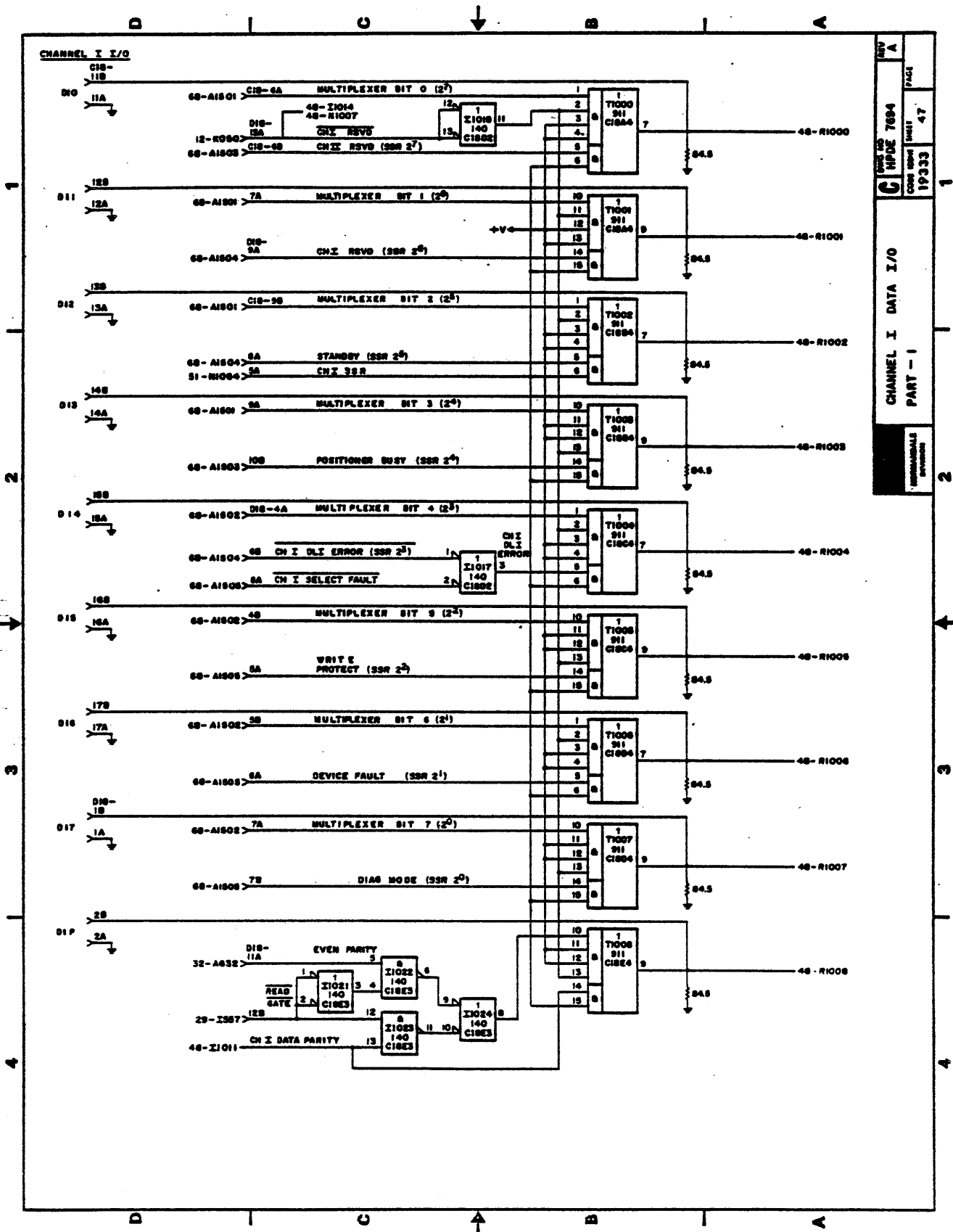


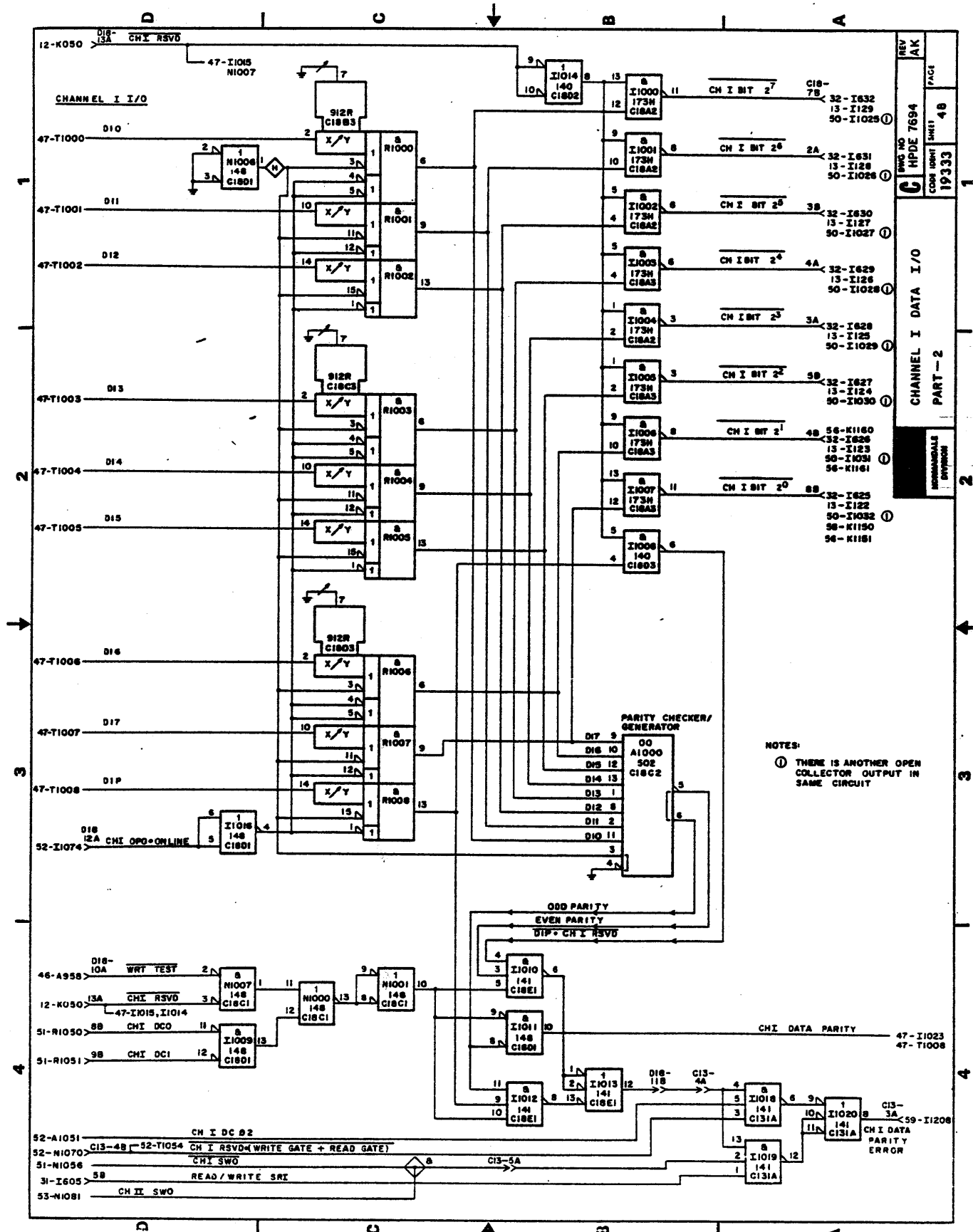




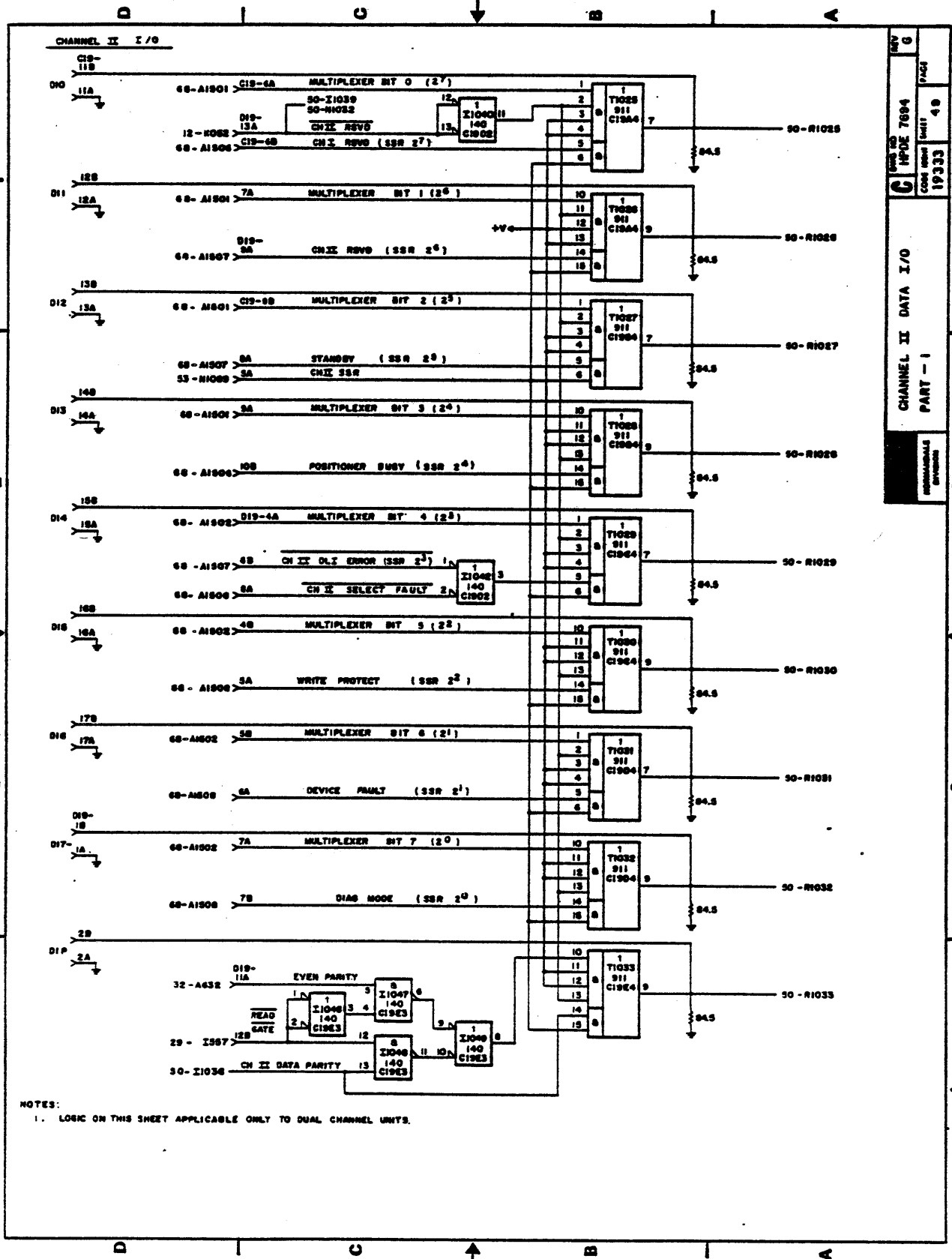
NOTES:  
 ① OUTPUT PINS 7 AND 6 OF 191 CHIPS ARE UNUSED  
 ② NOT USED

|                    |           |       |
|--------------------|-----------|-------|
| REV                | AK        | PAGE  |
| HW NO              | HPDE 7694 | 19333 |
| CODE               | INSTR     | 46    |
| COMMAND DECODE - 1 |           |       |
| DC0 - DC2 DECODING |           |       |
| FORMALS            |           |       |



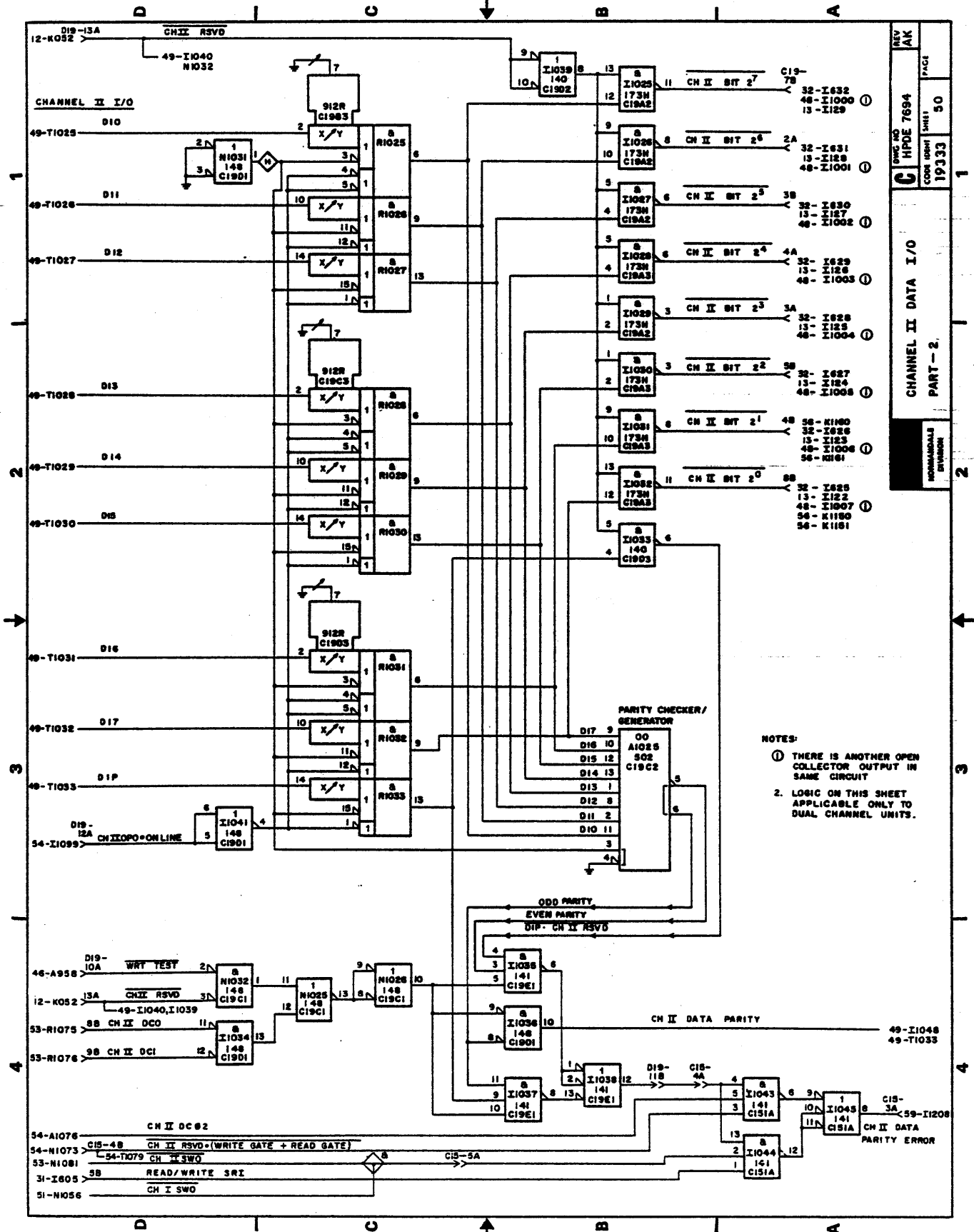


NOTES:  
 ① THERE IS ANOTHER OPEN COLLECTOR OUTPUT IN SAME CIRCUIT



UNIT NO. 6  
 PART - I  
 CHANNEL II DATA I/O  
 WORK UNIT 19333 UNIT 49  
 19333

NOTES:  
 1. LOGIC ON THIS SHEET APPLICABLE ONLY TO DUAL CHANNEL UNITS.



|                      |       |      |
|----------------------|-------|------|
| REV                  | AK    | PAGE |
| HPDE 7694            | 50    | 1    |
| COORD IDENT SHEET    | 19333 |      |
| CHANNEL II DATA I/O  |       |      |
| PART - 2             |       |      |
| NONMILITARY DIVISION |       |      |

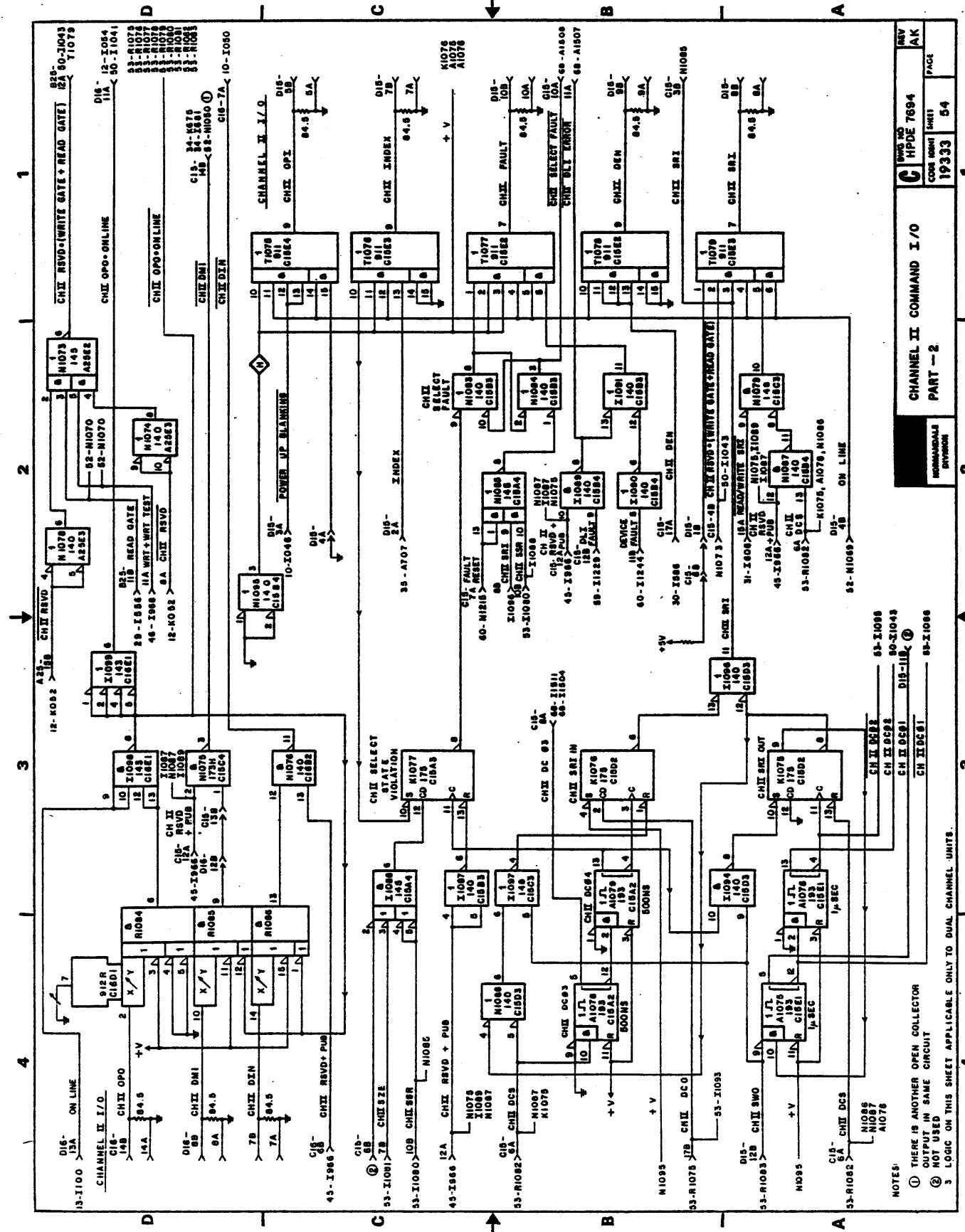
- NOTES:
- ① THERE IS ANOTHER OPEN COLLECTOR OUTPUT IN SAME CIRCUIT
  - 2. LOGIC ON THIS SHEET APPLICABLE ONLY TO DUAL CHANNEL UNITS.









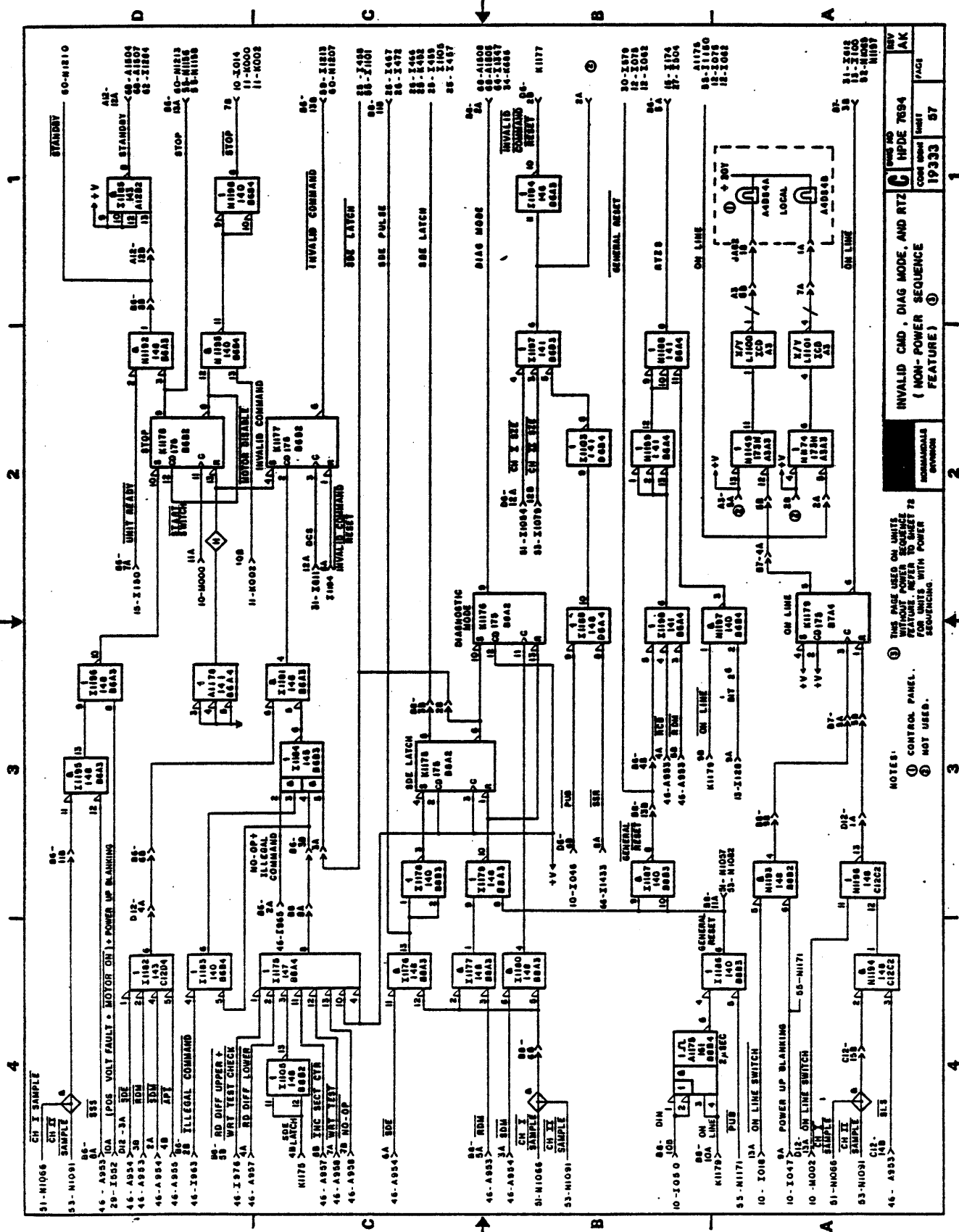


|                        |    |           |
|------------------------|----|-----------|
| REV                    |    | AK        |
| C                      |    | HPDE 7894 |
| 19333                  | 54 | PAGE      |
| CHANNEL II COMMAND I/O |    |           |
| PART - 2               |    |           |
| HOMERIDGE DIVISION     |    |           |

NOTES:  
 1 THERE IS ANOTHER OPEN COLLECTOR OUTPUT IN SAME CIRCUIT  
 2 NOT USED  
 3 LOGIC ON THIS SHEET APPLICABLE ONLY TO DUAL CHANNEL UNITS.



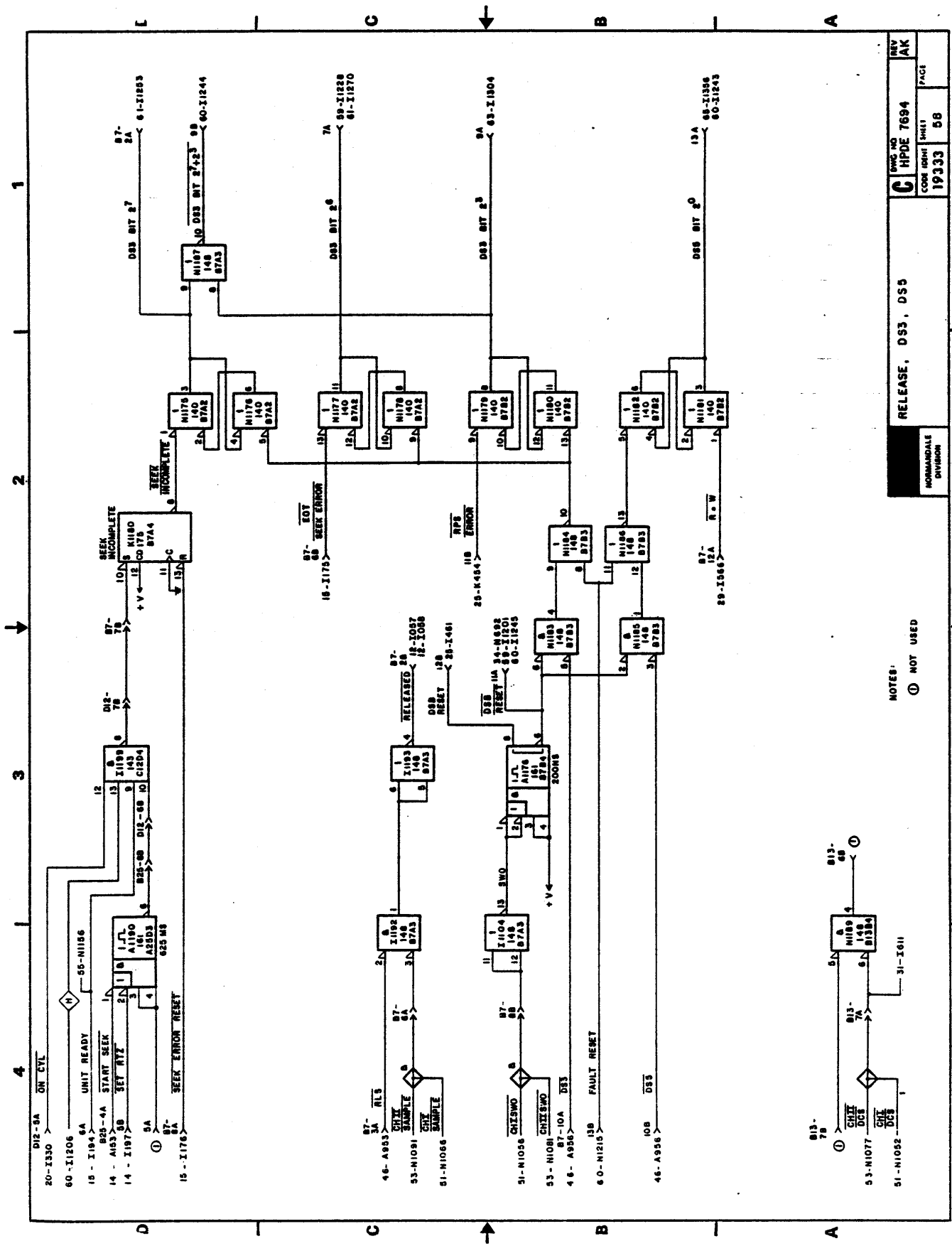




1  
2  
3  
4

|  |       |
|--|-------|
| 87V  | AK    |
| HPDE 7894  | 19333 |
| INVALID CMD, DIAG MODE, AND RTZ (NON-POWER SEQUENCE FEATURE) | 87    |
| NONMAGNALS   | 87    |
| SEQUENCING   | 87    |

NOTES:  
 ① THIS PAGE USED ON UNITS WITHOUT POWER SEQUENCE FEATURE. REFER TO SHEET 78 FOR UNITS WITH POWER SEQUENCING.  
 ② CONTROL PANEL.  
 ③ NOT USED.



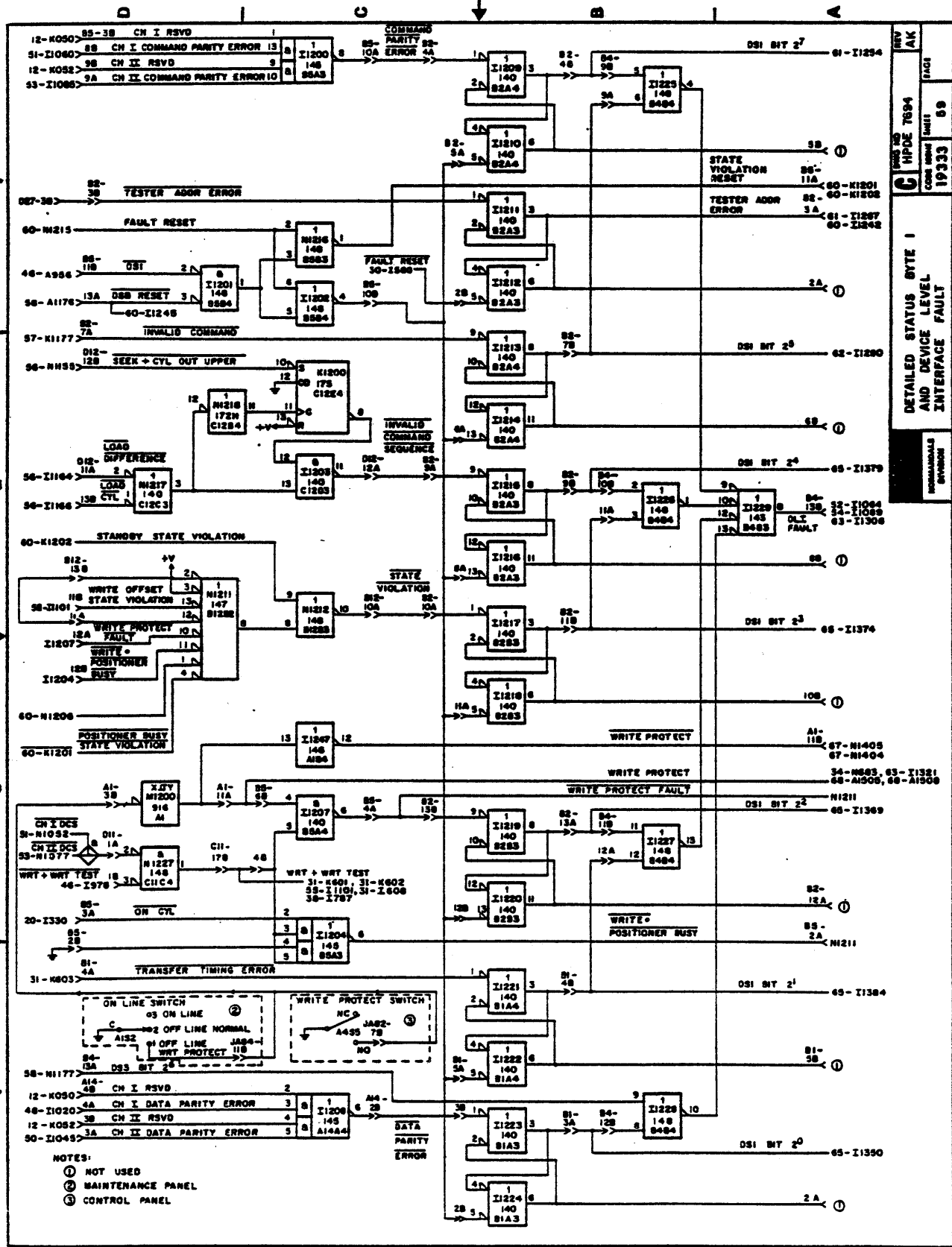
|       |           |
|-------|-----------|
| REV   | AK        |
| HW NO | HPDE 7694 |
| COORD | 19333     |
| SHEET | 58        |
| PAGE  | 1         |

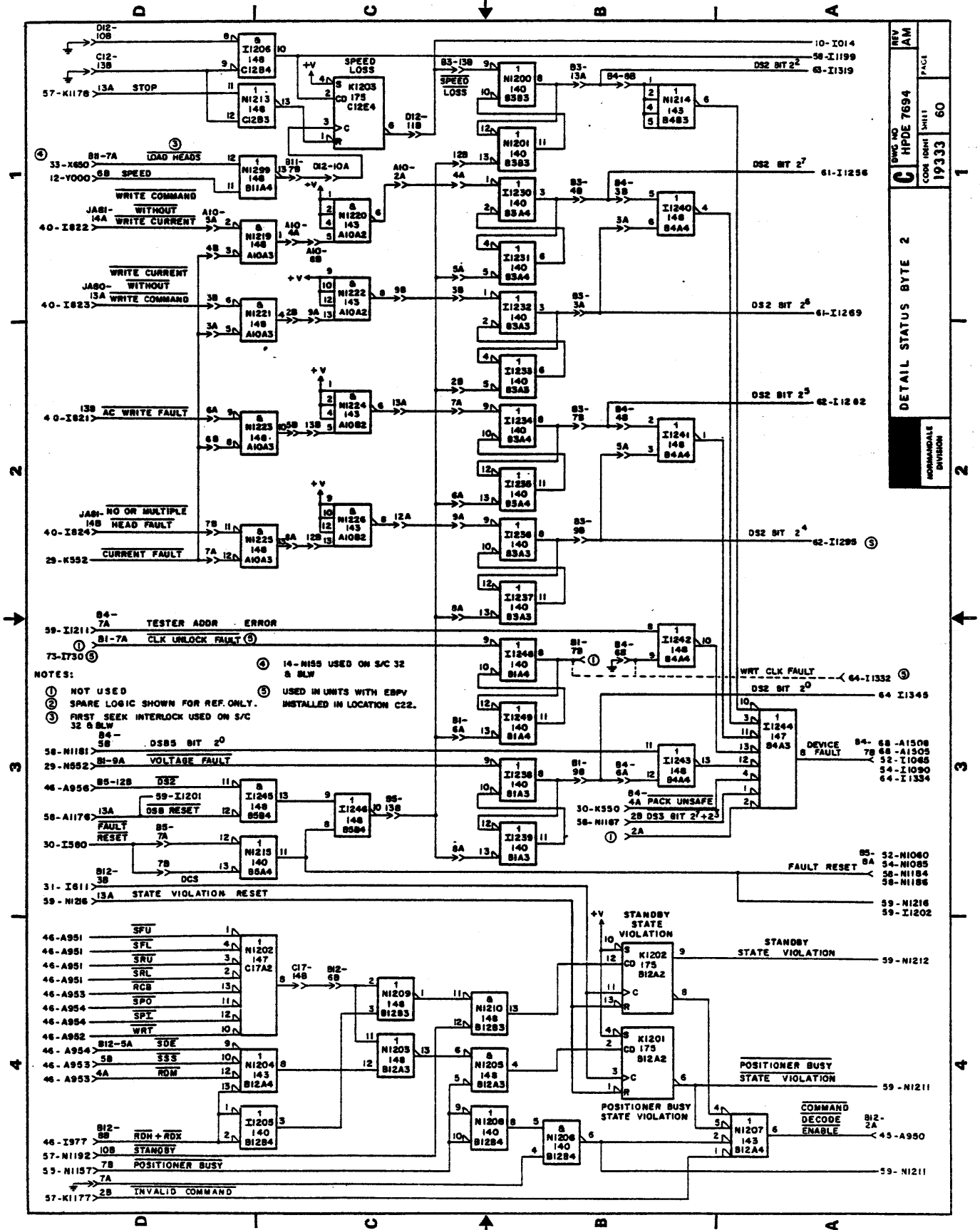
RELEASE, DS5, DS5

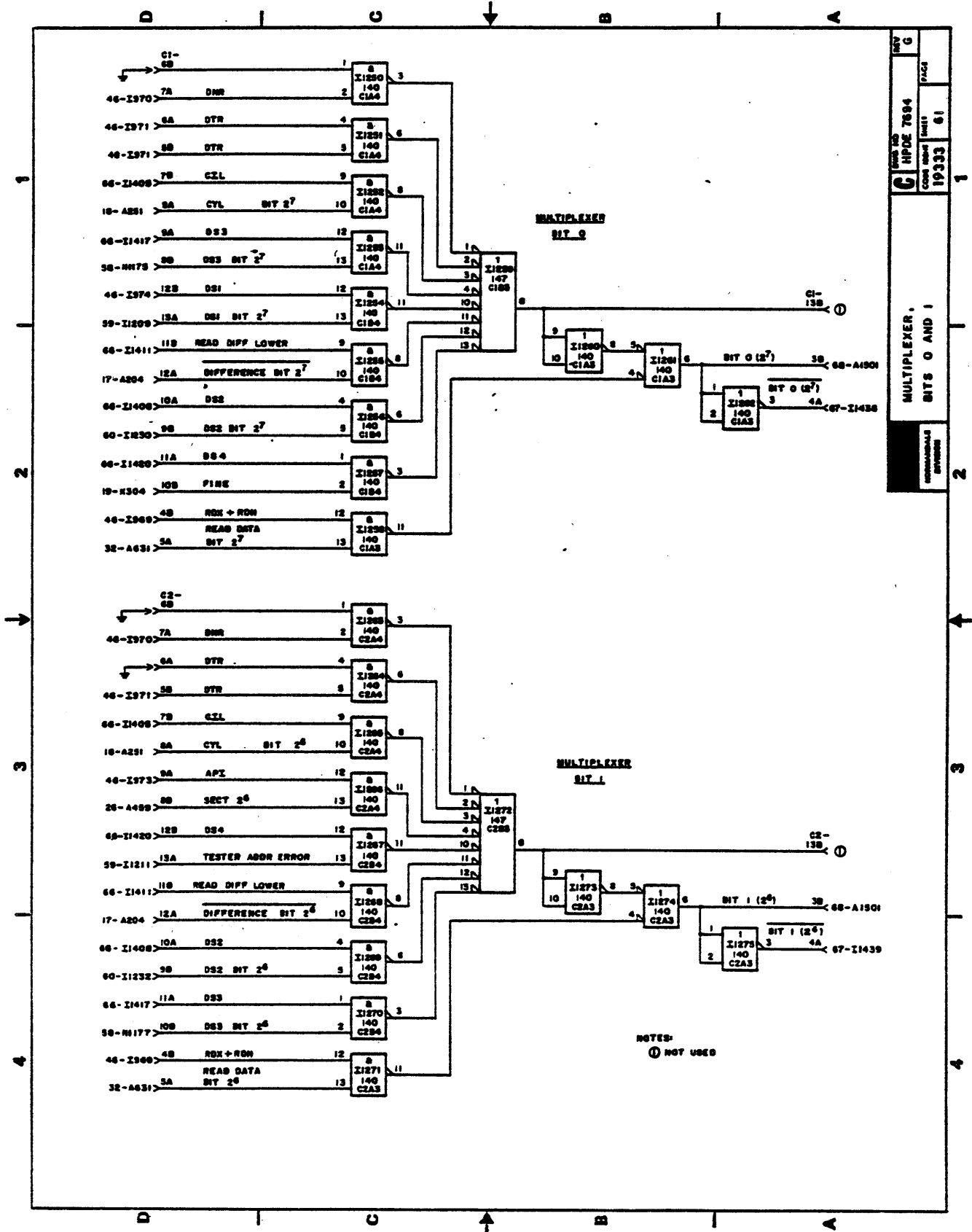
NORMANDALE DIVISION

NOTES:  
 (1) NOT USED

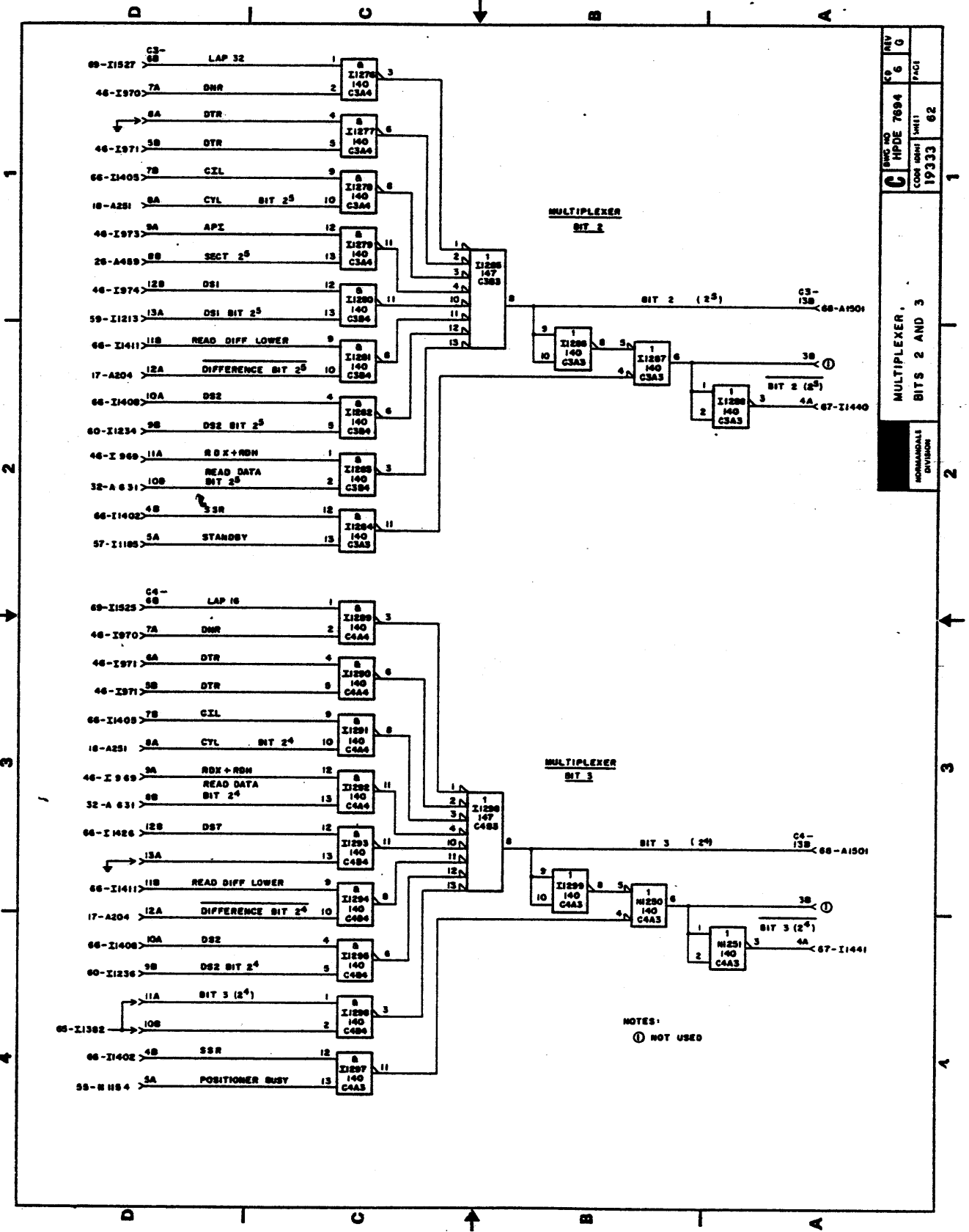




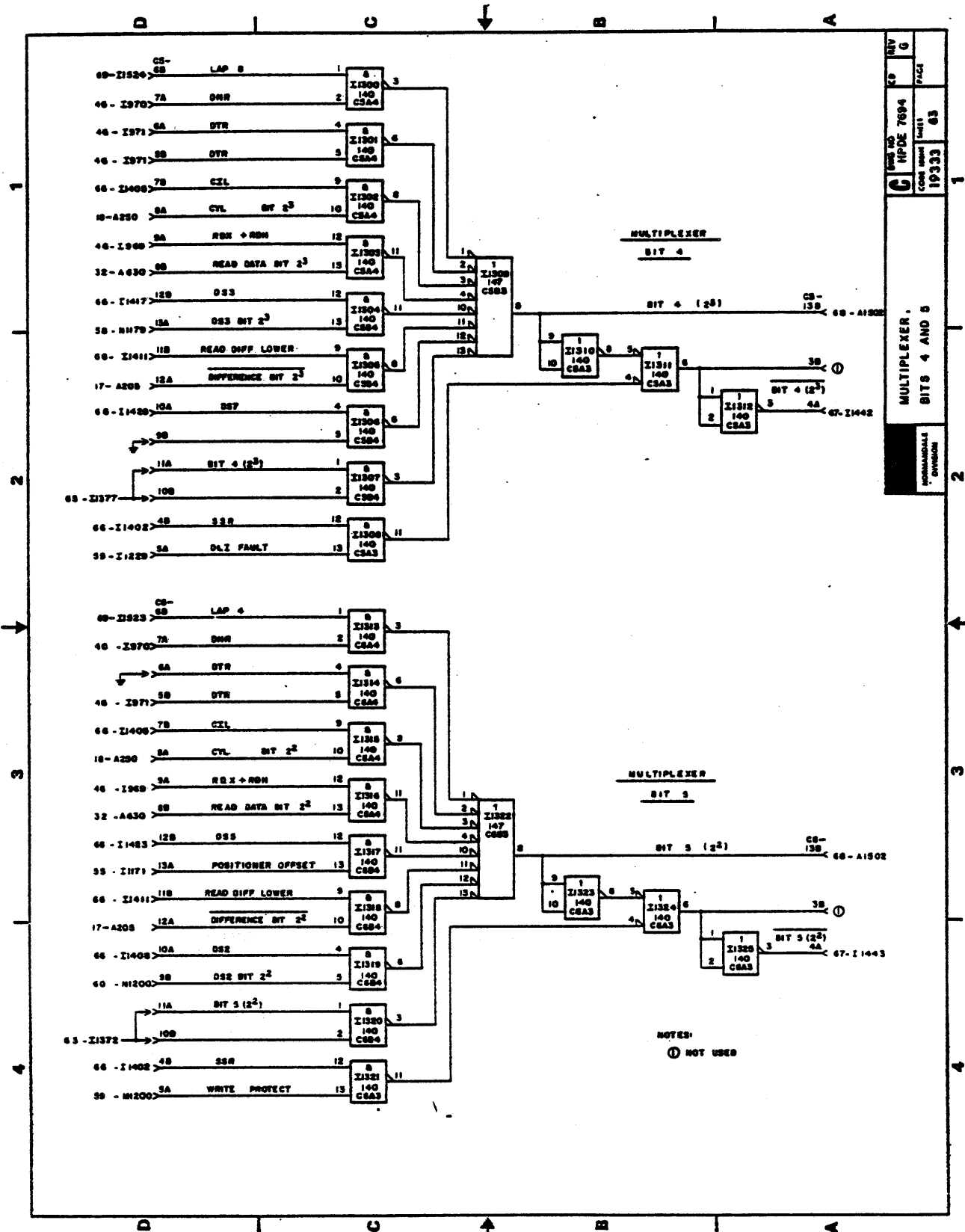




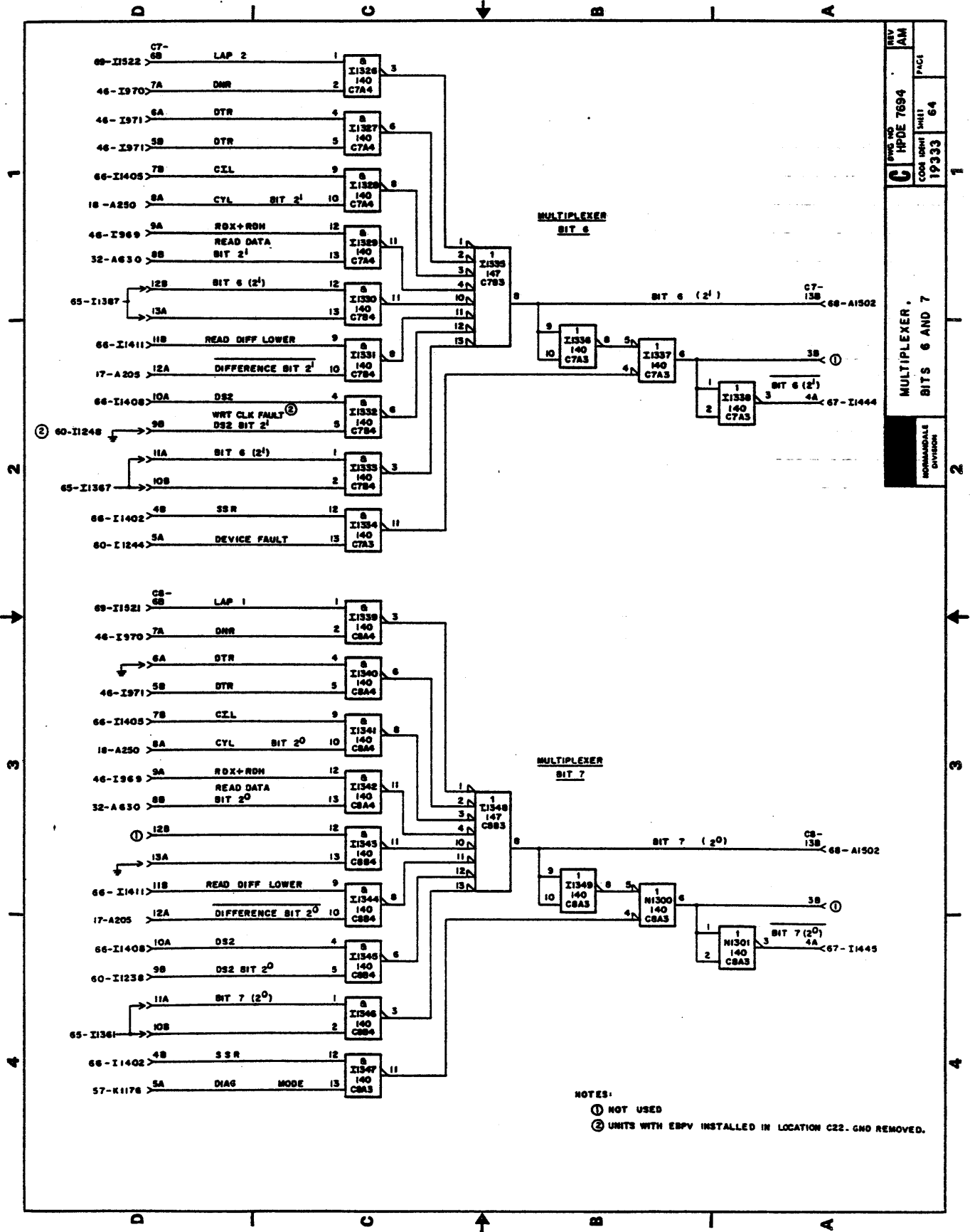
|             |                           |
|-------------|---------------------------|
| REV         | G                         |
| DATE        | 1933                      |
| BY          | 61                        |
| CHKD        |                           |
| APP'D       |                           |
| DESCRIPTION | MULTIPLEXER, BITS 0 AND 1 |



|                           |      |    |
|---------------------------|------|----|
| REV                       | 6    | 0  |
| CD                        | 6    | 0  |
| C INC NO HPDE 7694        |      |    |
| COOL UNIT                 | 1411 |    |
| FACT                      | 1933 | 62 |
| MULTIPLEXER, BITS 2 AND 3 |      |    |
| MANUFACTURE DIVISION      |      |    |



|                              |           |
|------------------------------|-----------|
| REV                          | G         |
| DATE                         |           |
| HPDE NO                      | HPDE 7694 |
| CONTRACT NO                  | 19333     |
| UNIT                         | 63        |
| MULTIPLEXER,<br>BITS 4 AND 5 |           |
| NORANDA<br>DIVISION          |           |

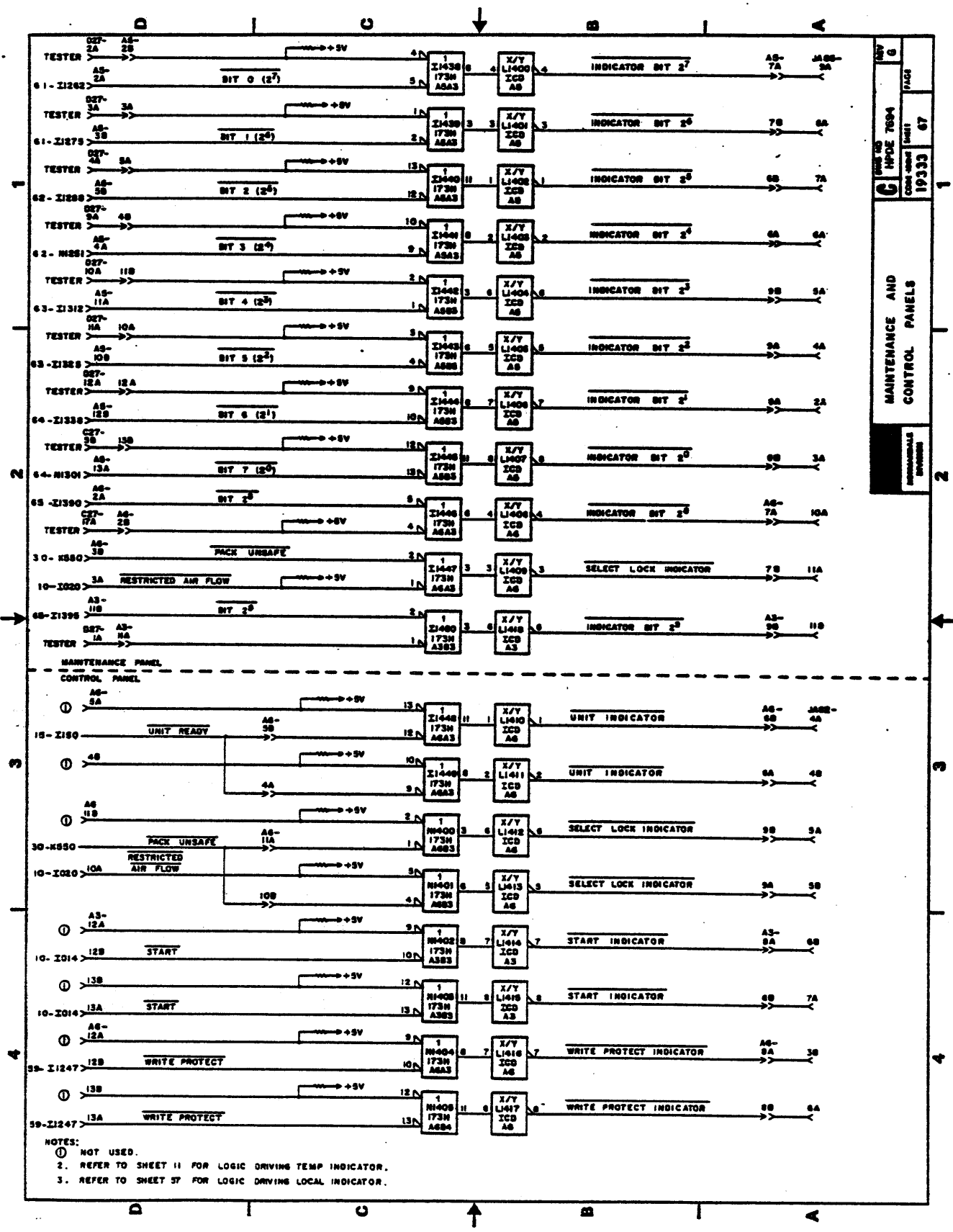


|                           |      |
|---------------------------|------|
| REV                       | AM   |
| HPDE 7694                 | PAGE |
| 19333                     | 64   |
| MULTIPLEXER, BITS 6 AND 7 |      |
| NONMALLE DIVISION         |      |

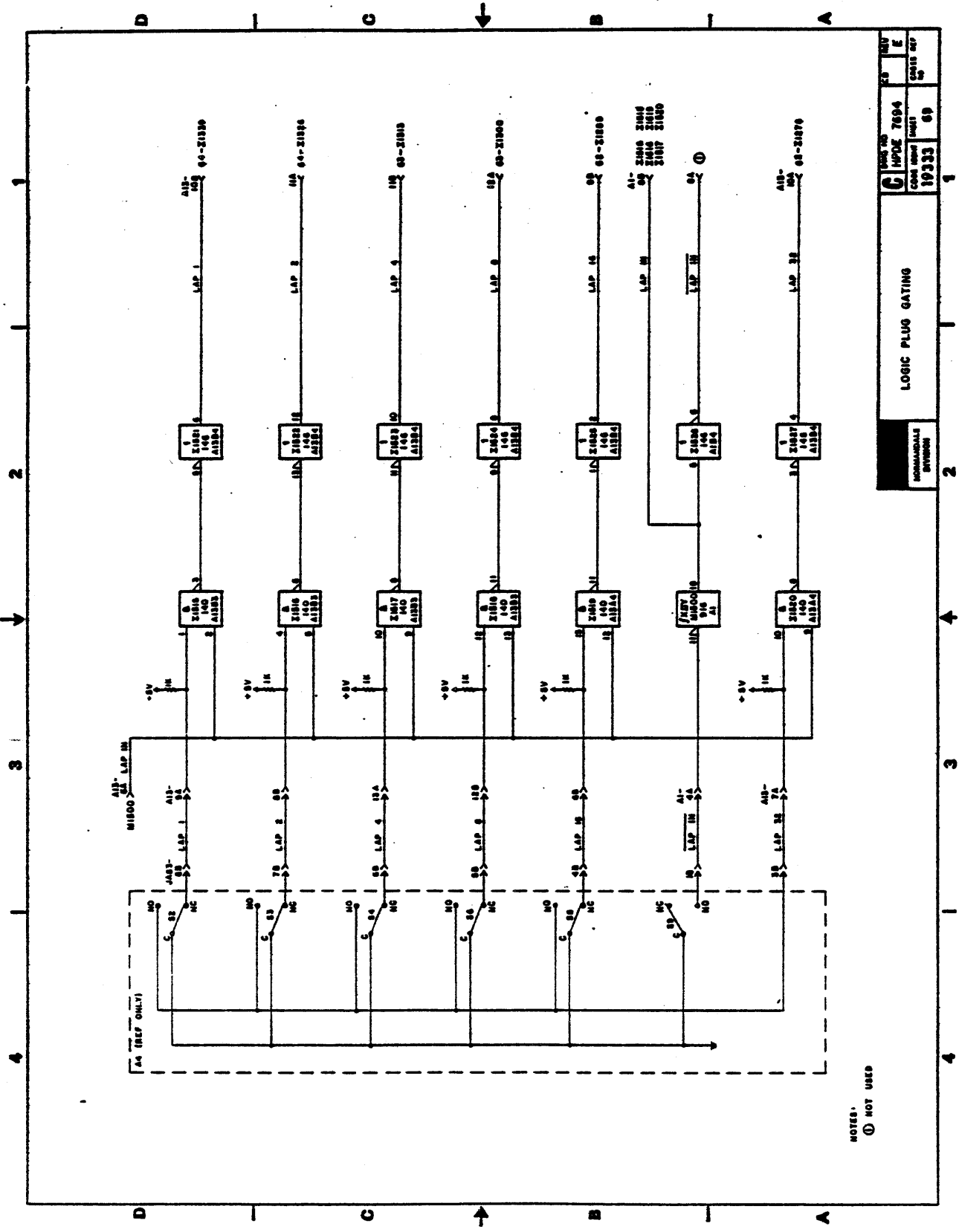




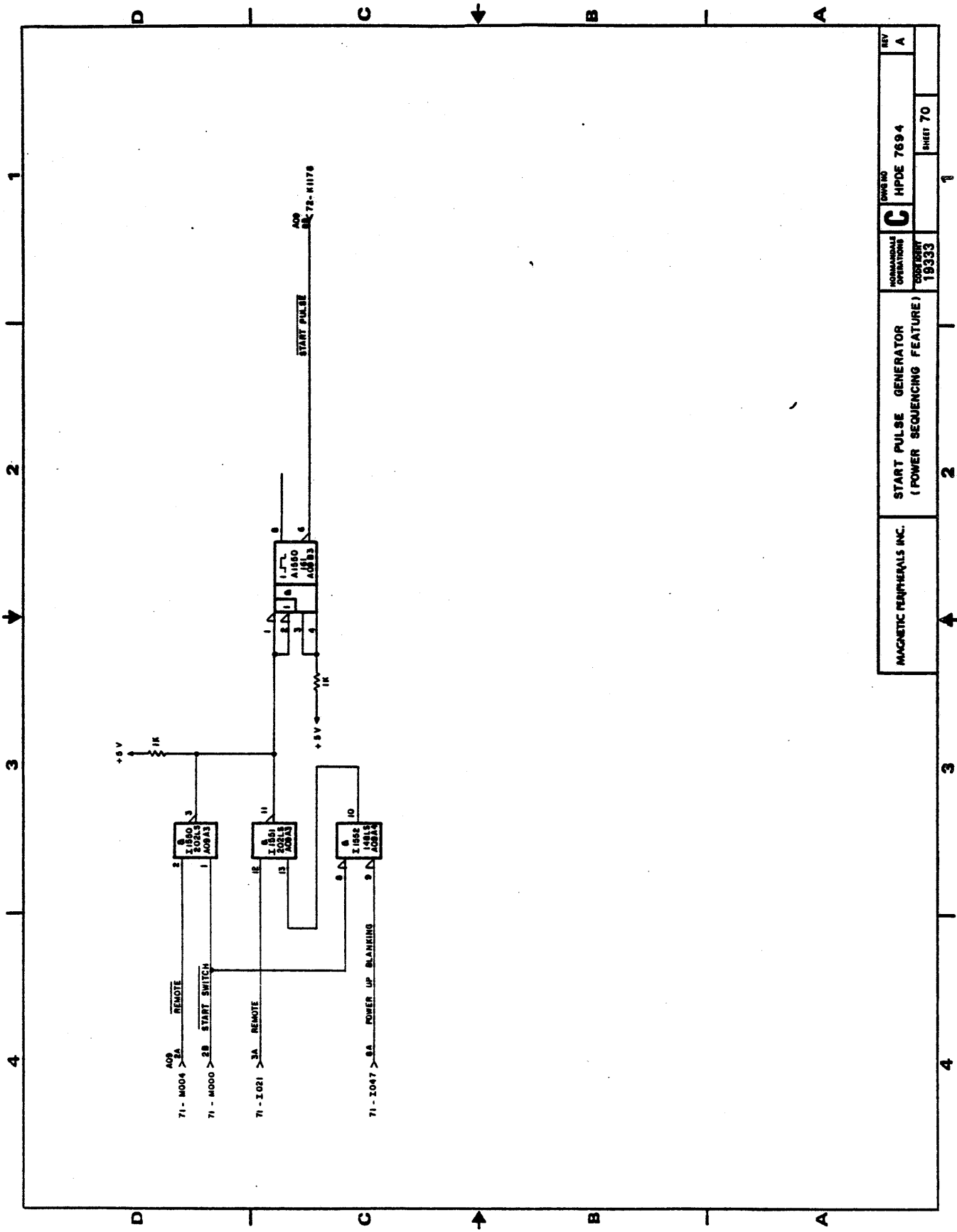




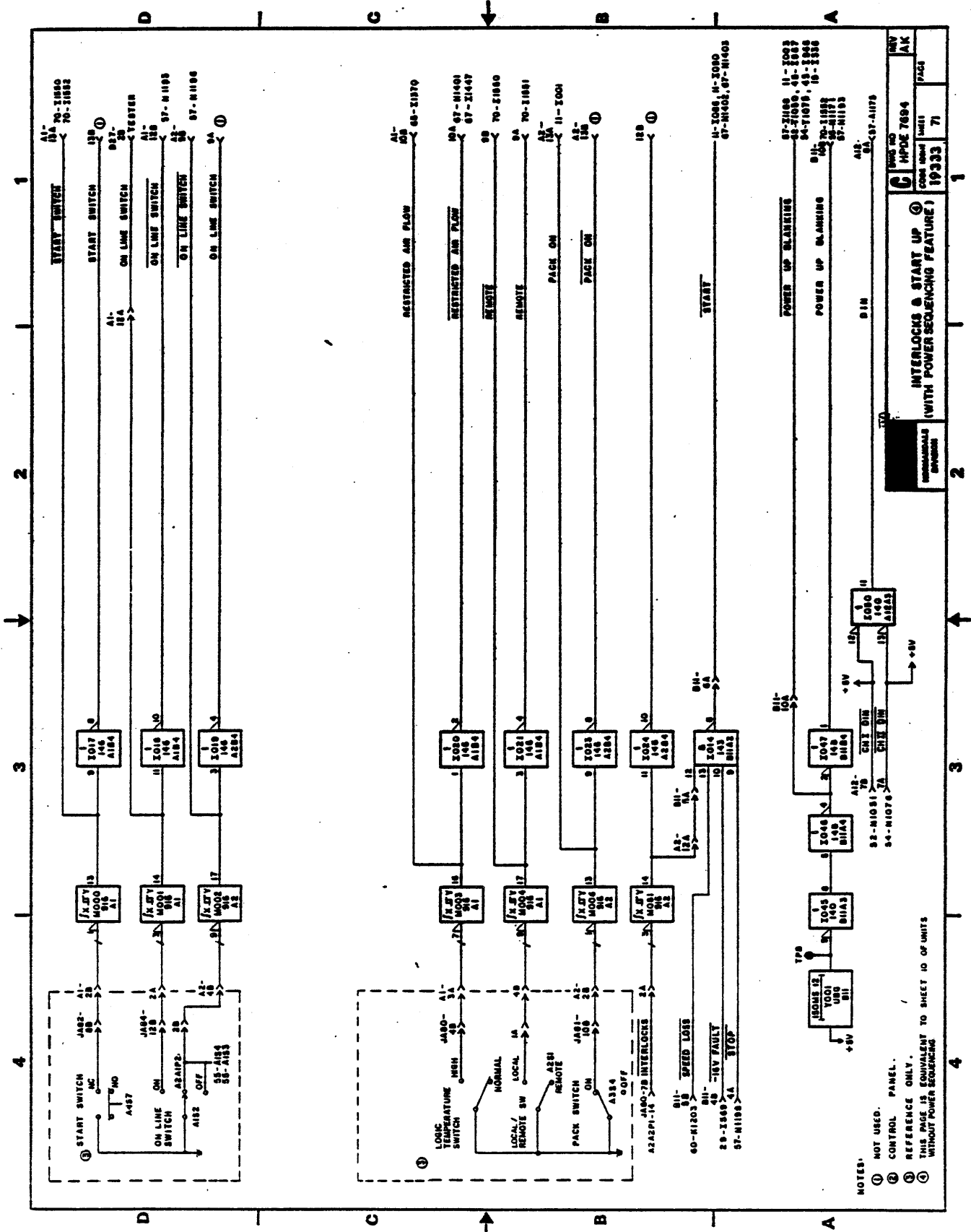




|                      |  |               |         |
|----------------------|--|---------------|---------|
| LOGIC PLUG GATING    |  | FORM NO. 7694 | REV. 69 |
| NORMANVILLE DIVISION |  | COOK (MKT)    | 19333   |
|                      |  | MPDE 7694     | 69      |
|                      |  | CAST REP      |         |

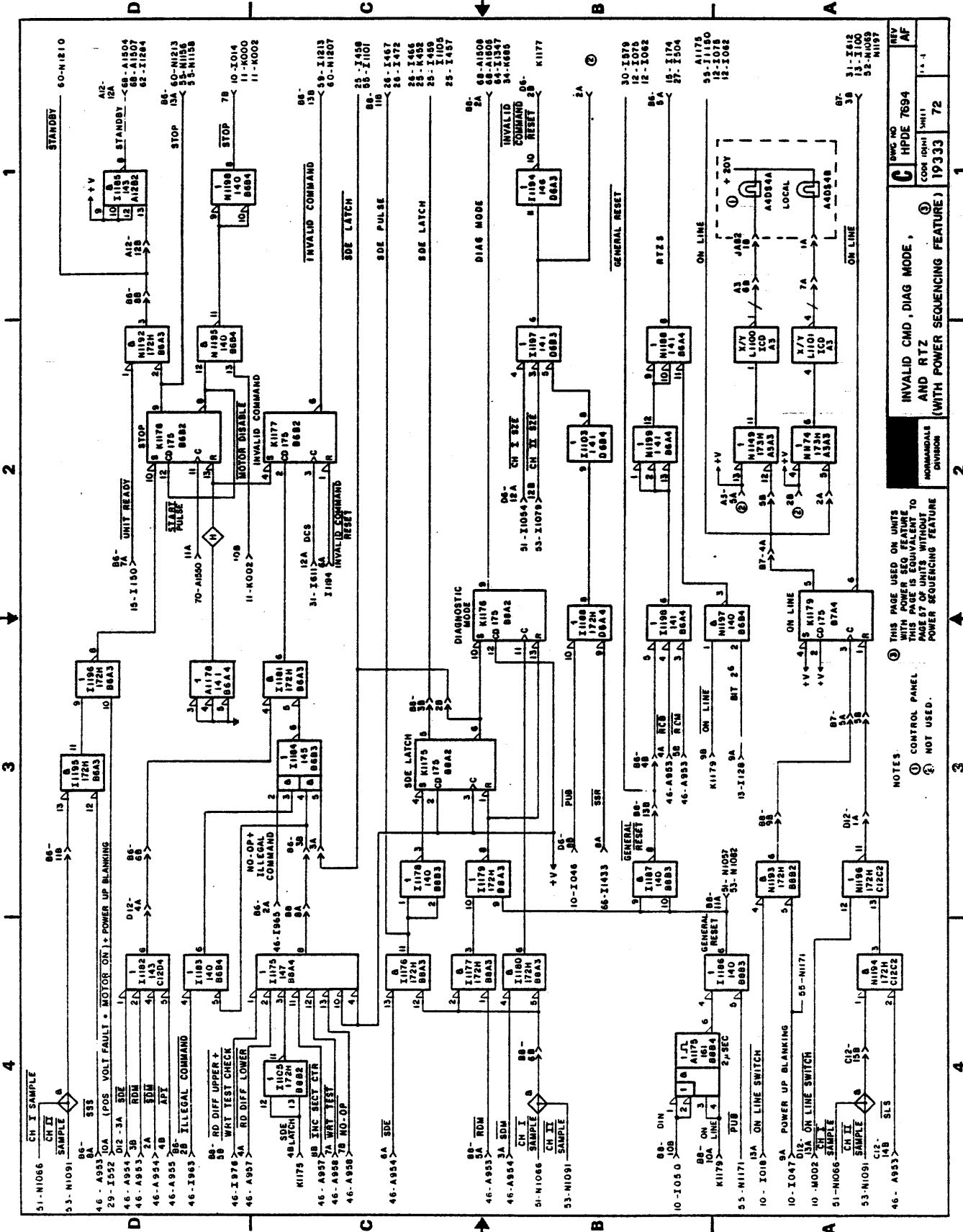


|  |       |
|--|-------|
| REV  | A     |
| HPDE   | 7694  |
| C  | 19333 |
| START PULSE GENERATOR (POWER SEQUENCING FEATURE) |       |
| MAGNETIC PERIPHERALS INC.                        |       |
| SHEET 70   |       |

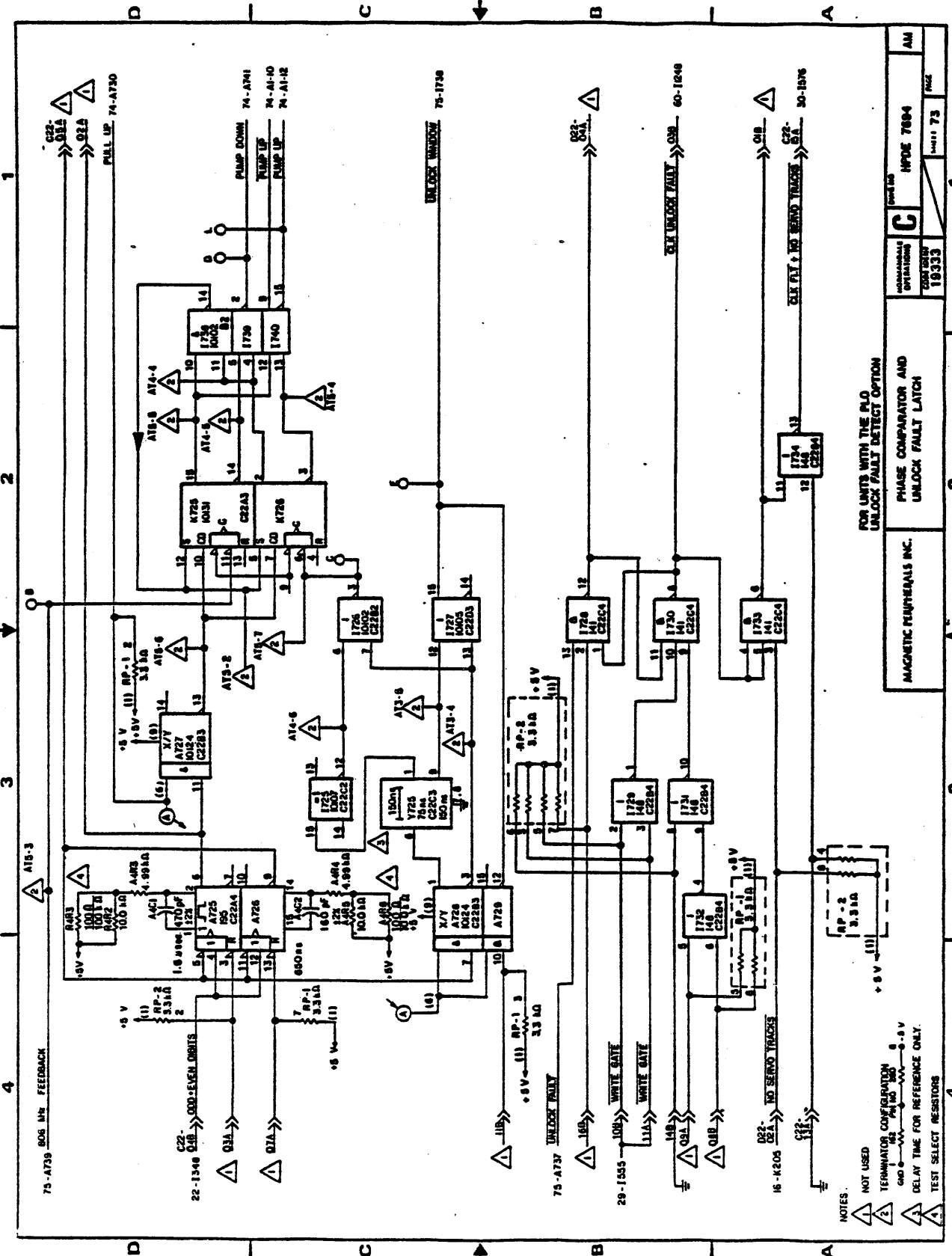


NOTES:  
 ① NOT USED.  
 ② CONTROL PANEL.  
 ③ REFERENCE ONLY.  
 ④ WITH PACE IS EQUIVALENT TO SHEET 10 OF UNITS WITHOUT POWER SEQUENCING

|           |      |
|-----------|------|
| REV       | AK   |
| MPDE 7894 | PAGE |
| 19333     | 71   |



|   |                           |
|---|---------------------------|
| REV   | AF                        |
| HPDE 7694   |                           |
| 19333   | 72                        |
| INVALID CMD, DIAG MODE,<br>AND RTZ<br>(WITH POWER SEQUENCING FEATURE)                               |                           |
| DIVISION<br>19333   | CONTROL PANEL<br>NOT USED |
| THIS PAGE USED ON UNITS WITH POWER SEQ FEATURE TO PAGE 57 OF UNITS WITHOUT POWER SEQUENCING FEATURE |                           |
| NOTES:<br>① CONTROL PANEL NOT USED.   |                           |

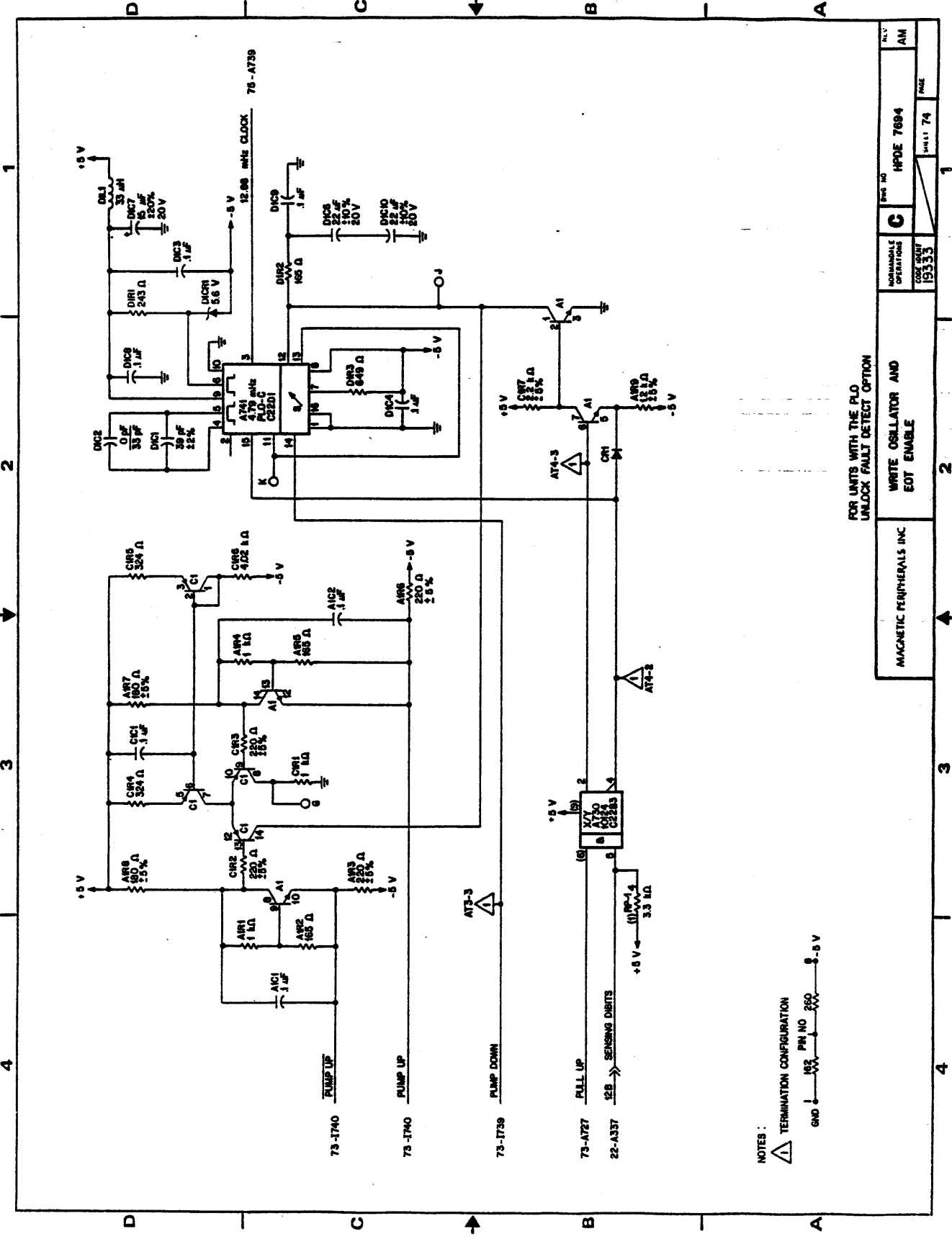


|          |          |          |          |
|----------|----------|----------|----------|
| 73       | 73       | 73       | 73       |
| 18333    | 18333    | 18333    | 18333    |
| OPTIONAL | OPTIONAL | OPTIONAL | OPTIONAL |
| CONTRACT | CONTRACT | CONTRACT | CONTRACT |
| 7894     | 7894     | 7894     | 7894     |
| AM       | AM       | AM       | AM       |

FOR UNITS WITH THE BLO  
UNLOCK FAULT DETECT OPTION  
PHASE COMPARATOR AND  
UNLOCK FAULT LATCH

MAGNETIC THERMALS INC.

- NOTES:
- NOT USED
  - TERMINATOR CONFIGURATION
  - Q10 - Q12 FOR REFERENCE ONLY
  - DELAY TIME FOR REFERENCE ONLY
  - TEST SELECT RESISTORS



FOR UNITS WITH THE PLO  
UNLOCK FAIL DETECT OPTION

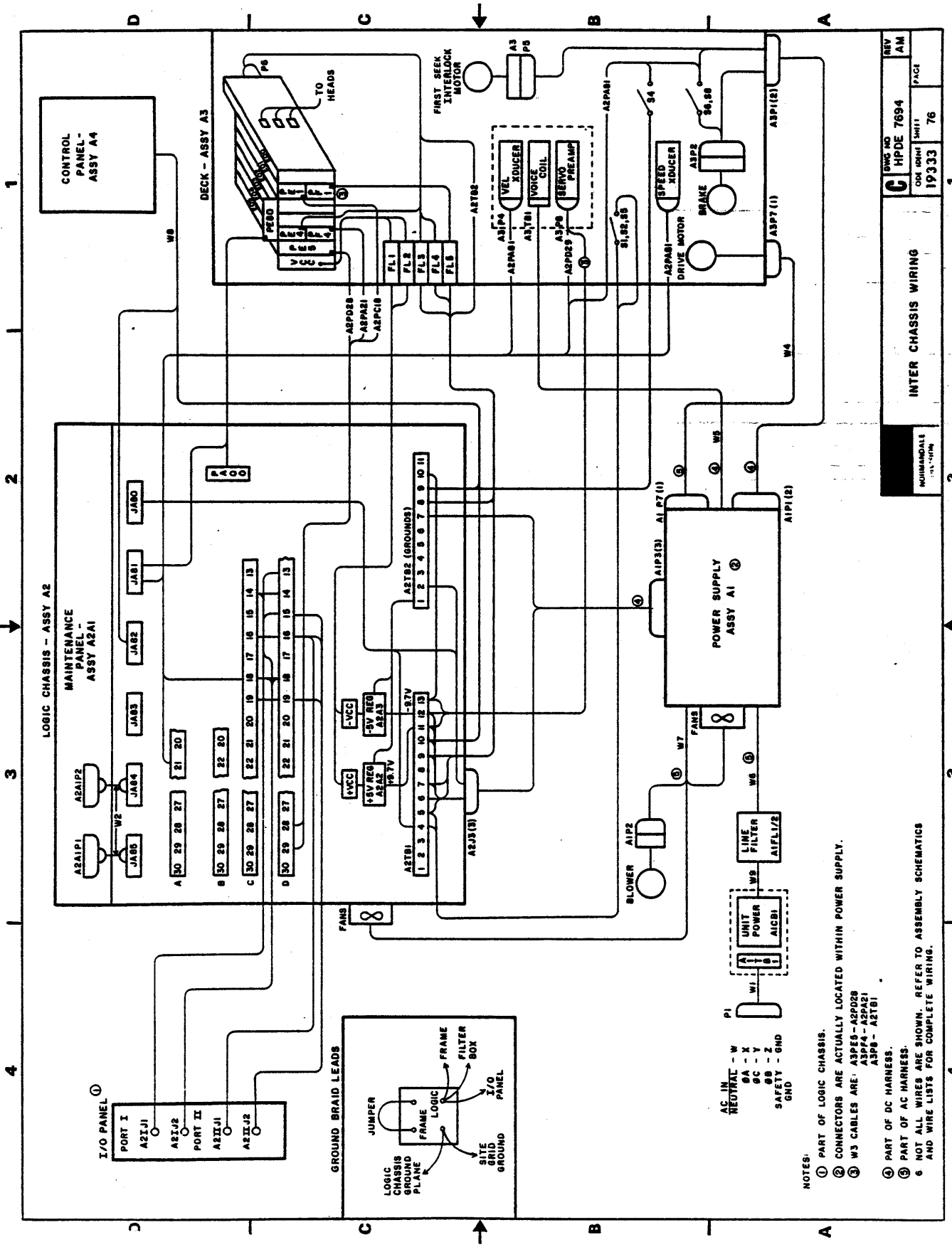
|                                    |            |                                    |            |
|------------------------------------|------------|------------------------------------|------------|
| REV. NO.                           | REV. NO.   | REV. NO.                           | REV. NO.   |
| AM                                 | AM         | AM                                 | AM         |
| OPERATIONS                         | OPERATIONS | OPERATIONS                         | OPERATIONS |
| 19333                              | 19333      | 19333                              | 19333      |
| MAGNETIC PERIPHERALS INC           |            | MAGNETIC PERIPHERALS INC           |            |
| WRITE OSCILLATOR AND<br>EOT ENABLE |            | WRITE OSCILLATOR AND<br>EOT ENABLE |            |
| HPDIE 7684                         |            | HPDIE 7684                         |            |
| SHEET 74                           |            | SHEET 74                           |            |
| PAGE                               |            | PAGE                               |            |

NOTES:  
 △ TERMINATION CONFIGURATION





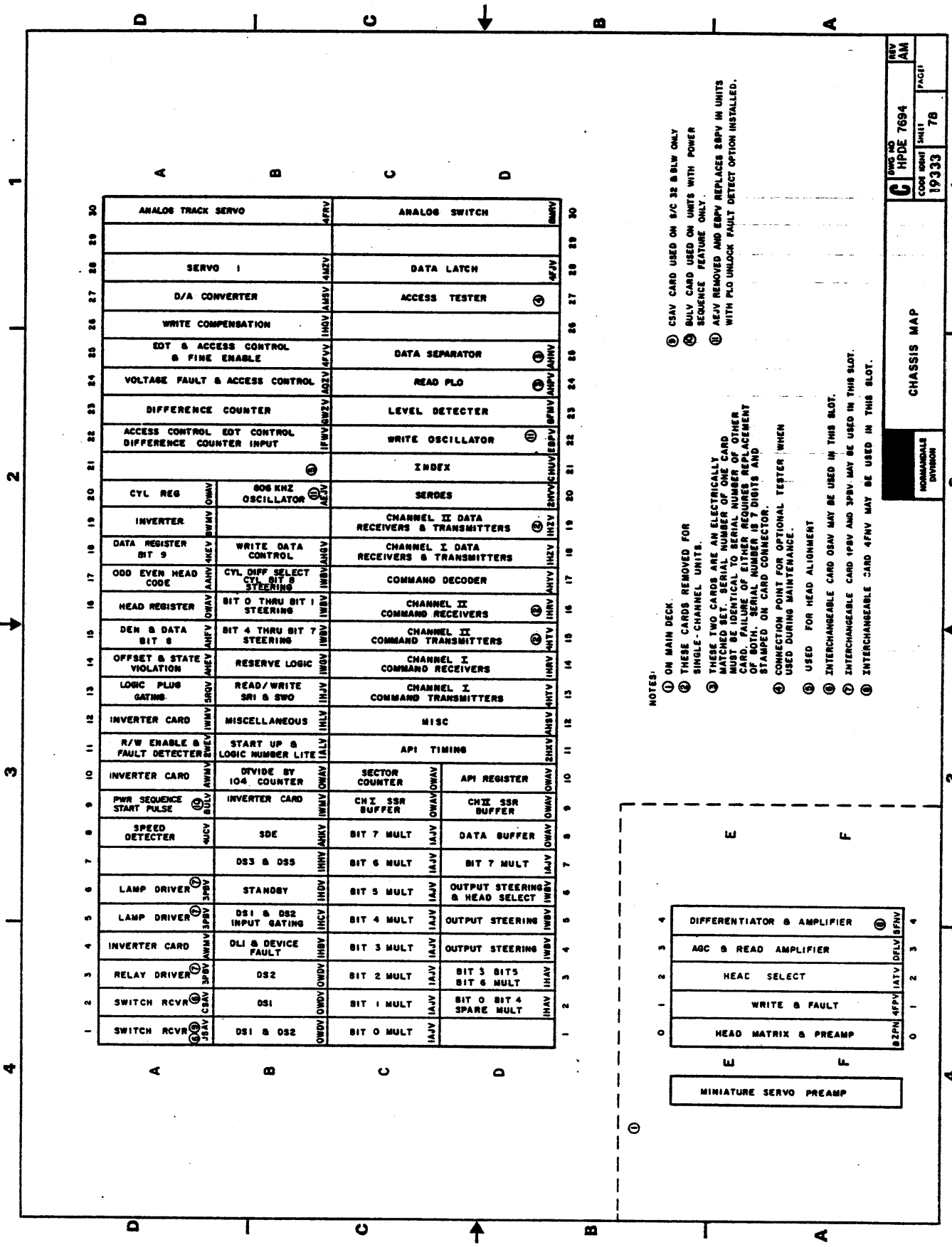




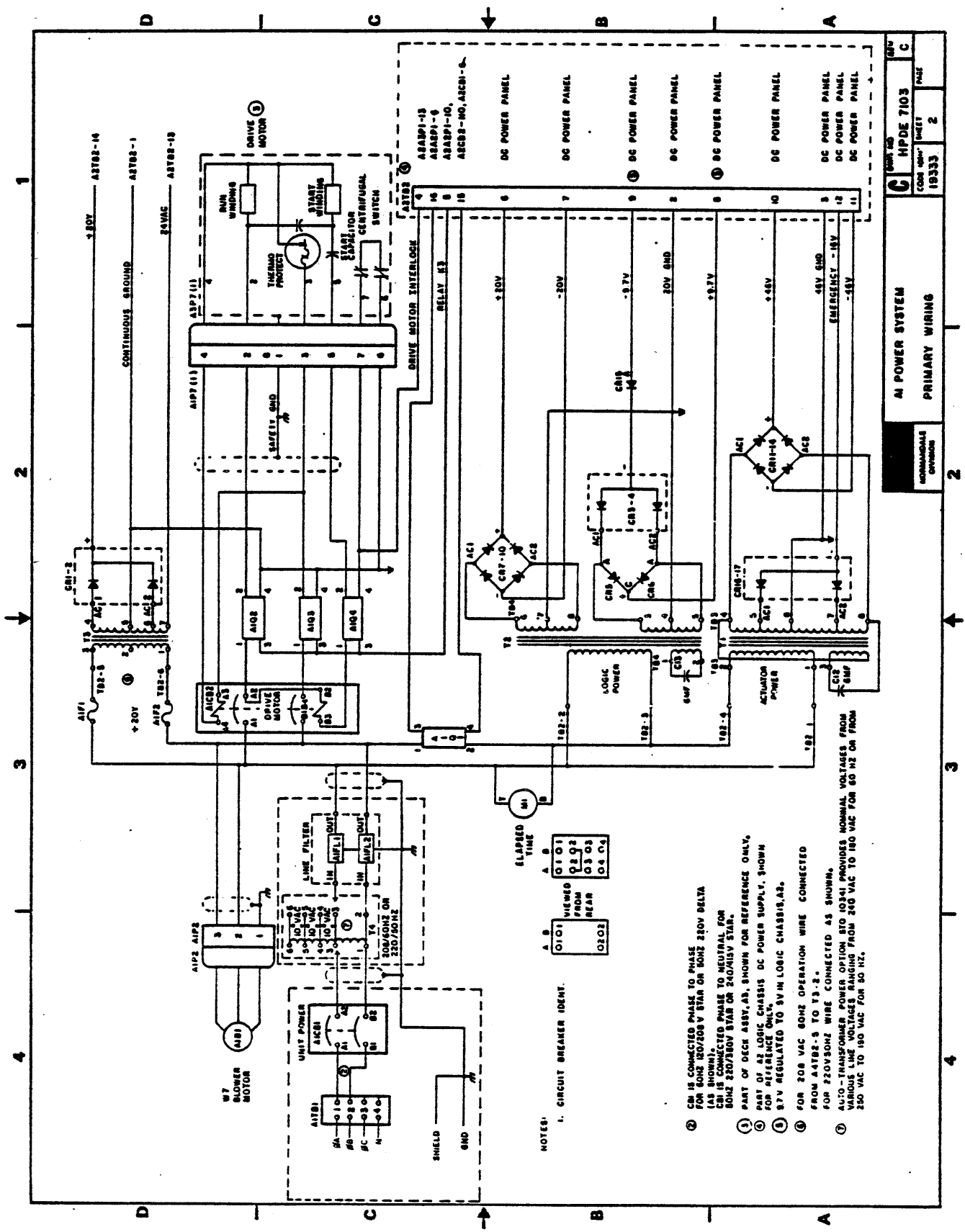
|                      |      |           |
|----------------------|------|-----------|
| REV                  |      | AM        |
| C                    |      | HPDE 7694 |
| DATE                 | 1933 | 76        |
| INTER CHASSIS WIRING |      |           |
| MUMFORD DALE         |      |           |
| 11-11-76             |      |           |
| PAGE                 |      | 1         |

- NOTES:
- ① PART OF LOGIC CHASSIS.
  - ② CONNECTORS ARE ACTUALLY LOCATED WITHIN POWER SUPPLY.
  - ③ W3 CABLES ARE: ASP05 - A2PD28  
ASP04 - A2PA21  
ASP08 - A2T81
  - ④ PART OF DC HARNESS.
  - ⑤ PART OF AC HARNESS.
  - ⑥ NOT ALL WIRES ARE SHOWN. REFER TO ASSEMBLY SCHEMATICS AND WIRE LISTS FOR COMPLETE WIRING.



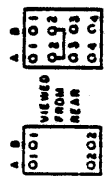


- NOTES:**
- ① ON MAIN DECK
  - ② THESE CARDS REMOVED FOR SINGLE-CHANNEL UNITS.
  - ③ THESE TWO CARDS ARE AN ELECTRICALLY MATCHED SET. SERIAL NUMBER OF ONE CARD MUST BE IDENTICAL TO SERIAL NUMBER OF OTHER CARD. FAILURE OF EITHER REQUIRES REPLACEMENT OF BOTH CARDS. SERIAL NUMBERS AND STAMPED ON CARD CONNECTOR.
  - ④ CONNECTION POINT FOR OPTIONAL TESTER WHEN USED DURING MAINTENANCE.
  - ⑤ USED FOR HEAD ALIGNMENT
  - ⑥ INTERCHANGEABLE CARD OS4V MAY BE USED IN THIS SLOT.
  - ⑦ INTERCHANGEABLE CARD 1F8V AND 3P8V MAY BE USED IN THIS SLOT.
  - ⑧ INTERCHANGEABLE CARD 4F8V MAY BE USED IN THIS SLOT.
- ⑨ CS4V CARD USED ON 8/C 32 & 8/LW ONLY  
 ⑩ BULV CARD USED ON UNITS WITH POWER SEQUENCE FEATURE ONLY  
 ⑪ AS4V REMOVED AND 8BPV REPLACES 8BPV IN UNITS WITH PLO UNLOCK FAULT DETECT OPTION INSTALLED.



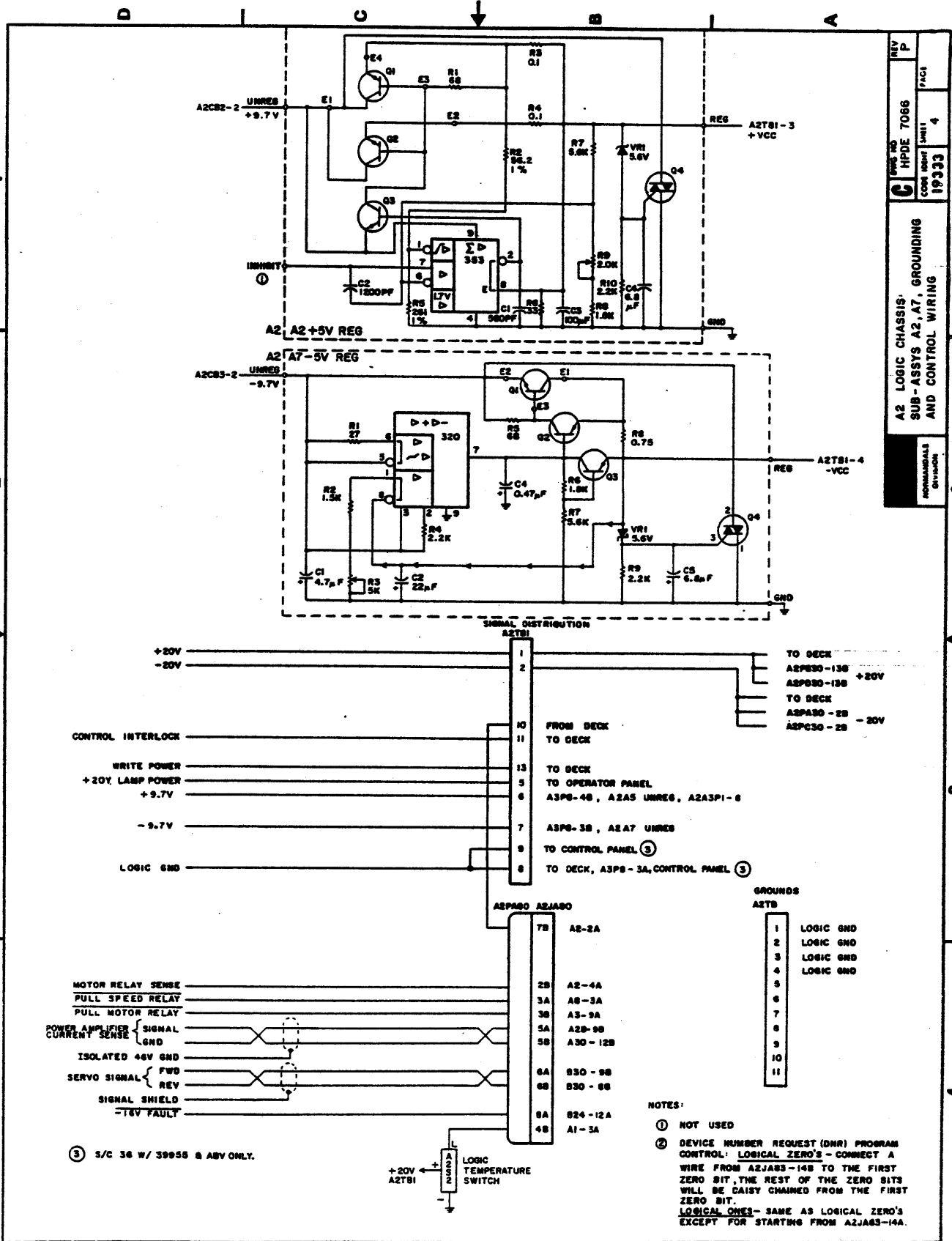
|                      |  |           |  |
|----------------------|--|-----------|--|
| AI POWER SYSTEM      |  | HPDE 7103 |  |
| PRIMARY WIRING       |  | SHEET 2   |  |
| NONMILITARY DIVISION |  | 19333     |  |

- NOTES:
1. CIRCUIT BREAKER IDENT.
  2. CM IS CONNECTED PHASE TO PHASE FOR 50HZ 120/208V STAR OR 50HZ 220V DELTA (AS SHOWN). CM IS CONNECTED PHASE TO NEUTRAL FOR 60HZ 220/380V STAR OR 240/415V STAR.
  3. PART OF DECK ASST. AS, SHOWN FOR REFERENCE ONLY.
  4. PART OF AI LOGIC CHASSIS DC POWER SUPPLY, SHOWN FOR REFERENCE ONLY.
  5. 9.7V REGULATED TO 9V IN LOGIC CHASSIS, AS.
  6. FOR 208 VAC 60HZ OPERATION WIRE CONNECTED FROM AI182-9 TO Y3-2.
  7. FOR 220V50HZ WIRE CONNECTED AS SHOWN.
  8. AI10 - TRANSFORMER POWER OPTION STD 10341 PROVIDES NOMINAL VOLTAGES FROM VARIOUS LINE VOLTAGES RANGING FROM 240 VAC TO 180 VAC FOR 60 HZ OR FROM 280 VAC TO 190 VAC FOR 50 HZ.



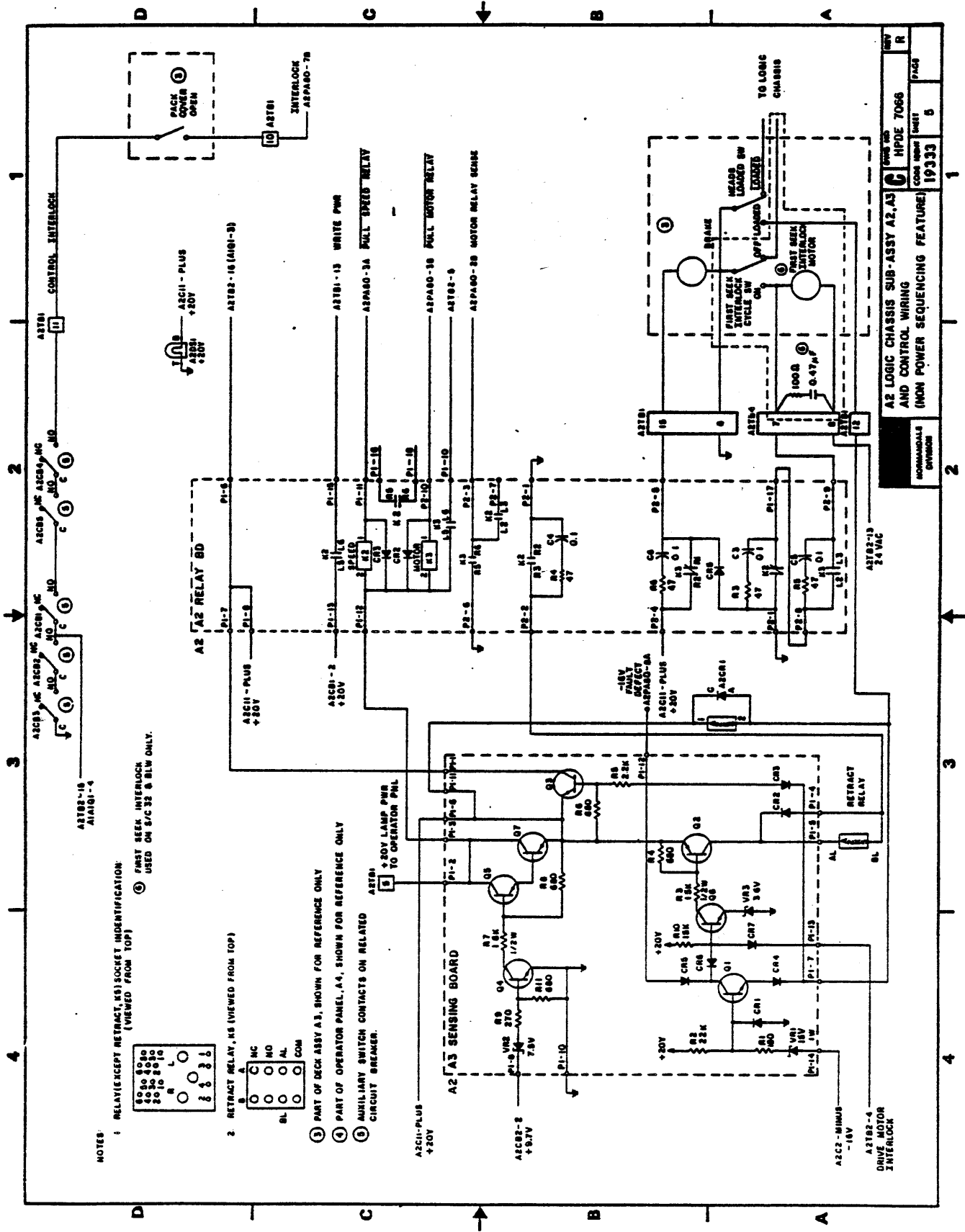






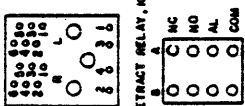
REV P  
 HPDE 7066  
 1933  
 4  
**A2 LOGIC CHASSIS SUB-ASSYS A2.AT, GROUNDING AND CONTROL WIRING**  
 NORMALS DIVISION



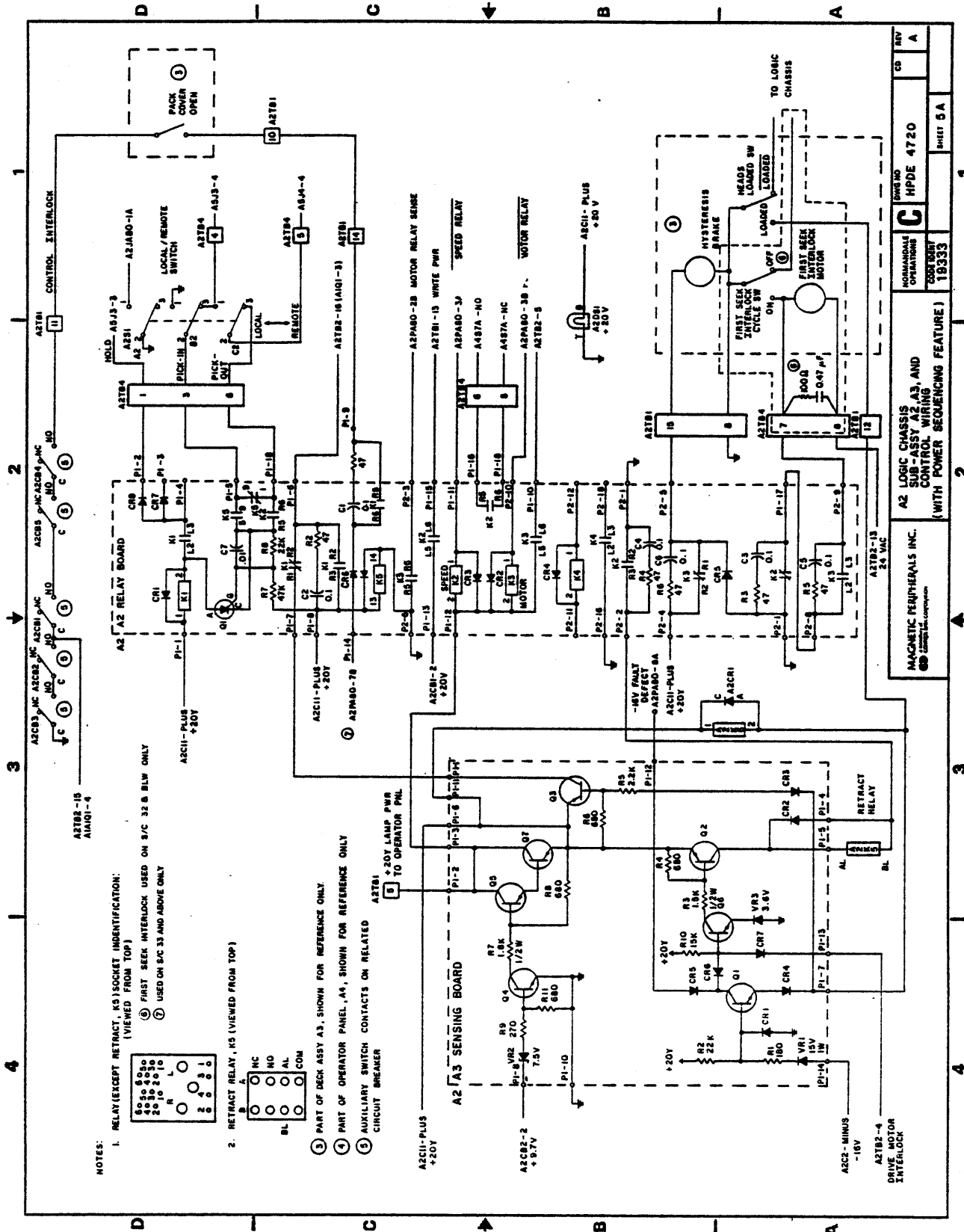


**NOTES**

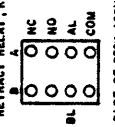
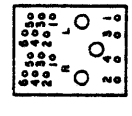
- 1 RELAY (CEPT RETRACT, NS) SOCKET IDENTIFICATION (VIEWED FROM TOP)
- 2 RETRACT RELAY, NS (VIEWED FROM TOP)
- 3 PART OF DECK ASSY A3, SHOWN FOR REFERENCE ONLY
- 4 AUXILIARY SWITCH CONTACTS ON RELATED CIRCUIT BREAKER.



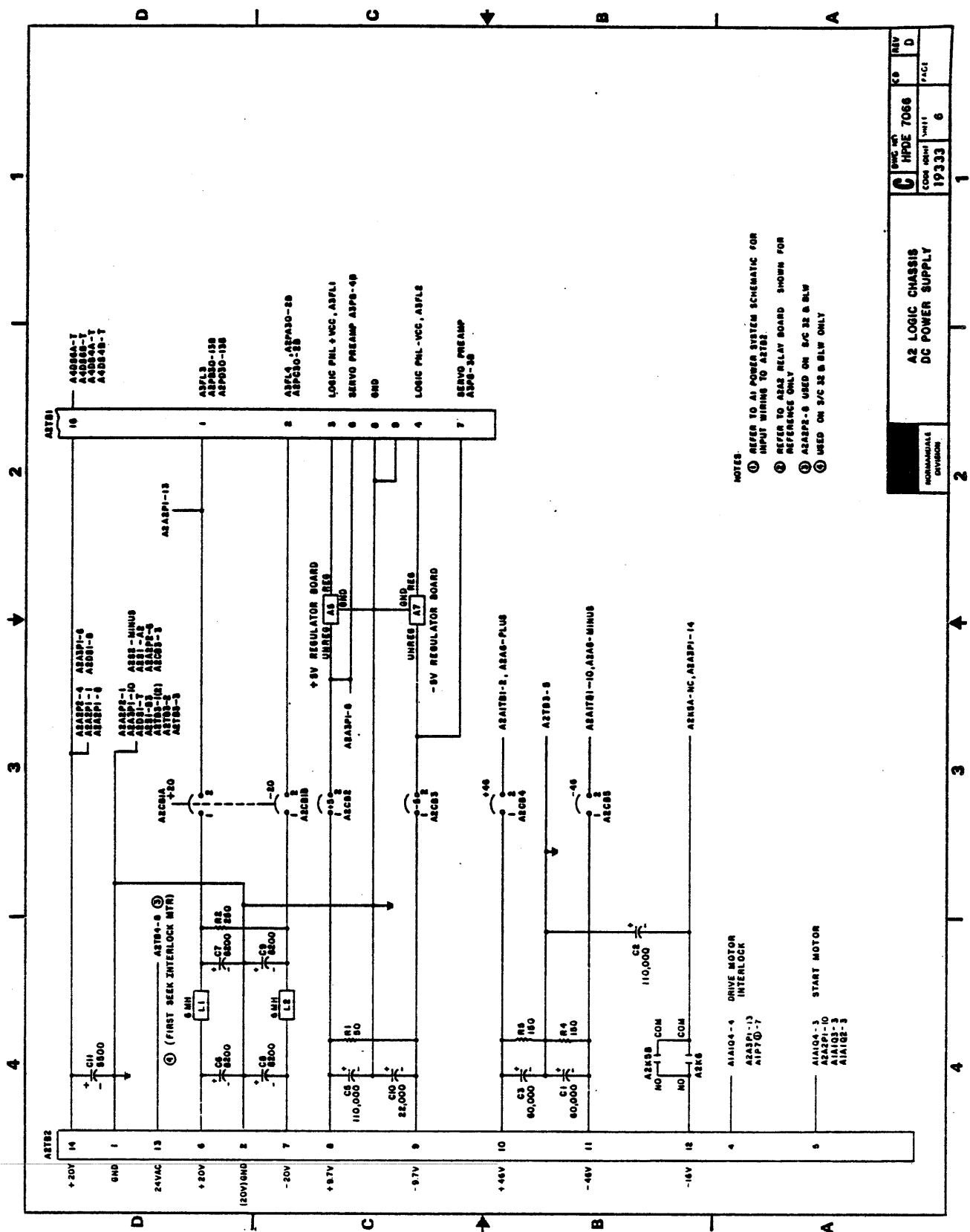
|  |  |               |        |
|--|--|---------------|--------|
| A2 LOGIC CHASSIS SUB-ASSY A2, A3 AND CONTROL WIRING (NON POWER SEQUENCING FEATURE) |  | REV C         | REV R  |
| NORMANVILLE DIVISION   |  | DATE 08/11/61 | PAGE 6 |
|  |  | HPDE 7066     |        |



- NOTES:
1. RELAY (EXCEPT RETRACT, K5) SOCKET IDENTIFICATION: (VIEWED FROM TOP)
  2. RETRACT RELAY, K5 (VIEWED FROM TOP)
  3. PART OF DECK ASSY A3, SHOWN FOR REFERENCE ONLY
  4. PART OF OPERATOR PANEL, A4, SHOWN FOR REFERENCE ONLY
  5. AUXILIARY SWITCH CONTACTS ON RELATED CIRCUIT BREAKER



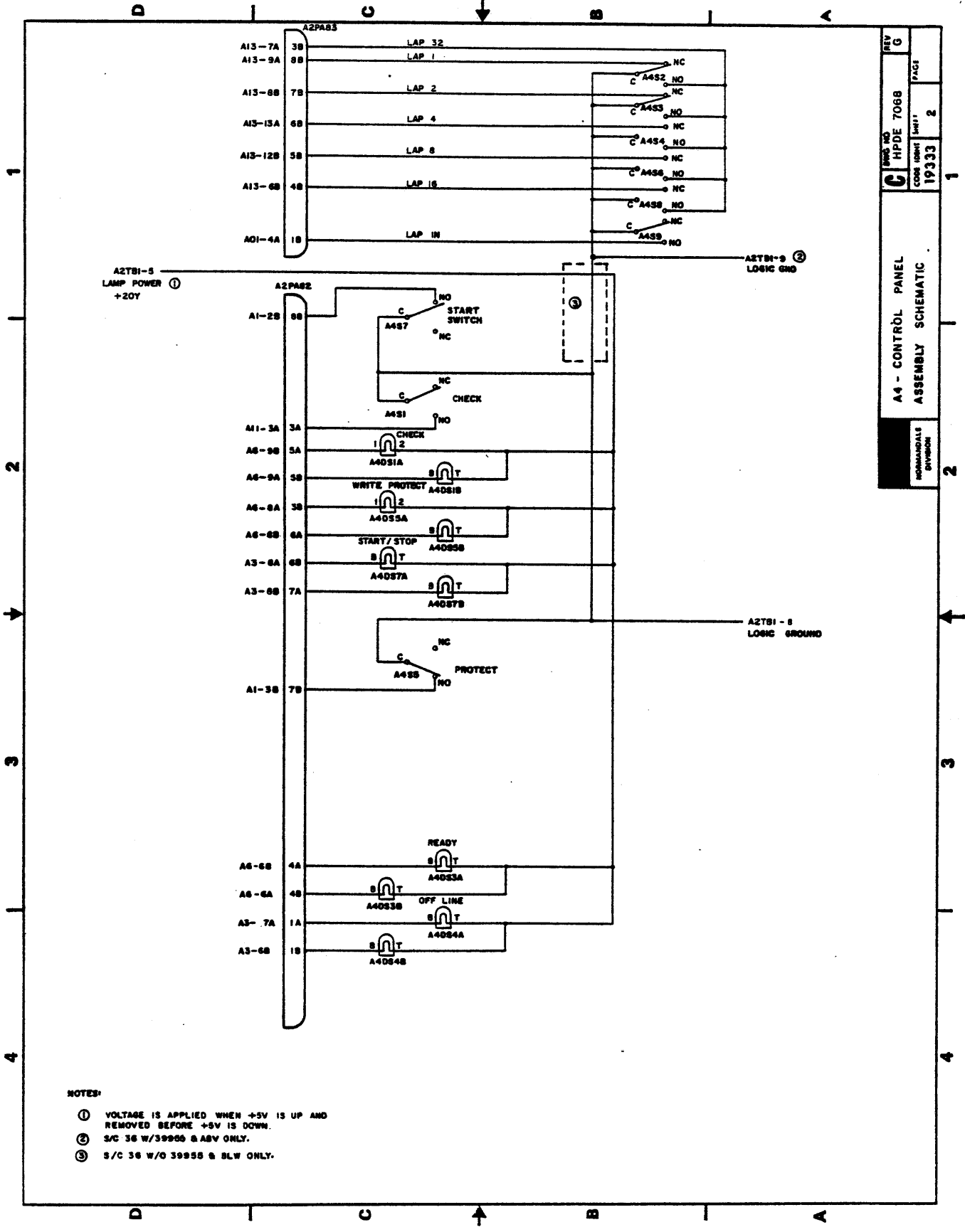


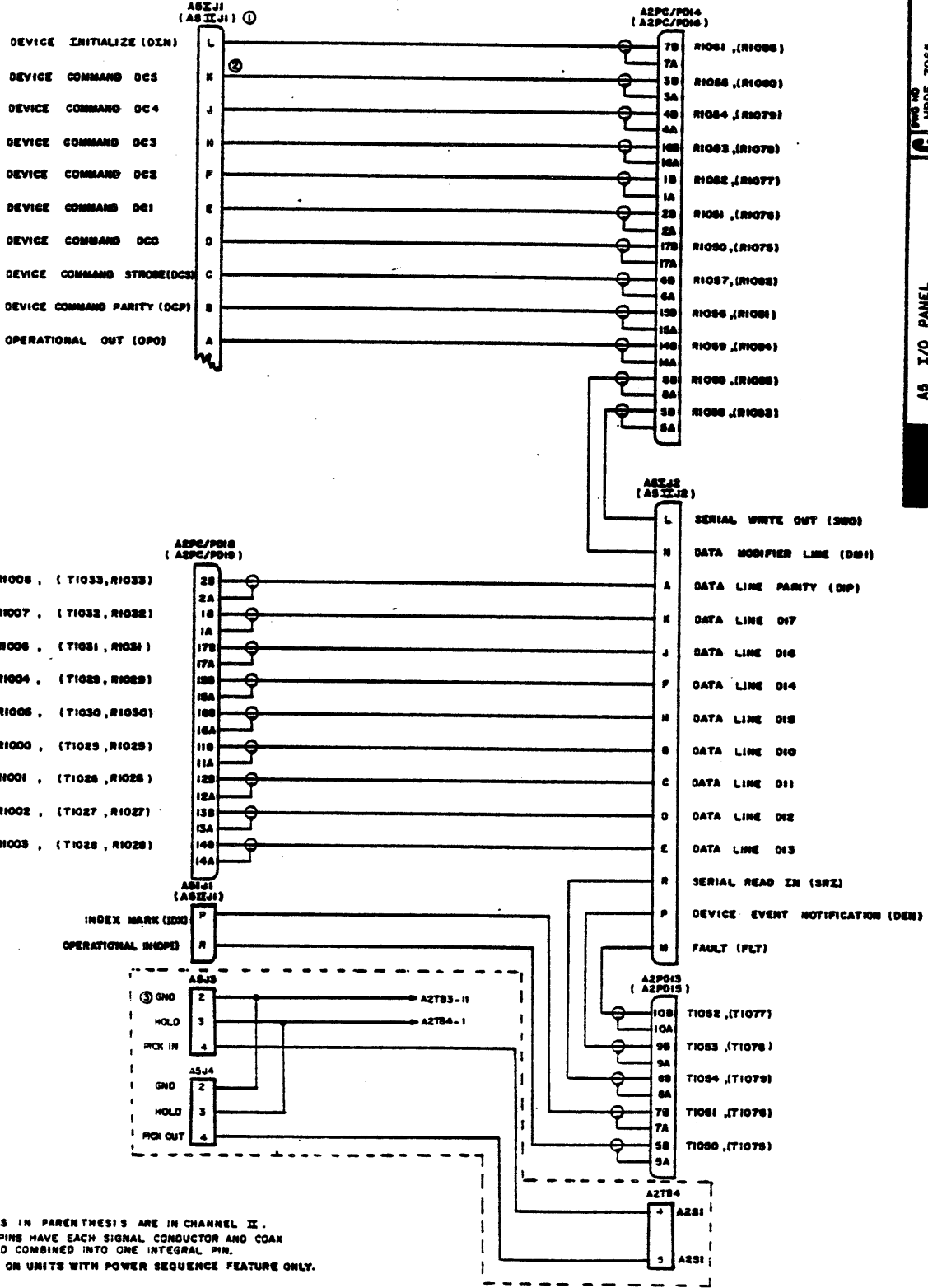


- NOTES:
- ① REFER TO ALL POWER SYSTEM SCHEMATIC FOR INPUT WIRING TO SETS.
  - ② REFER TO A2AS RELAY BOARD SHOWN FOR REFERENCE ONLY
  - ③ A2ASP2-S USED ON S/C 32 & BLW
  - ④ USED ON S/C 32 & BLW ONLY

|                     |                                  |      |      |      |
|---------------------|----------------------------------|------|------|------|
| REV                 | 1                                | 2    | 3    | 4    |
|                     | DATE                             | 1933 | 1933 | 1933 |
| PAGE                | 6                                | 6    | 6    | 6    |
|                     | A2 LOGIC CHASSIS DC POWER SUPPLY |      |      |      |
| COMMERCIAL DIVISION |                                  |      |      |      |





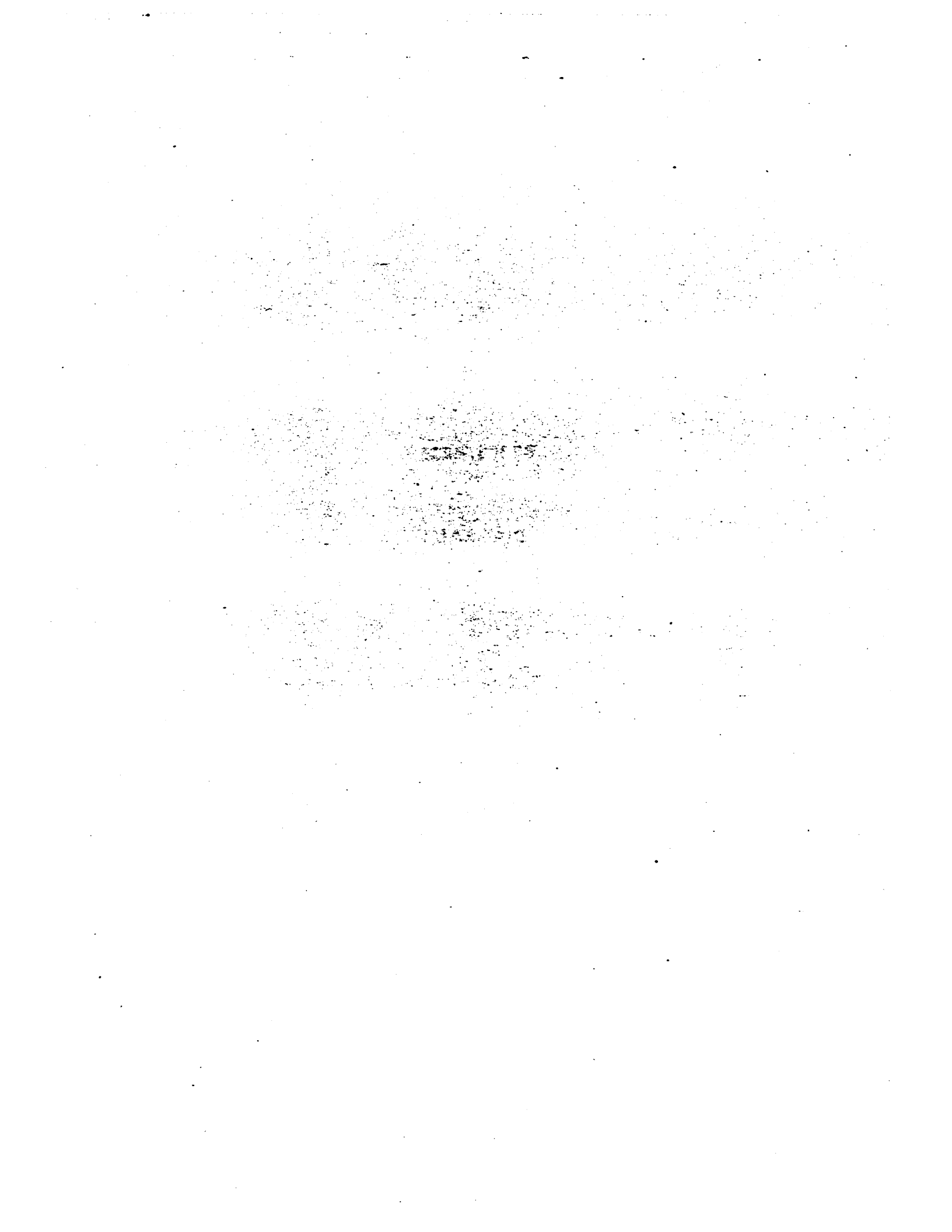


NOTES:  
 ① TERMS IN PARENTHESIS ARE IN CHANNEL II.  
 ② I/O PINS HAVE EACH SIGNAL CONDUCTOR AND COAX SHIELD COMBINED INTO ONE INTEGRAL PIN.  
 ③ USED ON UNITS WITH POWER SEQUENCE FEATURE ONLY.

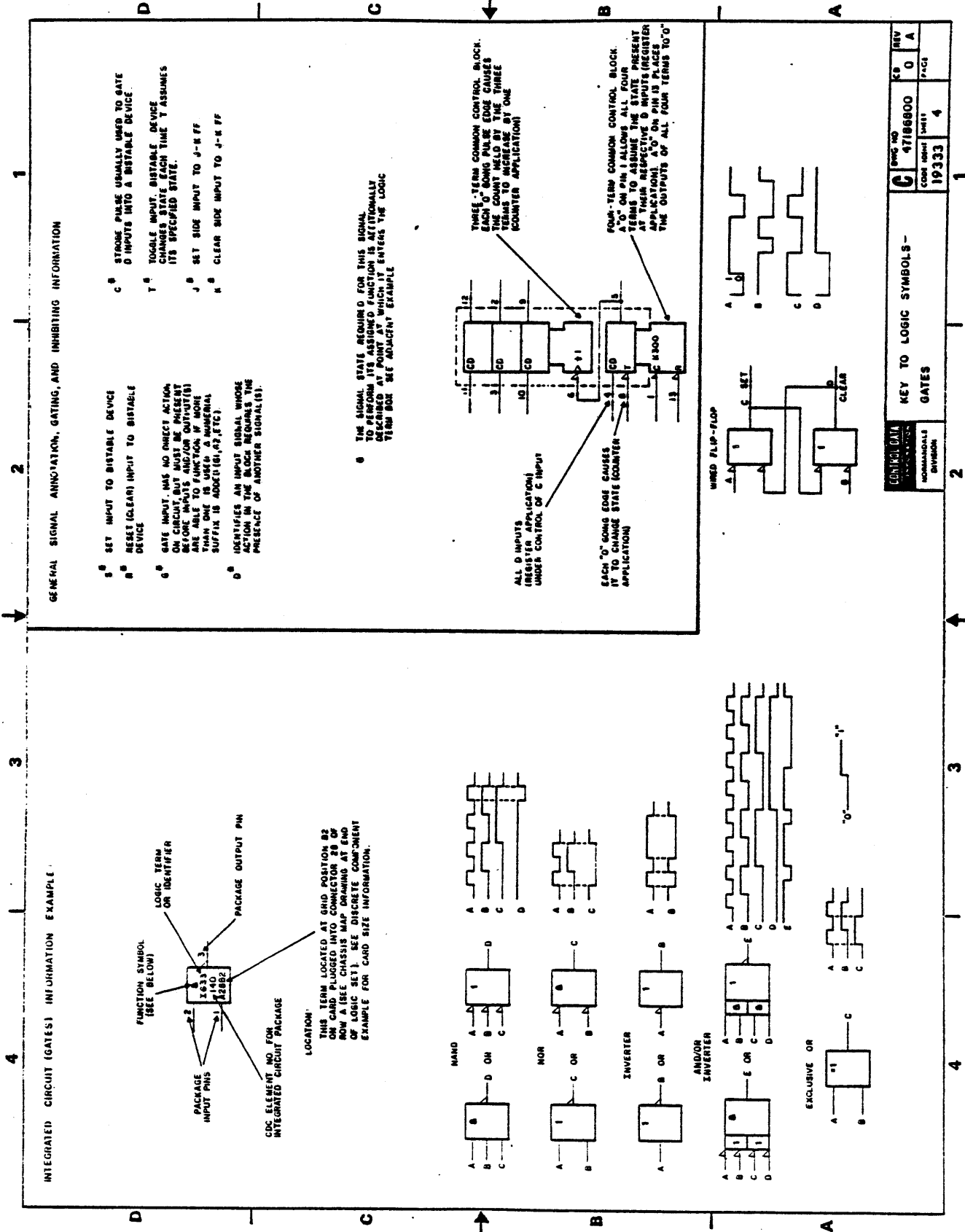
**BR3E4/BR3E5**

**DIAGRAMS**





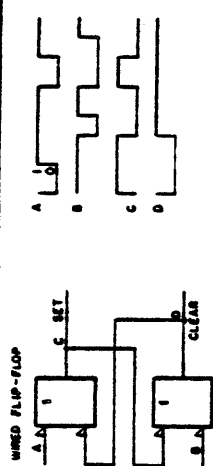
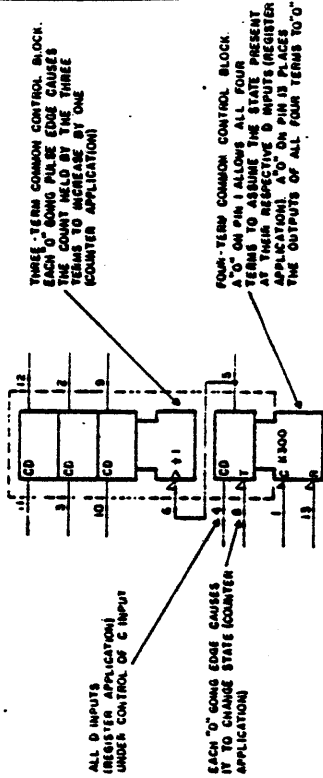




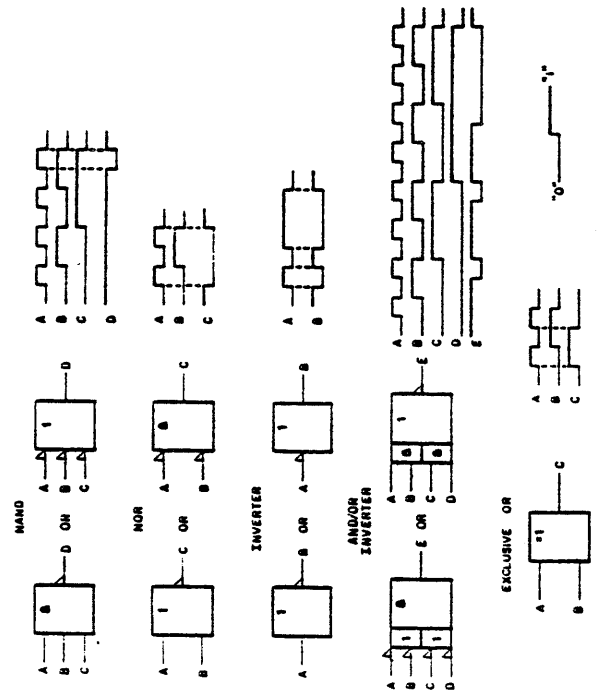
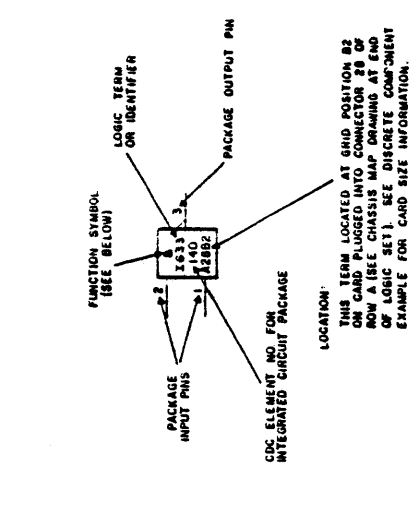
GENERAL SIGNAL ANNOTATION, GATING, AND INHIBITING INFORMATION

- S<sup>o</sup> SET INPUT TO BISTABLE DEVICE
- R<sup>o</sup> RESET (CLEAR) INPUT TO BISTABLE DEVICE
- G<sup>o</sup> GATE INPUT, HAS NO DIRECT ACTION ON CIRCUIT, BUT MUST BE PRESENT AT ALL TIMES TO OPERATE (ALL LOGIC SYMBOLS HAVE A MINIMUM OF ONE GATE INPUT). MORE THAN ONE IS USED A MINUS SIGN (-) SUFFIX IS ADDED (G1, G2, ETC)
- D<sup>o</sup> IDENTIFIES AN INPUT SIGNAL WHOSE ACTION IN THE BLOCK REQUIRES THE PRESENCE OF ANOTHER SIGNAL(S).
- C<sup>o</sup> STROBE PULSE USUALLY USED TO GATE D INPUTS INTO A BISTABLE DEVICE.
- T<sup>o</sup> TOGGLE INPUT, BISTABLE DEVICE CHANGES STATE EACH TIME T ASSUMES ITS SPECIFIED STATE.
- J<sup>o</sup> SET SIDE INPUT TO J-K FF
- K<sup>o</sup> CLEAR SIDE INPUT TO J-K FF

THE SIGNAL STATE REQUIRED FOR THIS SIGNAL TO PERFORM ITS ASSIGNED FUNCTION IS INDICATED BY THE LETTERS IN THE LOGIC SYMBOL. SEE ADJACENT EXAMPLE

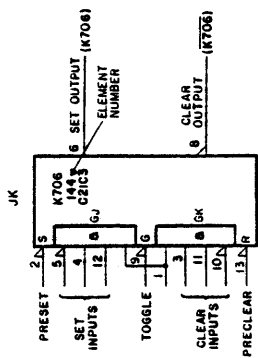


INTEGRATED CIRCUIT (GATES) INFORMATION EXAMPLE



|                              |  |             |      |
|------------------------------|--|-------------|------|
| KEY TO LOGIC SYMBOLS - GATES |  | FIG. NO.    | REV. |
|                              |  | C 4718800   | D A  |
|                              |  | COORD. UNIT | PAGE |
|                              |  | 19333       | 4    |

FLIP - FLOPS

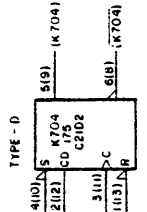
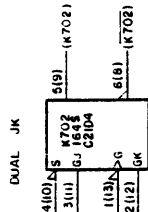
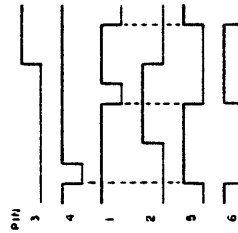
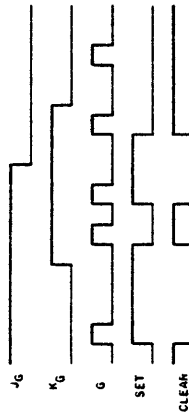


\* PIN 1 IS CONNECTED INTERNALLY TO BOTH INPUTS

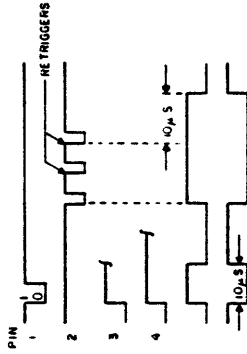
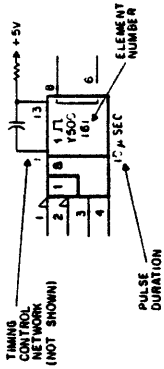
JK TRUTH TABLE

| INPUTS | OUTPUTS BEFORE TOGGLE |   | OUTPUTS AFTER TOGGLE |       |
|--------|-----------------------|---|----------------------|-------|
|        | J                     | K | SET                  | CLEAR |
| 0      | 0                     | 0 | 1                    | 1     |
| 0      | 0                     | 1 | 0                    | 1     |
| 0      | 1                     | 0 | 1                    | 0     |
| 0      | 1                     | 1 | 0                    | 0     |
| 1      | 0                     | 0 | 1                    | 0     |
| 1      | 0                     | 1 | 1                    | 0     |
| 1      | 1                     | 0 | 1                    | 0     |
| 1      | 1                     | 1 | 0                    | 0     |

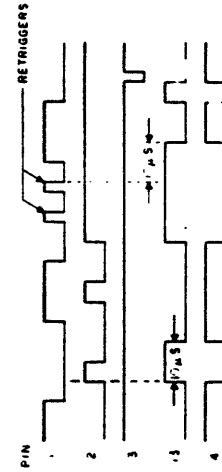
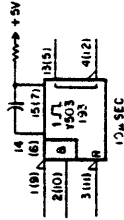
- J - J OUTPUT CONDITIONED BY LEADING EDGE OF DYNAMIC TOGGLE (G)
- K - K OUTPUT CONDITIONED BY LEADING EDGE OF DYNAMIC TOGGLE (G)
- G - GATE INPUT, HAS NO DIRECT EFFECT ON CIRCUIT, BUT MUST BE PRESENT BEFORE SIGNALS TO OUTPUT (S)
- S - SET INPUT, WHEN "0", FF IS SET REGARDLESS OF INPUTS AND GATE STATES
- R - RESET(CLEAR) INPUT, WHEN "0", FF IS CLEARED REGARDLESS OF INPUTS AND GATE STATES



RETRIGGERABLE MULTIVIBRATORS (SINGLE SHOTS)



DUAL SINGLE SHOT WITH RESET



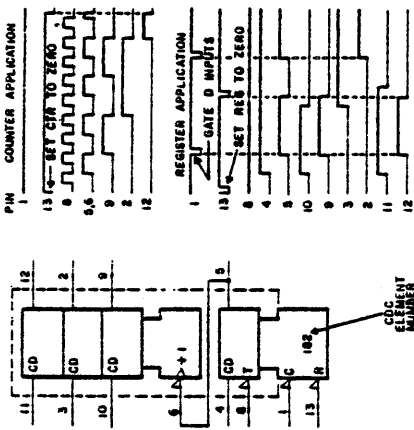
KEY TO LOGIC SYMBOLS -  
BISTABLE DEVICES

DWG NO 47186800  
CODE 108H1 19333 5

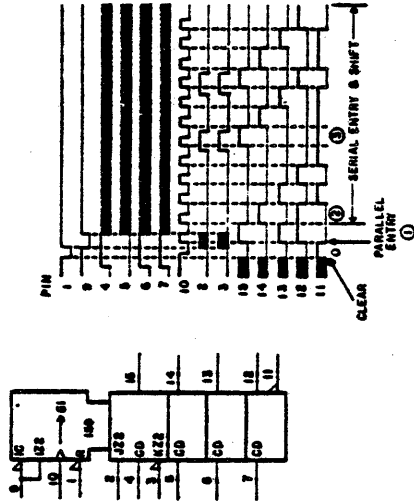
NORMANDALE DIVISION

COUNTERS AND SHIFT REGISTERS

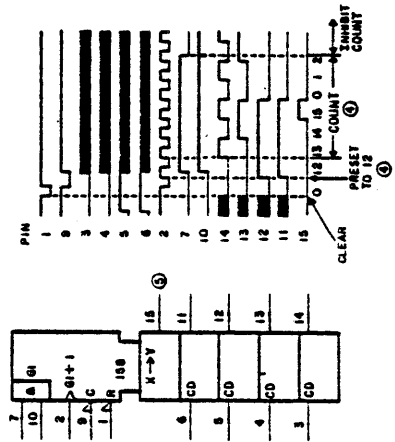
TYPE 182  
4-BIT COUNTER/STORAGE ELEMENT



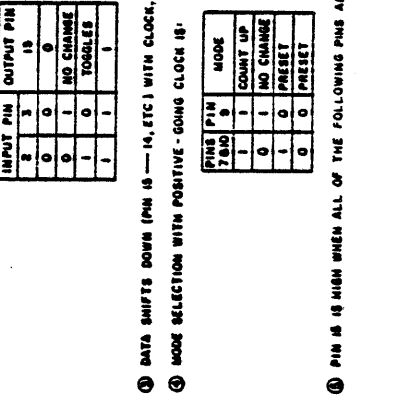
TYPE 159  
4-BIT SHIFT REGISTER  
WITH PARALLEL ENTRY



TYPE 158  
SYNCHRONOUS  
PRESETTABLE UP COUNTER



TYPE 158  
HEXADECIMAL  
SYNCHRONOUS  
PRESETTABLE UP COUNTER

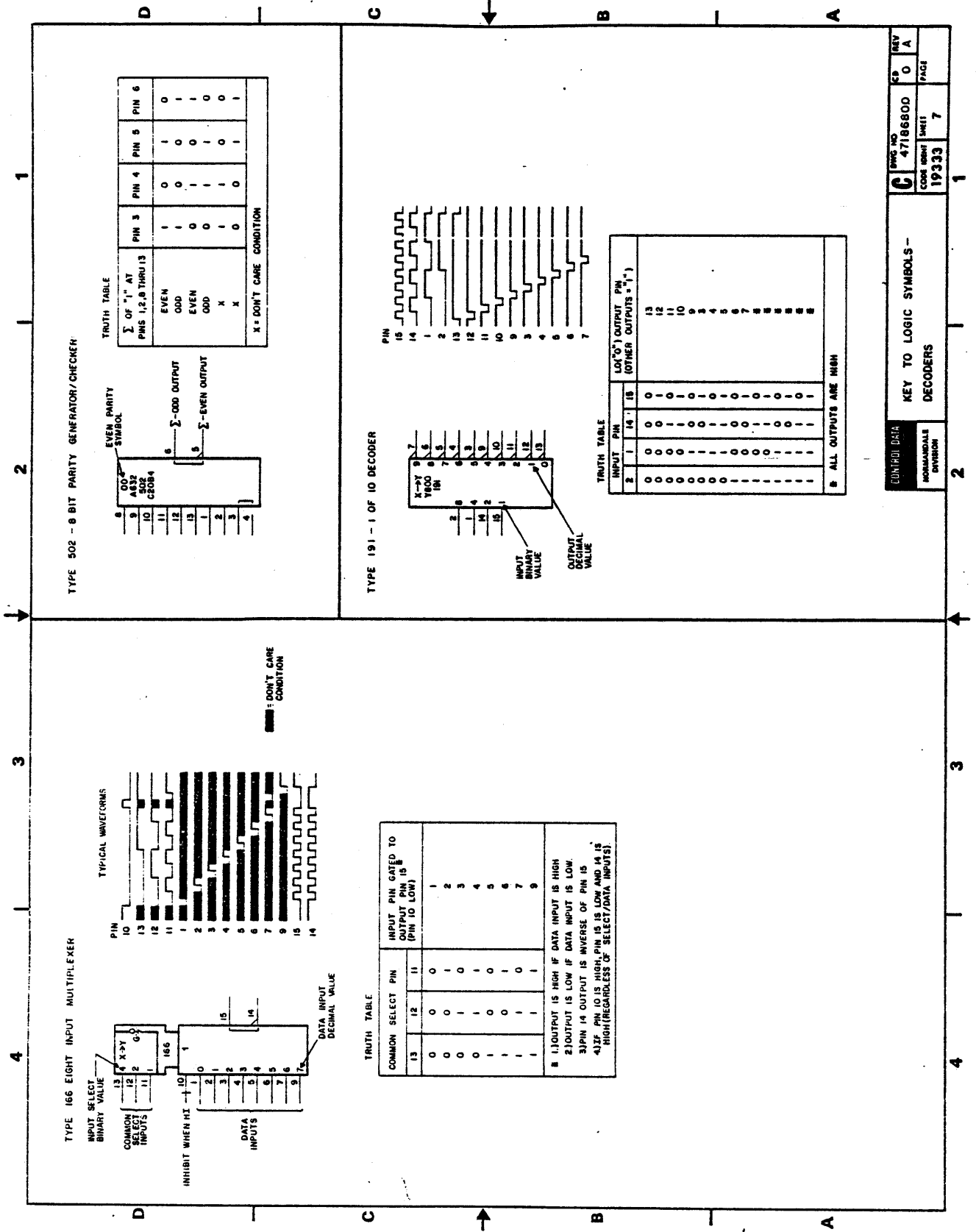


NOTES:

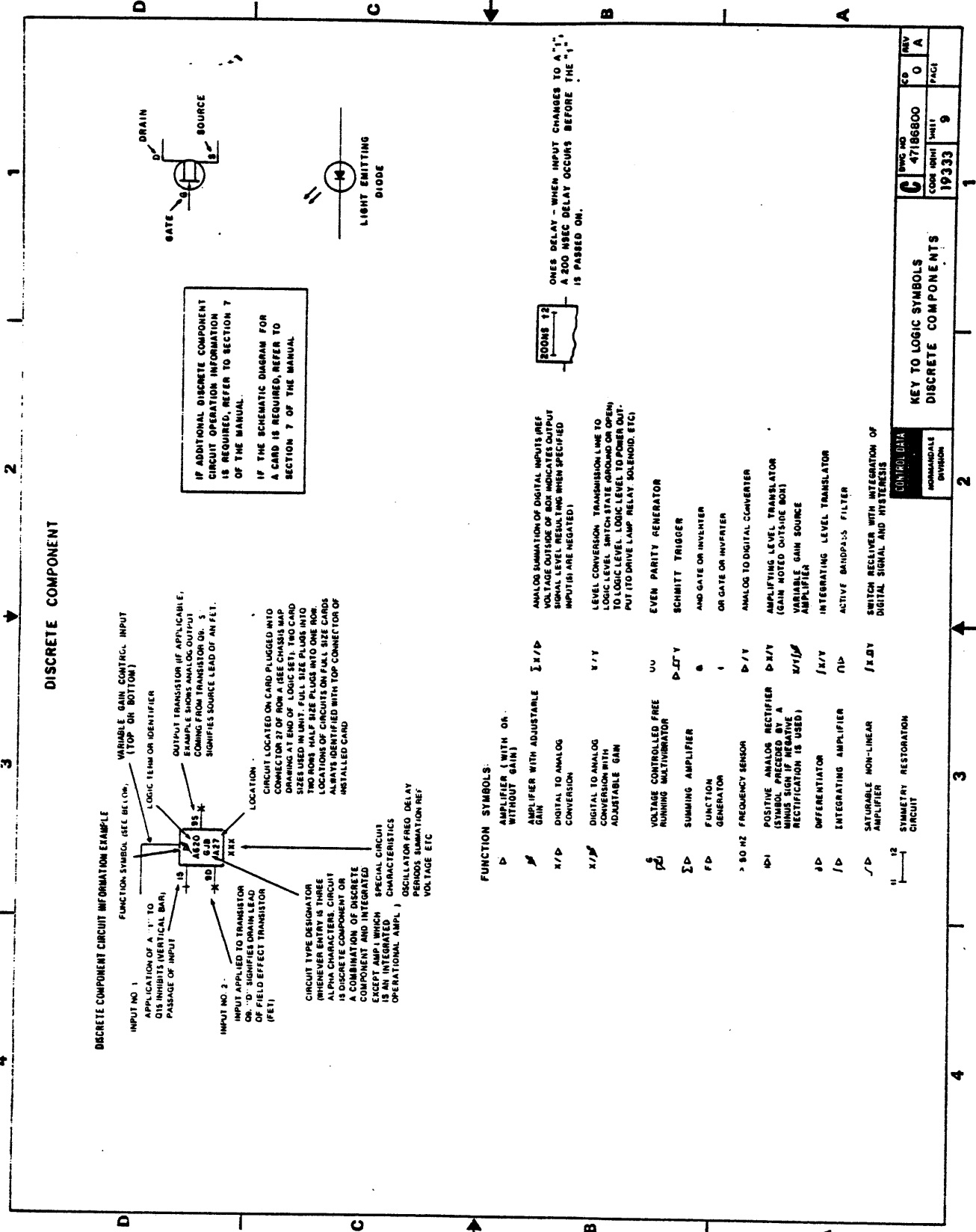
- ① DATA ENTERED INTO 0-INPUT VIA PIN 4 BY PIN 9 LOW AND POSITIVE-GOING SIGNAL ON PIN 10.
  - ② DATA ENTERED INTO -HIGH INPUT BY PIN 9 HIGH AND POSITIVE-GOING SIGNAL ON PIN 10. PIN 4 INPUT INHIBITED BECAUSE OF PIN 9 HIGH. OUT IS THEN AS FOLLOWS:
- | INPUT PIN | OUTPUT PIN |
|-----------|------------|
| 2         | 3          |
| 3         | 10         |
| 0         | 0          |
| 1         | NO CHANGE  |
| 1         | 0          |
| 1         | 1          |
- ③ DATA SHIFTS DOWN (PIN 15 — 14, ETC.) WITH CLOCK.
  - ④ MODE SELECTION WITH POSITIVE-GOING CLOCK IS:
- | PINS    | MODE |
|---------|------|
| 7 AND 9 | 1    |
| 1       | 1    |
| 0       | 1    |
| 1       | 0    |
| 1       | 0    |
| 0       | 0    |
| 0       | 0    |
- ⑤ PIN 15 IS HIGH WHEN ALL OF THE FOLLOWING PINS ARE HIGH: 10, 11, 12, 13, AND 14.

■ DON'T CARE CONDITION

|                        |   |                    |           |
|------------------------|---|--------------------|-----------|
| MORGANTHAU<br>DIVISION | KEY TO LOGIC SYMBOLS -<br>COUNTERS / SHIFT REGISTER | DWS NO<br>47186900 | REV<br>A  |
|                        |   | CON GRANT<br>19333 | PAGE<br>6 |







D 1 2 3 4

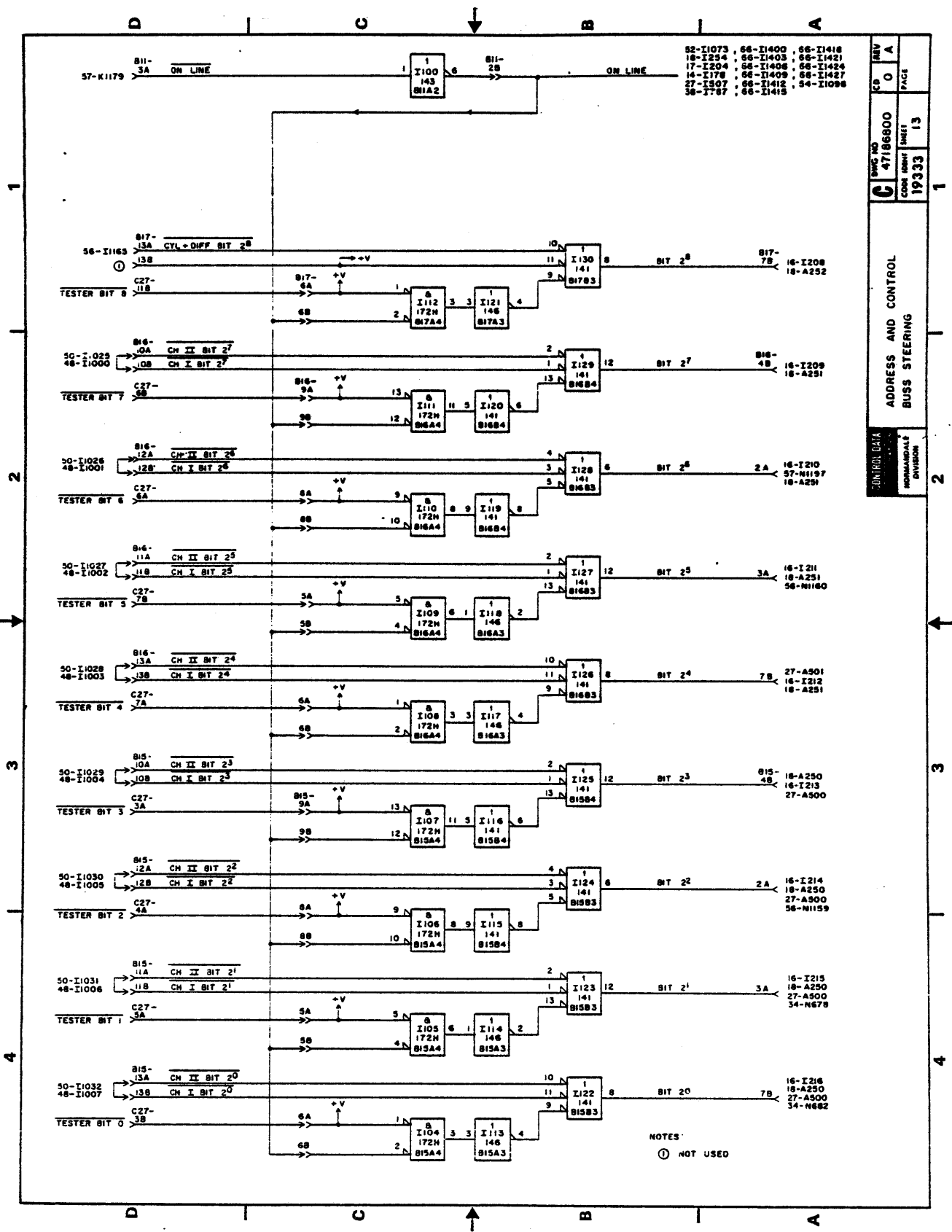
A B C D





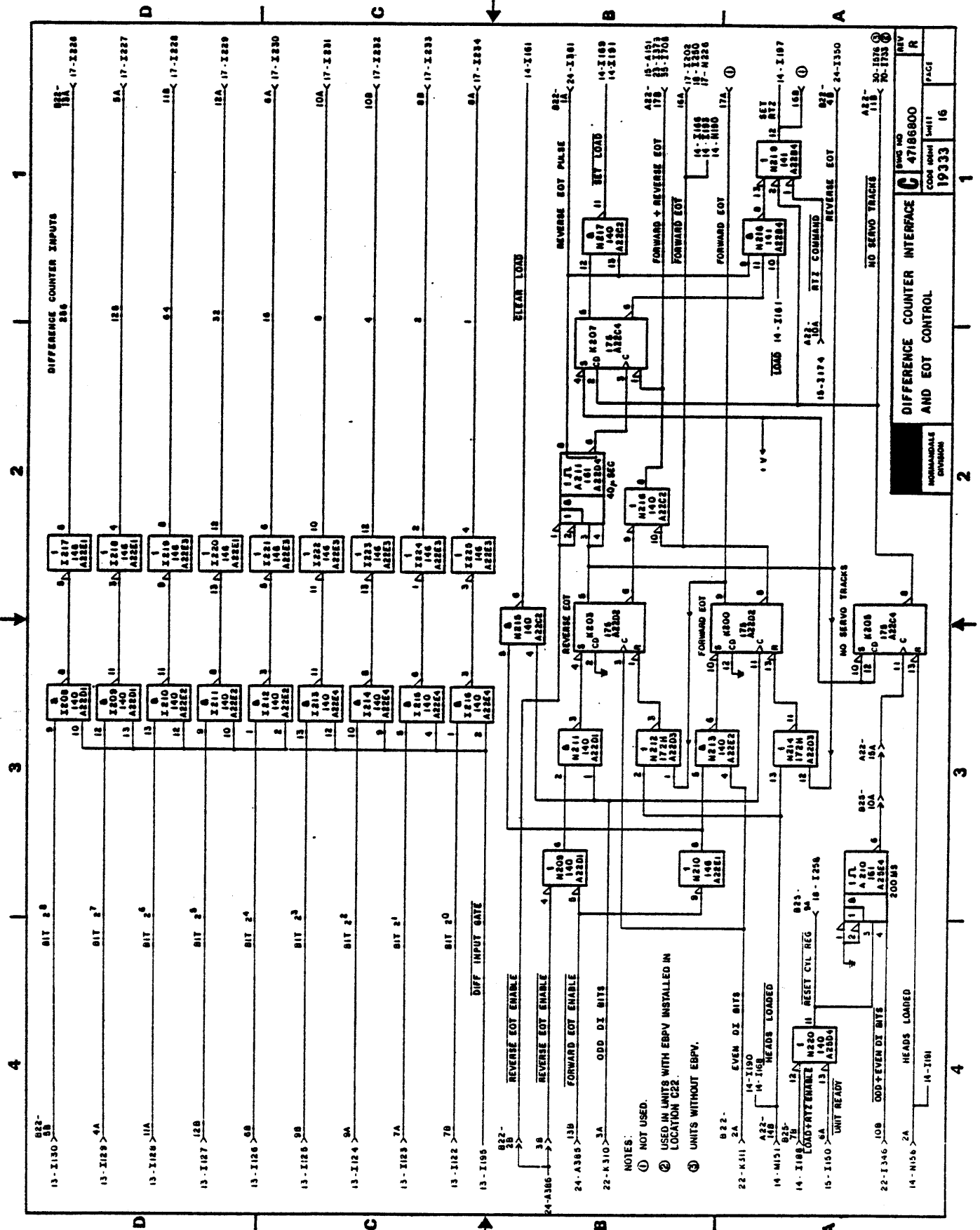








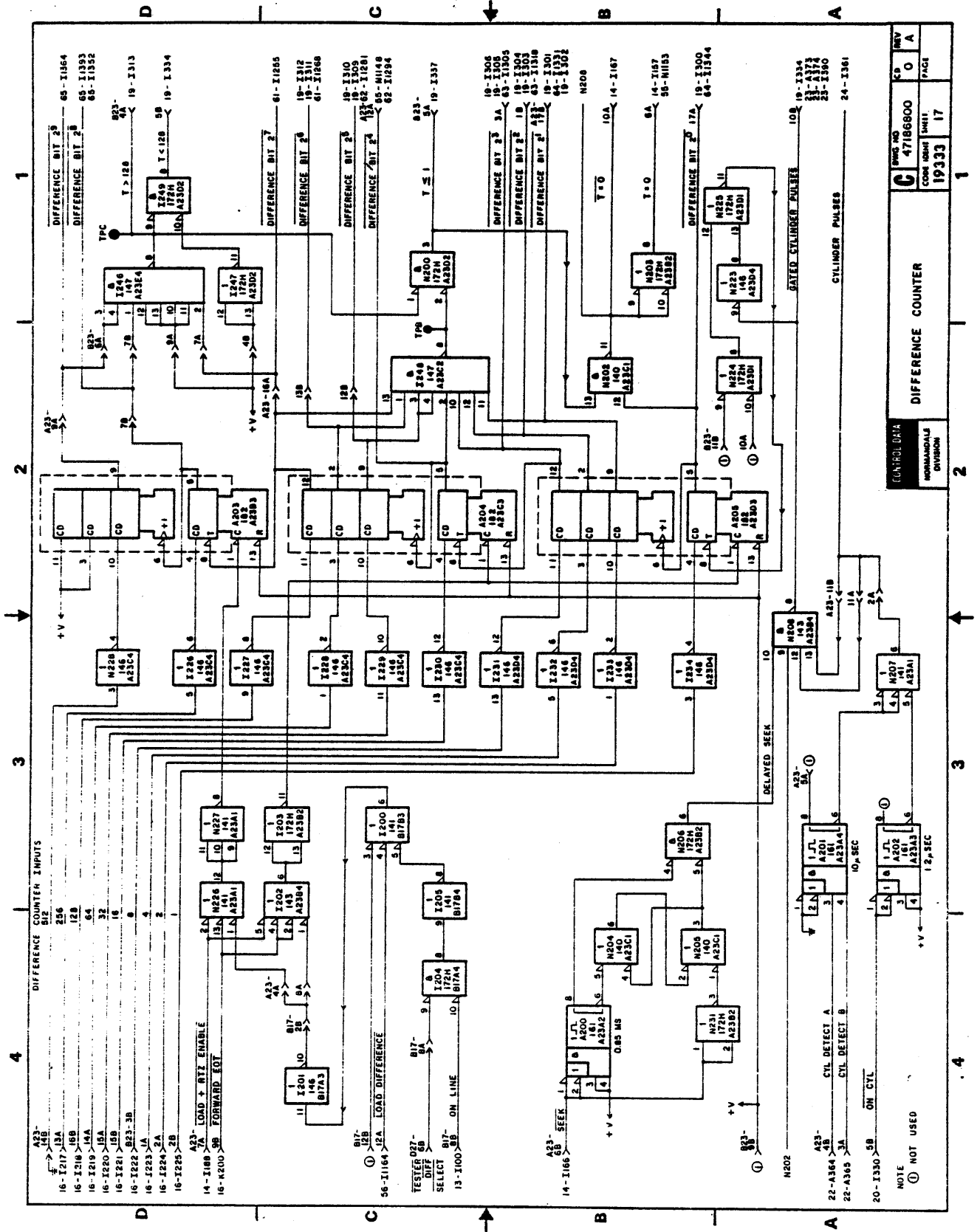




NOTES:  
 ① NOT USED.  
 ② USED IN UNITS WITH EBVP INSTALLED IN LOCATION C22.  
 ③ UNITS WITHOUT EBVP.

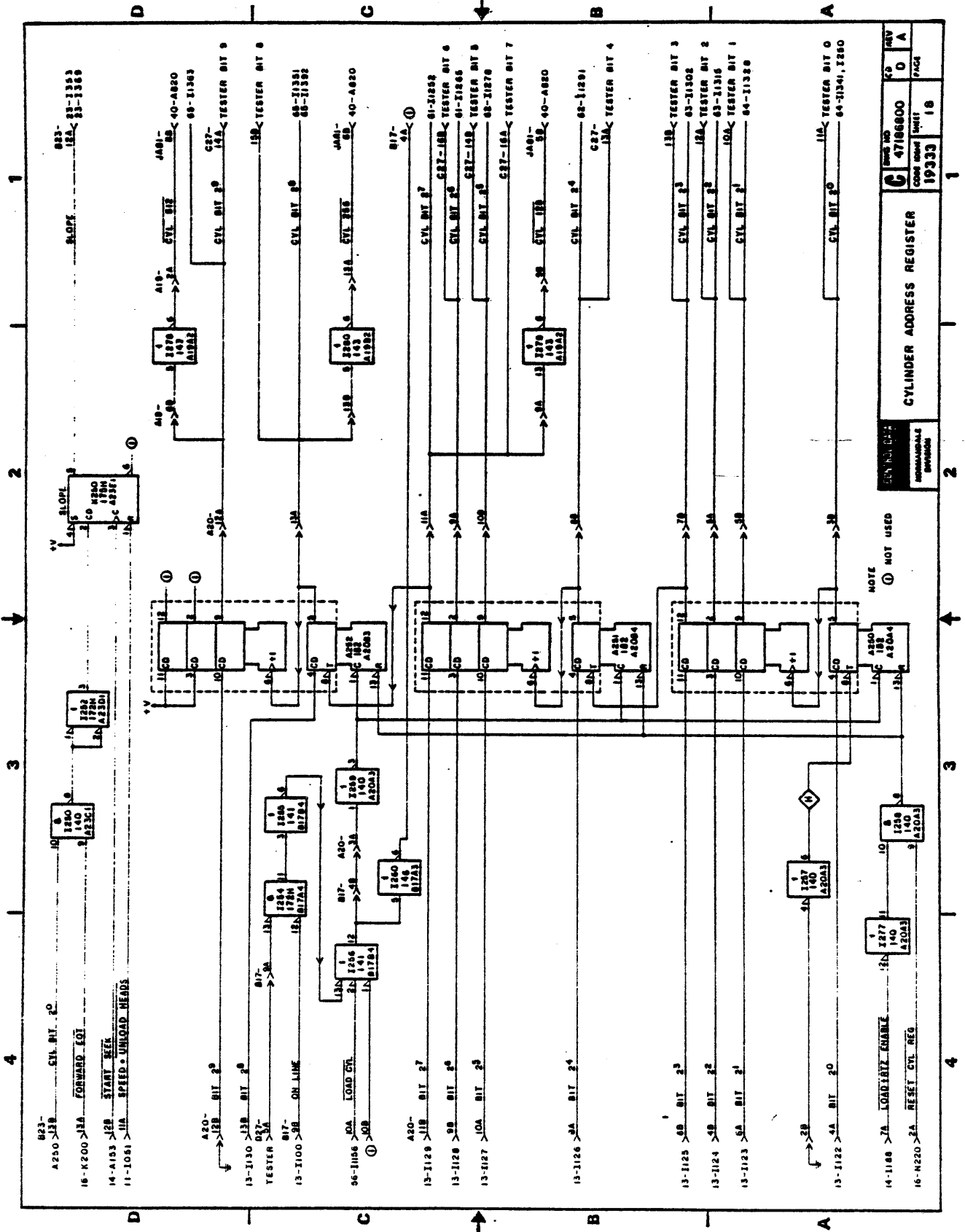
|                              |                            |
|------------------------------|----------------------------|
| DIFFERENCE COUNTER INTERFACE | DIFFERENCE COUNTER CONTROL |
| 19333                        | 16                         |
| REV NO 47186800              | PAGE 1                     |

NON-MANUFACTURABLE DIVISION



83318100 D



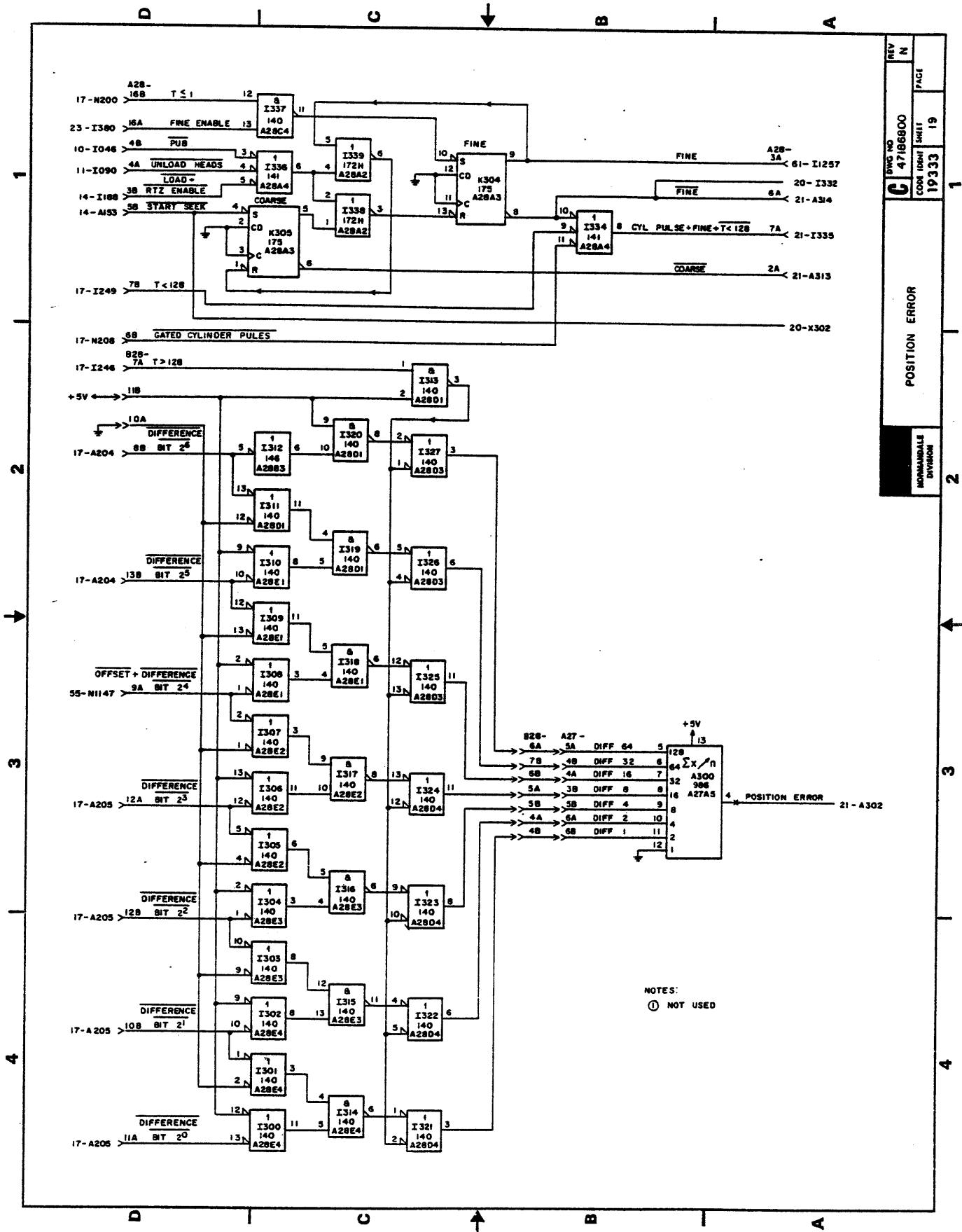


|            |         |    |
|------------|---------|----|
| REV        | 0       | A  |
| DATE       | 19333   | 18 |
| CON. NO.   | 4718600 |    |
| TESTER BIT |         |    |
| CYL. BIT   |         |    |

**CYLINDER ADDRESS REGISTER**

NOT USED

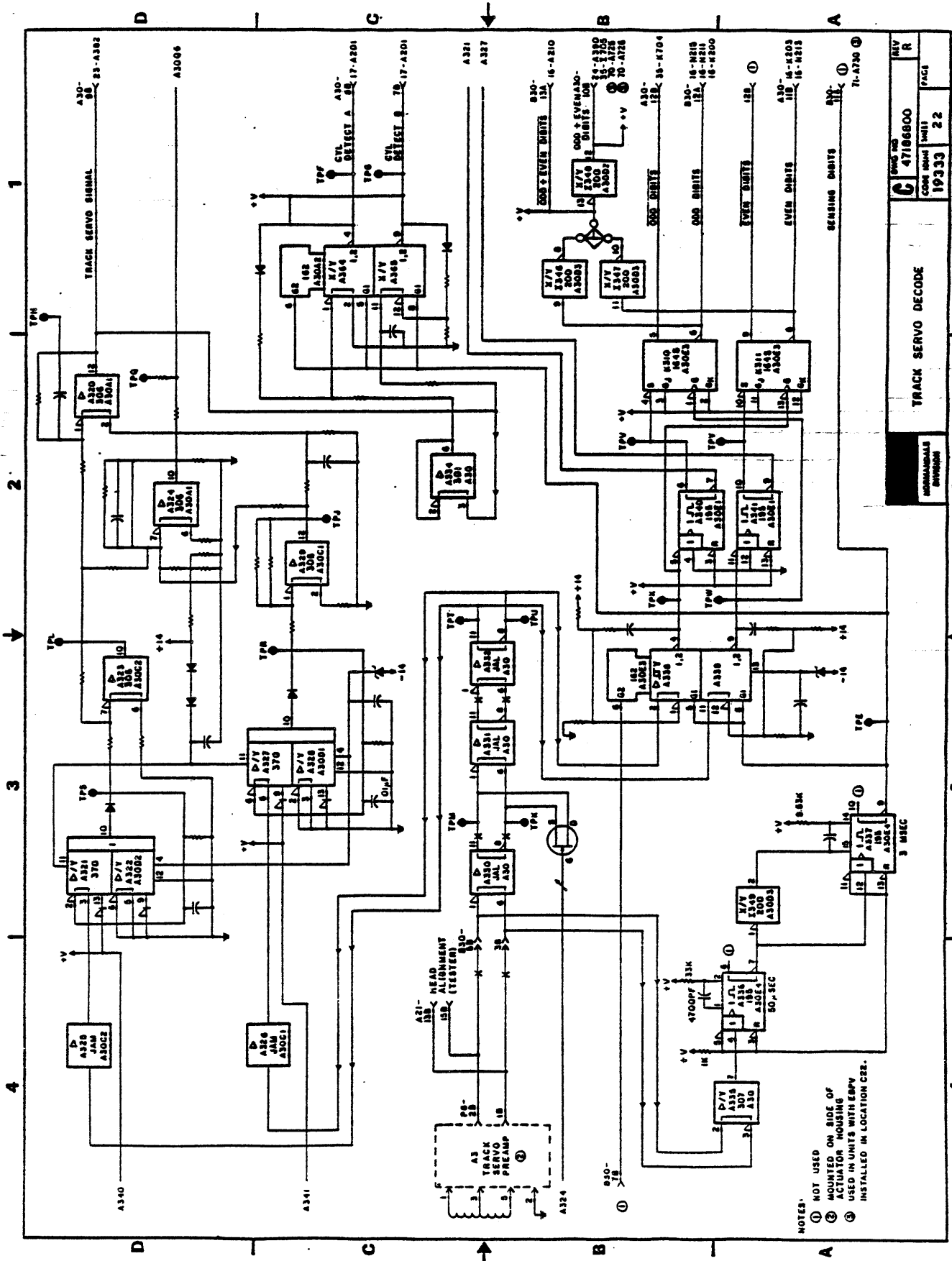
NOTE ① NOT USED



|                      |    |
|----------------------|----|
| REV                  | N  |
| 47186800             | 19 |
| 19333                | 19 |
| POSITION ERROR       |    |
| MORNINGDALE DIVISION |    |



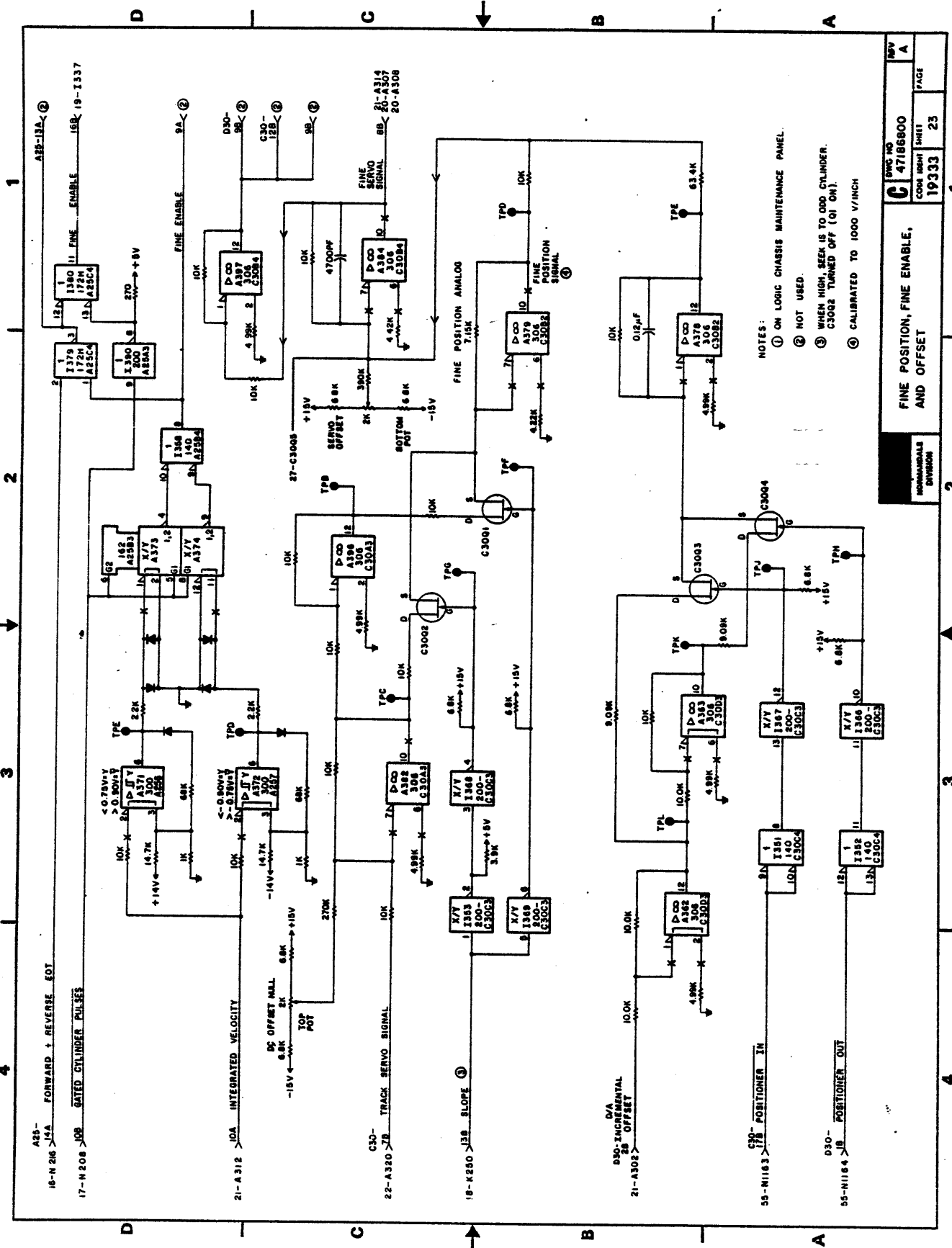




|        |            |
|--------|------------|
| REV    | R          |
| QWG NO | C 47186800 |
| COM NO | 19333      |
| UNIT   | 22         |
| PAGE   | 22         |

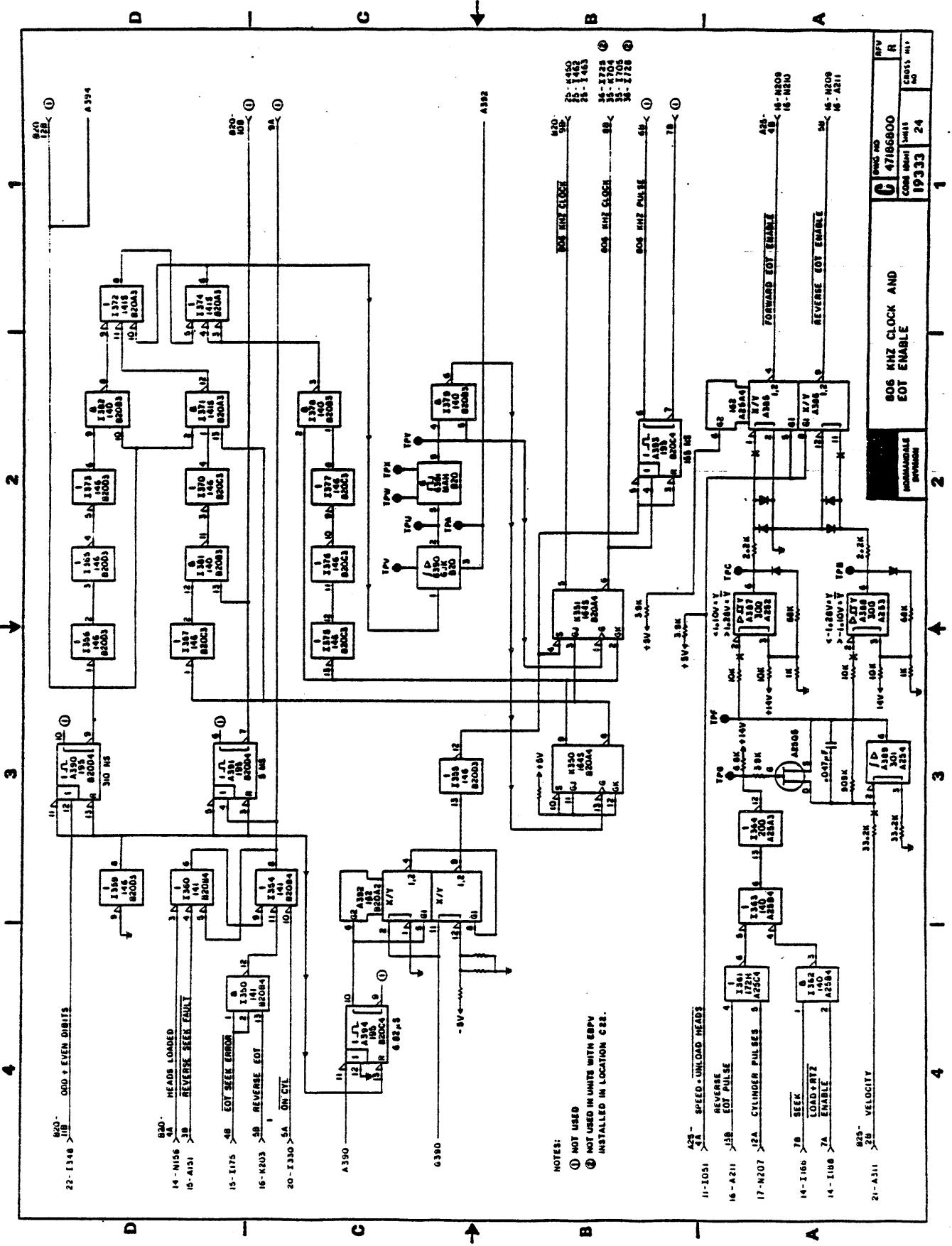
**TRACK SERVO DECODE**

- NOTES:
- ① NOT USED
  - ② MOUNTED ON SIDE OF ACTUATOR HOUSING
  - ③ USED IN UNITS WITH EMPV INSTALLED IN LOCATION CEE.



- NOTES:
- ① ON LOGIC CHASSIS MAINTENANCE PANEL.
  - ② NOT USED.
  - ③ WHEN HIGH SEEK IS TO ODD CYLINDER. C3002 TURNED OFF (OI ON).
  - ④ CALIBRATED TO 1000 V/INCH

|                  |  |                          |  |                  |  |                          |  |                  |  |                        |  |                  |  |                       |  |                  |  |           |  |                  |  |                       |  |                   |  |                  |  |                   |  |                   |  |
|------------------|--|--------------------------|--|------------------|--|--------------------------|--|------------------|--|------------------------|--|------------------|--|-----------------------|--|------------------|--|-----------|--|------------------|--|-----------------------|--|-------------------|--|------------------|--|-------------------|--|-------------------|--|
| 425-<br>16-N 216 |  | 1A FORWARD + REVERSE EDT |  | 425-<br>17-N 208 |  | 1B GATED CYLINDER PULSES |  | 425-<br>21-A 312 |  | 1C INTEGRATED VELOCITY |  | 425-<br>22-A 320 |  | 1D TRACK SERVO SIGNAL |  | 425-<br>19-K 250 |  | 1E SLOPE  |  | 425-<br>21-A 302 |  | 1F INCREMENTAL OFFSET |  | 425-<br>55-N 1183 |  | 1G POSITIONER IN |  | 425-<br>55-N 1184 |  | 1H POSITIONER OUT |  |
| REV              |  | A                        |  | REV              |  | A                        |  | REV              |  | A                      |  | REV              |  | A                     |  | REV              |  | A         |  | REV              |  | A                     |  | REV               |  | A                |  | REV               |  | A                 |  |
| C 4718600        |  | C 4718600                |  | C 4718600        |  | C 4718600                |  | C 4718600        |  | C 4718600              |  | C 4718600        |  | C 4718600             |  | C 4718600        |  | C 4718600 |  | C 4718600        |  | C 4718600             |  | C 4718600         |  | C 4718600        |  | C 4718600         |  |                   |  |
| 19333            |  | 19333                    |  | 19333            |  | 19333                    |  | 19333            |  | 19333                  |  | 19333            |  | 19333                 |  | 19333            |  | 19333     |  | 19333            |  | 19333                 |  | 19333             |  | 19333            |  | 19333             |  |                   |  |
| 23               |  | 23                       |  | 23               |  | 23                       |  | 23               |  | 23                     |  | 23               |  | 23                    |  | 23               |  | 23        |  | 23               |  | 23                    |  | 23                |  | 23               |  | 23                |  |                   |  |
| PAGE             |  | PAGE                     |  | PAGE             |  | PAGE                     |  | PAGE             |  | PAGE                   |  | PAGE             |  | PAGE                  |  | PAGE             |  | PAGE      |  | PAGE             |  | PAGE                  |  | PAGE              |  | PAGE             |  | PAGE              |  |                   |  |
| REV              |  | REV                      |  | REV              |  | REV                      |  | REV              |  | REV                    |  | REV              |  | REV                   |  | REV              |  | REV       |  | REV              |  | REV                   |  | REV               |  | REV              |  | REV               |  | REV               |  |
| A                |  | A                        |  | A                |  | A                        |  | A                |  | A                      |  | A                |  | A                     |  | A                |  | A         |  | A                |  | A                     |  | A                 |  | A                |  | A                 |  | A                 |  |



W/O - 1348 ODD + EVEN DIRITS  
 14- N166 > 4A HEADS LOADED  
 10- A151 > 3B REVERSE SEEK ERROR  
 15- 1175 > 4B EOT SEEK ERROR  
 16- K203 > 3B REVERSE EOT  
 20- 1330 > 5A ON CTL

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 547- 1986  
 548- 1987  
 549- 1988  
 550- 1989  
 551- 1990  
 552- 1991  
 553- 1992  
 554- 1993  
 555- 1994  
 556- 1995  
 557- 1996  
 558- 1997  
 559- 1998  
 560- 1999  
 561- 2000

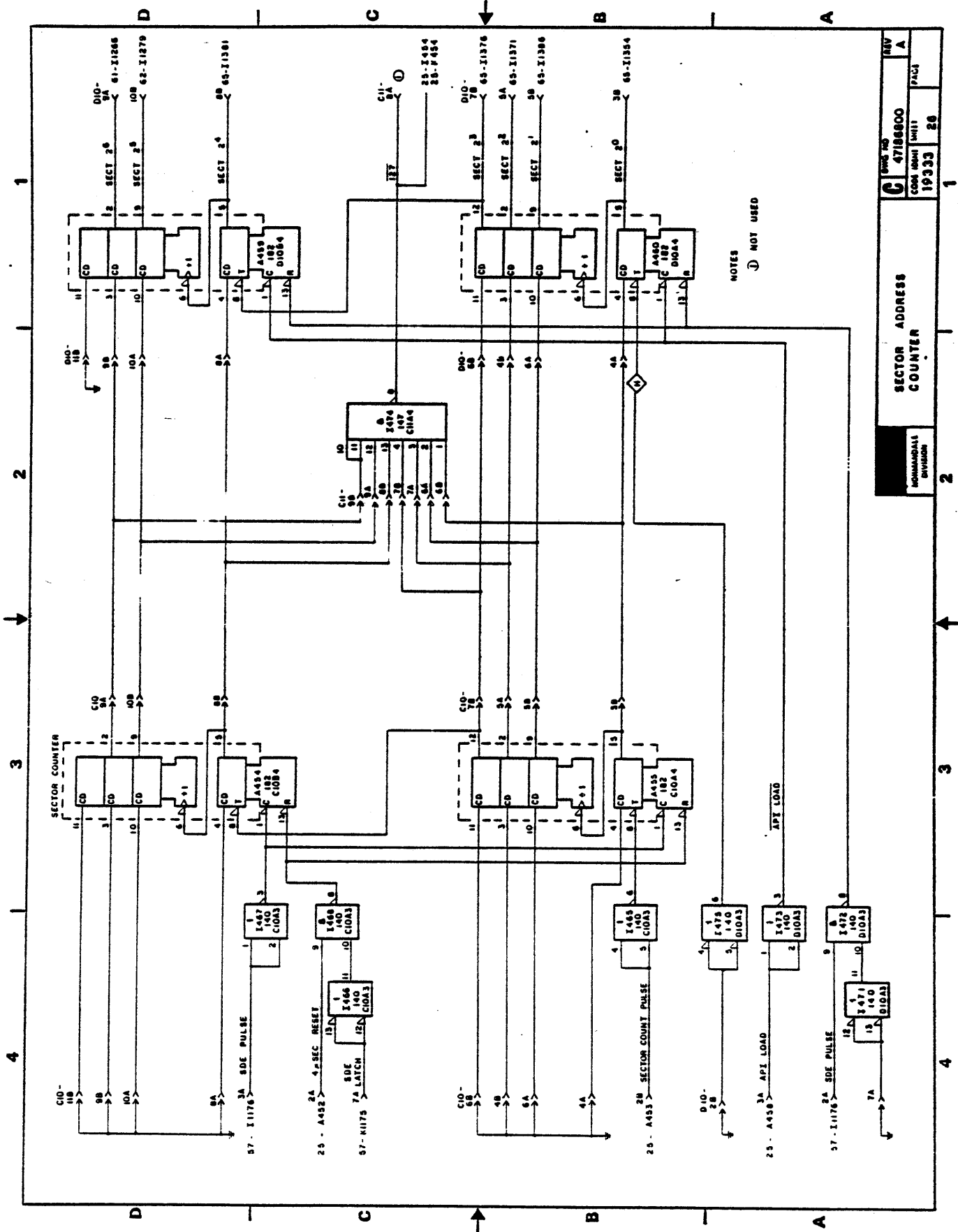
NOTES:  
 ① NOT USED  
 ② NOT USED IN UNITS WITH ERPV  
 INSTALLED IN LOCATION C22.

11-1051 > 2A SPEED-UNLOAD HEADS  
 16- A211 > 3B REVERSE EOT PULSE  
 17- M207 > 12A CYLINDER PULSES  
 14- I166 > 7B SEEK  
 14- I188 > 7A LOAD/RTZ ENABLE  
 21- A311 > 5B VELOCITY

805 KHZ CLOCK AND EOT ENABLE  
 805 KHZ CLOCK  
 805 KHZ PULSE  
 75  
 78  
 81  
 84



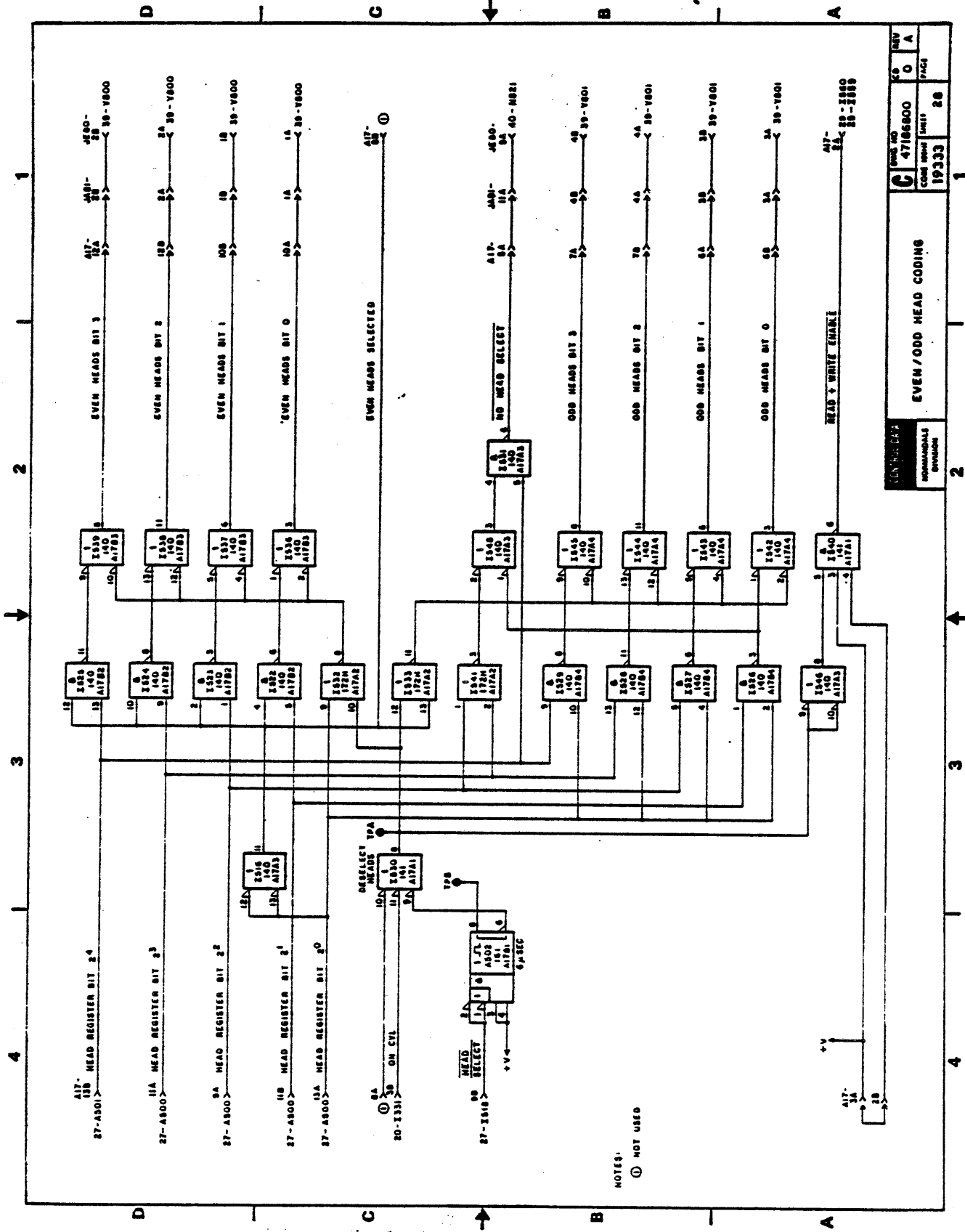




|                      |  |                |  |      |  |
|----------------------|--|----------------|--|------|--|
| SECTOR ADDRESS       |  | C 4718800      |  | 18V  |  |
| COUNTER              |  | 19333          |  | A    |  |
| NONMAGNETIC DIVISION |  | COOL UNIT UNIT |  | PALI |  |
|                      |  | 28             |  |      |  |

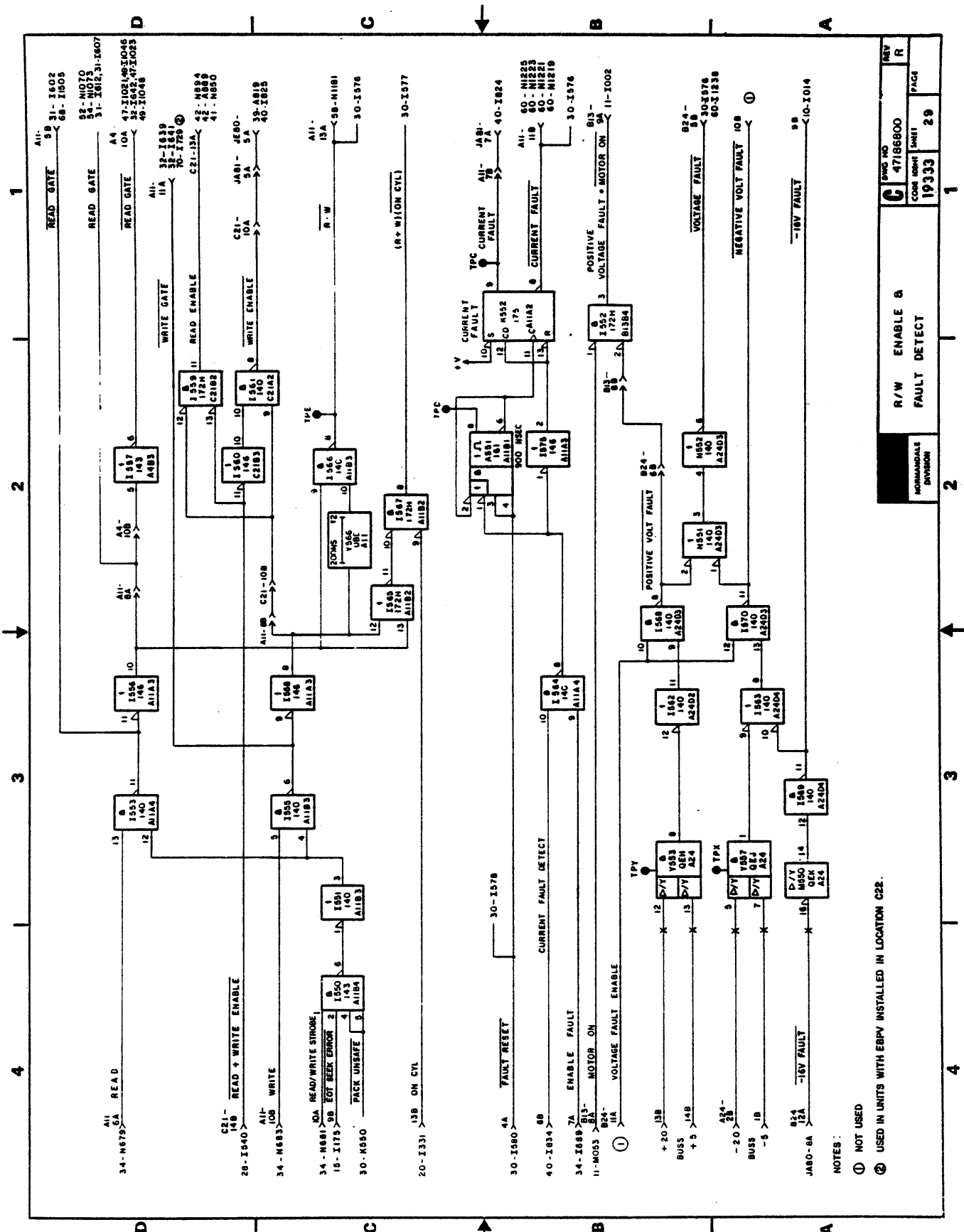
NOTES  
 Ⓢ NOT USED





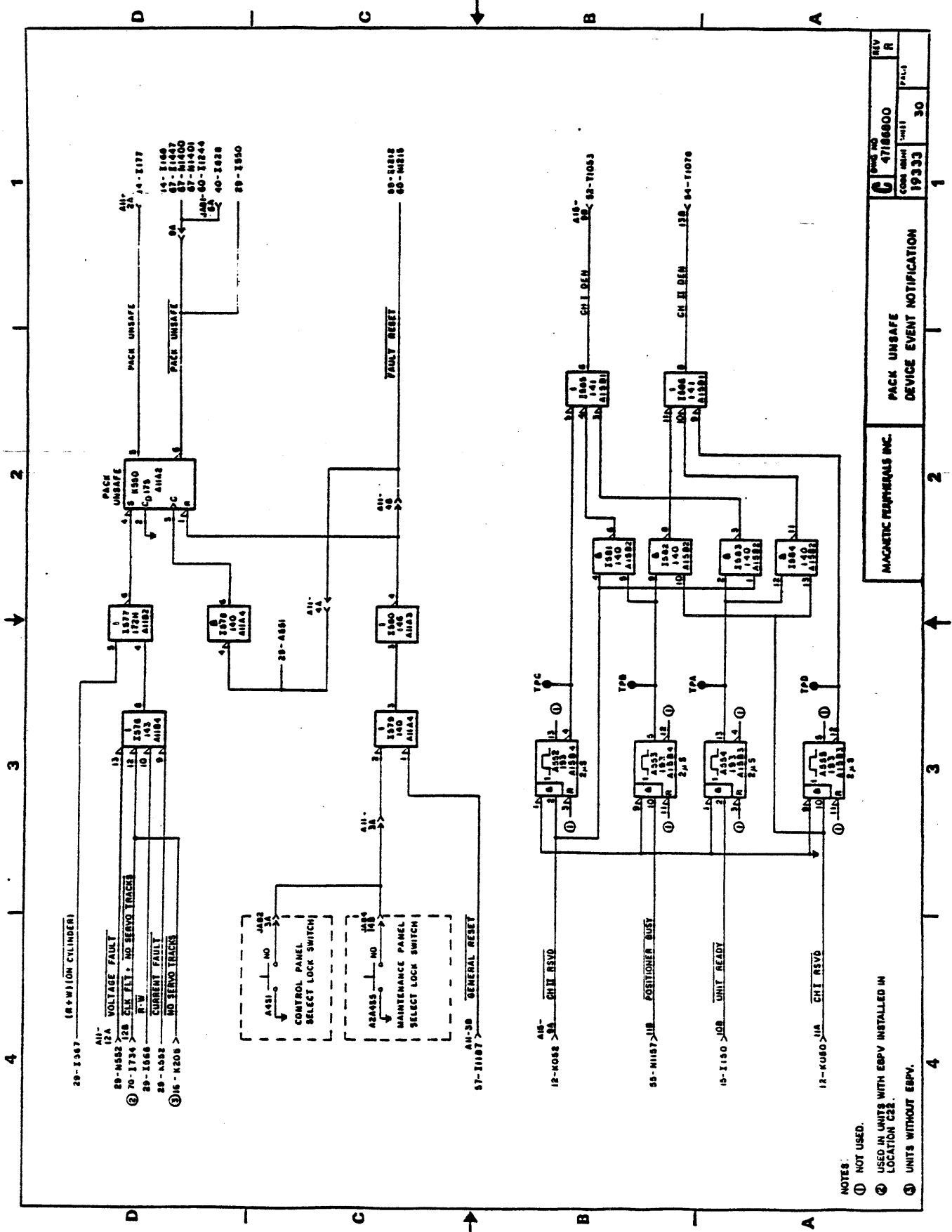
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|----------------------|--|----------|--|----|-----|
| CONTRACT NO.         |  | 47186800 |  | CS | NAV |
| COMB. UNIT UNIT      |  | 19333    |  | O  | A   |
| PAGE                 |  | 28       |  |    |     |
| EVEN/ODD HEAD CODING |  |          |  |    |     |

NOTES:  
 ① NOT USED



|                    |       |
|--------------------|-------|
| REV                | R     |
| NO. 4718800        | 29    |
| COORD. IDENT SHEET | 19333 |
| DIVISION           | 1     |
| FAULT DETECT       | 2     |
| ENABLE B           | 3     |
| R/W                | 4     |

NOTES:  
 ① NOT USED  
 ② USED IN UNITS WITH EBVP INSTALLED IN LOCATION C22.

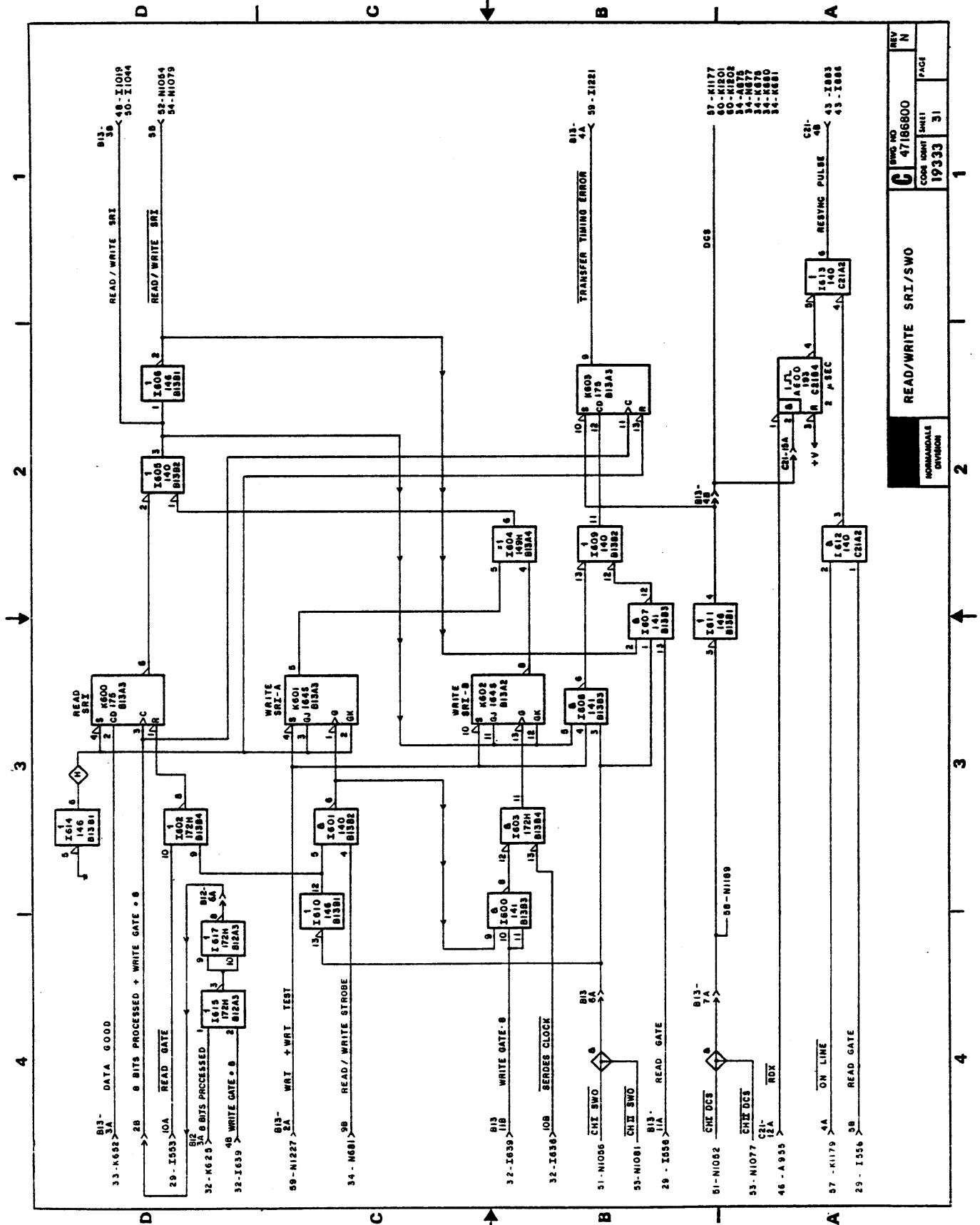


|        |      |
|--------|------|
| REV    | R    |
| REV NO | 6    |
| DATE   | 1933 |
| UNIT   | 30   |
| FAULT  |      |

MAGNETIC MATERIALS INC.

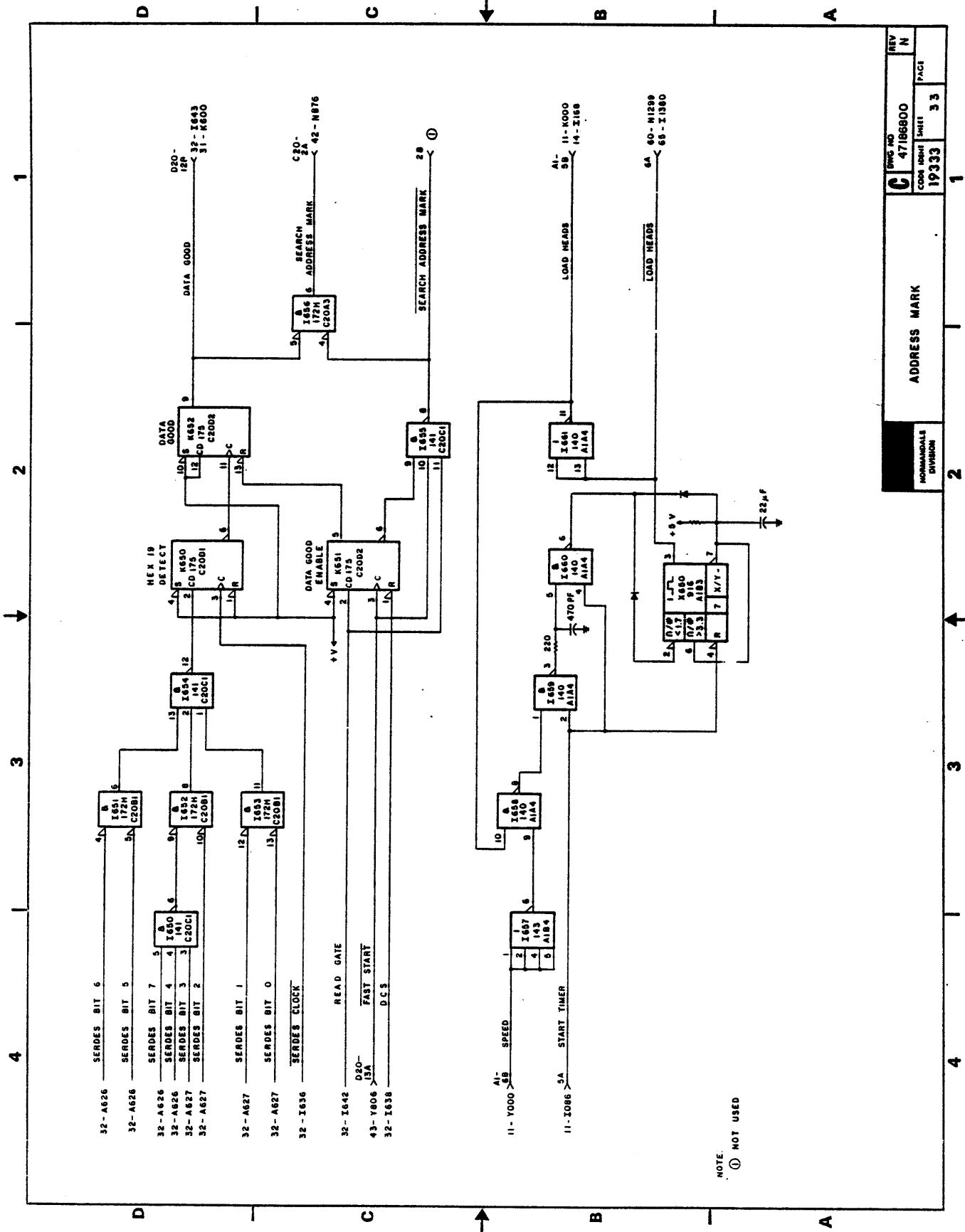
PACK UNSAFE  
DEVICE EVENT NOTIFICATION

- NOTES:
- ① NOT USED.
  - ② USED IN UNITS WITH ESPV INSTALLED IN LOCATION 622.
  - ③ UNITS WITHOUT ESPV.



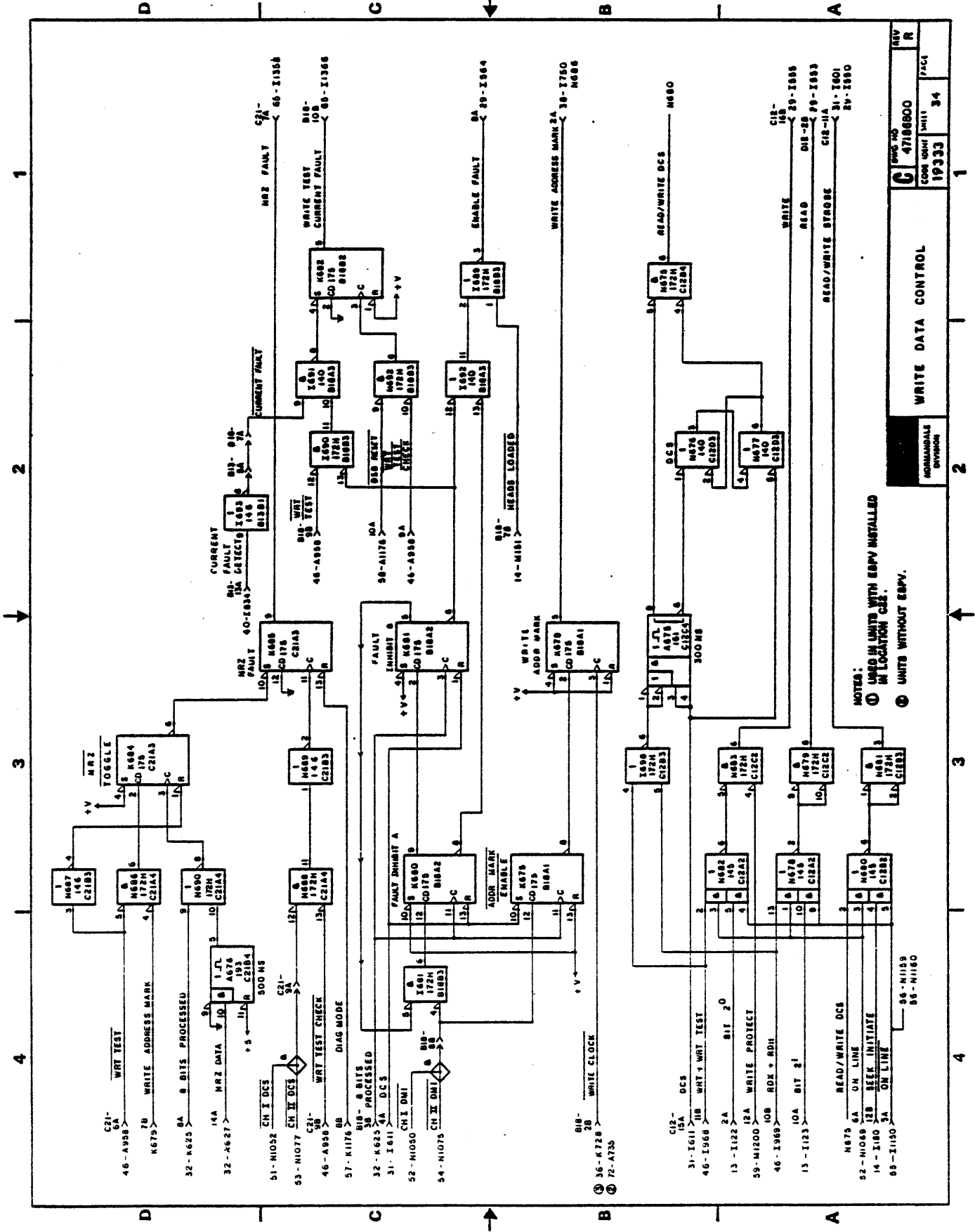
|                      |   |       |    |
|----------------------|---|-------|----|
| REV N                |   | PAGE  |    |
| 47186800             | 1 | 19333 | 31 |
| READ/WRITE SRI/SWO   |   |       |    |
| NORMANVILLE DIVISION |   |       |    |





|                     |  |             |          |
|---------------------|--|-------------|----------|
| ADDRESS MARK        |  | REV         | N        |
| NORMANDALE DIVISION |  | DWG NO      | 47186800 |
|                     |  | COPIES MADE | 140      |
|                     |  | 19333       | 33       |
|                     |  | PAGE        | 1        |

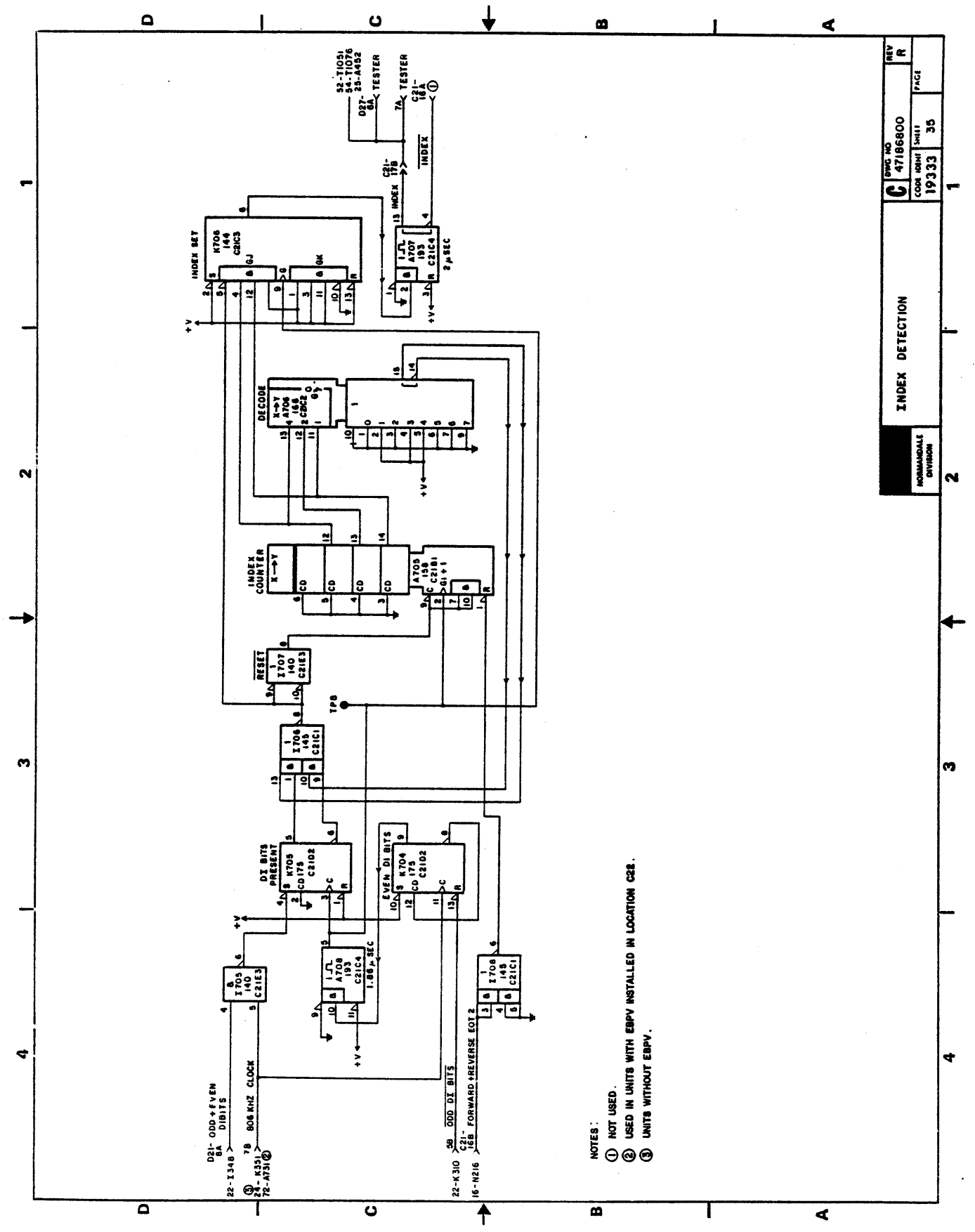




|         |    |
|---------|----|
| REV     | R  |
| 4718600 |    |
| 19333   | 34 |

WRITE DATA CONTROL

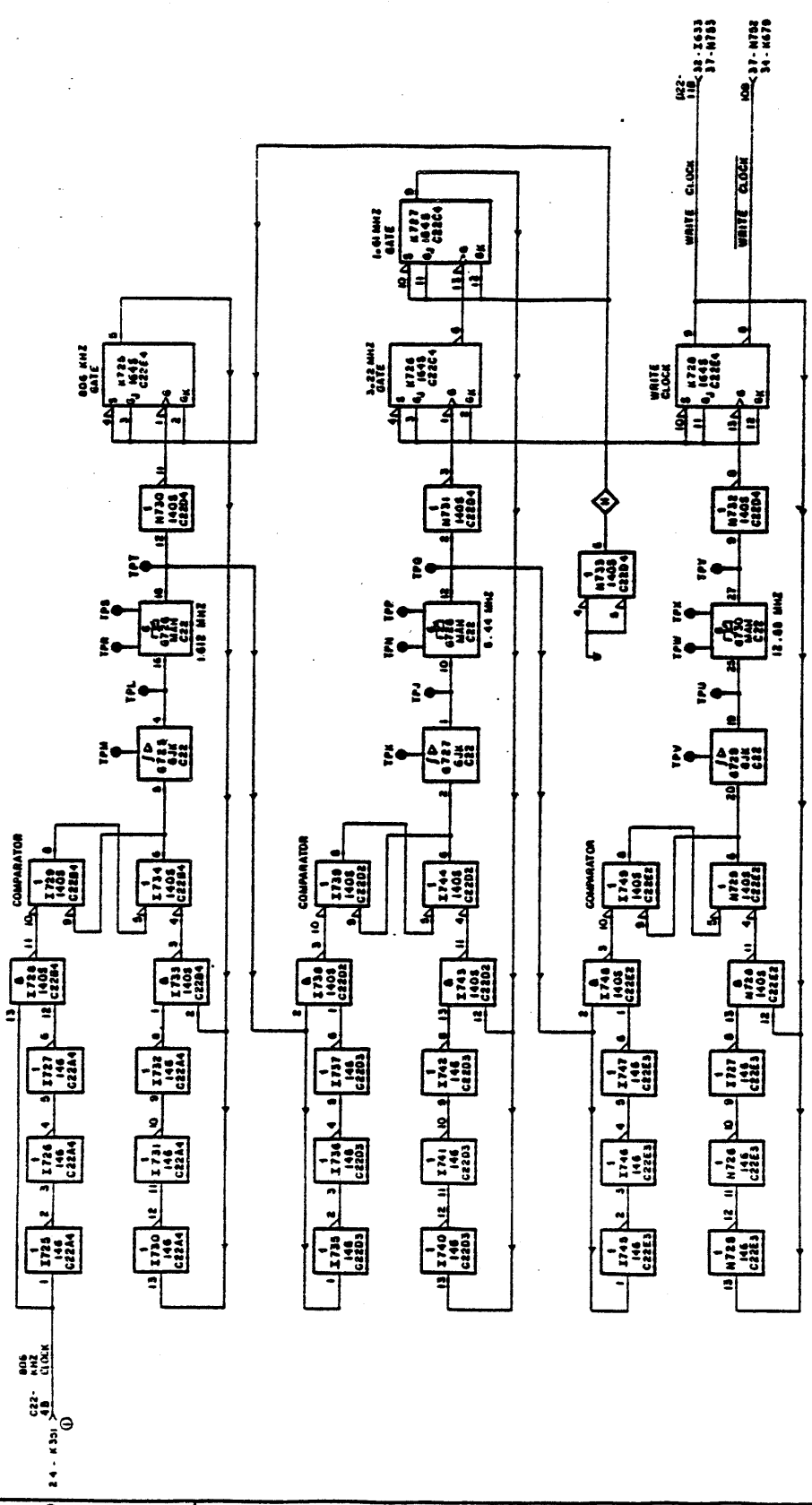
NOTES:  
 ① UNITS IN UNITS WITH 8SPV INSTALLED  
 IN LOCATION CSE.  
 ② UNITS WITHOUT 8SPV.



- NOTES:
- ① NOT USED.
  - ② USED IN UNITS WITH ESPV INSTALLED IN LOCATION C22.
  - ③ UNITS WITHOUT ESPV.

|                     |    |                     |
|---------------------|----|---------------------|
| INDEX DETECTION     |    | REV R               |
| NORMANDALE DIVISION |    | SPWG NO 47186800    |
| 19333               | 35 | COOR UNIT SHRT PAGE |

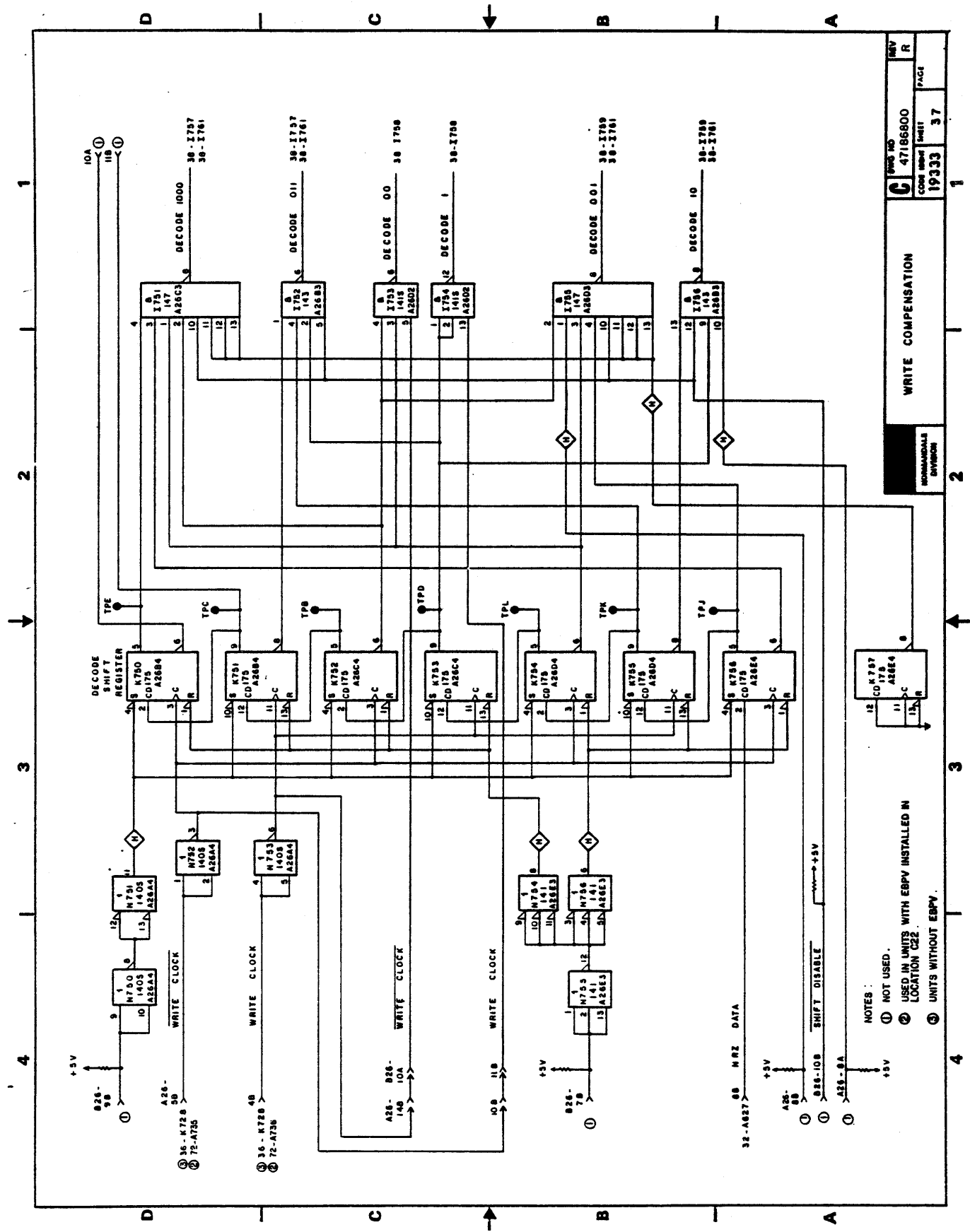
1 2 3 4



NOTES:  
 ① NOT USED IN UNITS WITH 8BPV INSTALLED IN LOCATION C22.

|                          |          |                       |       |
|--------------------------|----------|-----------------------|-------|
| MAGNETIC PERFORMALS INC. |          | WRITE CLOCK GENERATOR |       |
| Part No                  | 47186800 | REV                   | R     |
| Cont. No.                | 19333    | UNIT                  | 36    |
|                          |          | DATE                  | 7-1-1 |

1 2 3 4



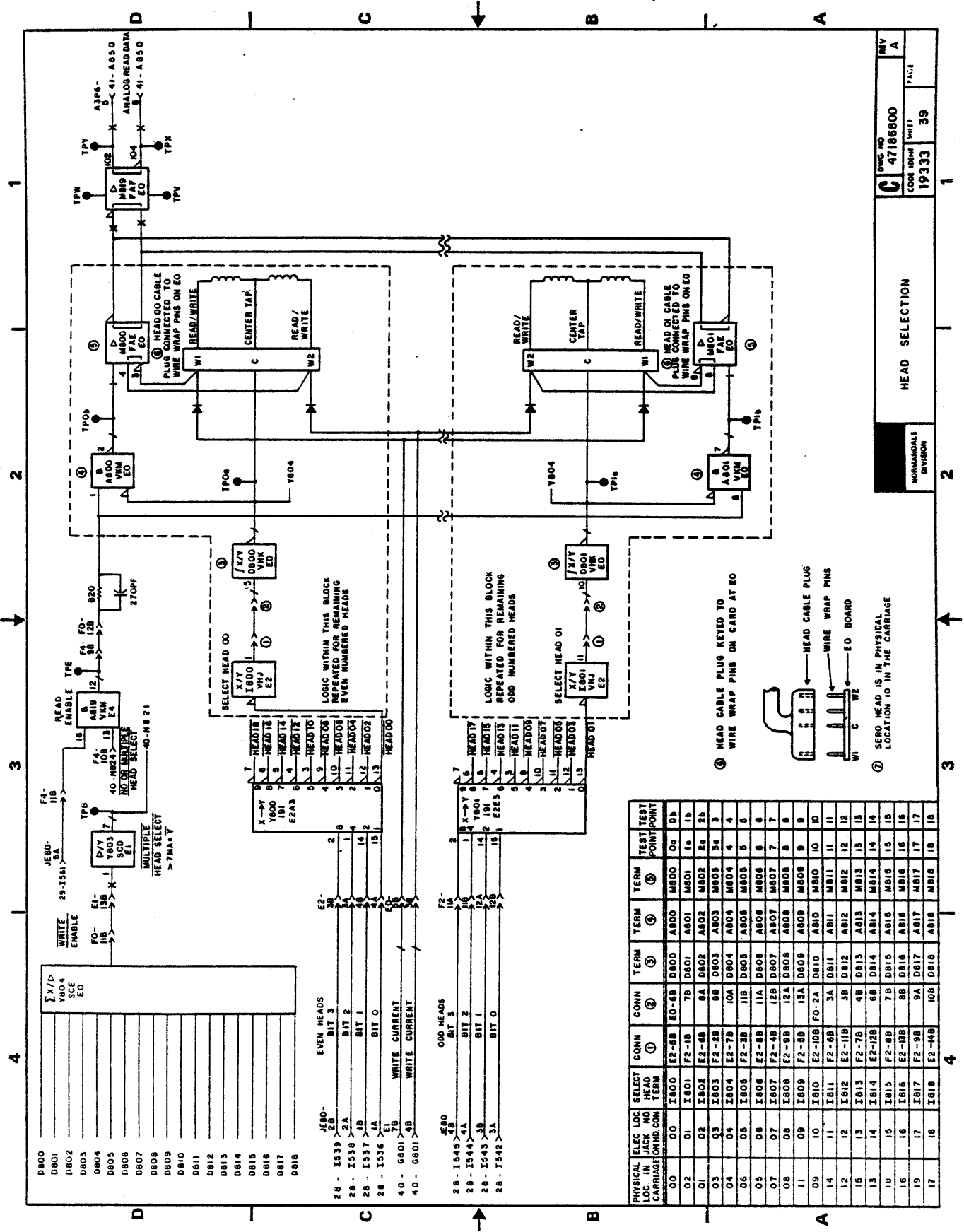
|            |      |      |
|------------|------|------|
| PART NO    |      | REV  |
| C 47186800 |      | R    |
| QUANTITY   | DATE | PAGE |
| 19333      | 1987 | 37   |

WRITE COMPENSATION

NONMAGNETIC DIVISION

- NOTES:
- ① NOT USED.
  - ② USED IN UNITS WITH EBVP INSTALLED IN LOCATION CEE.
  - ③ UNITS WITHOUT EBVP.



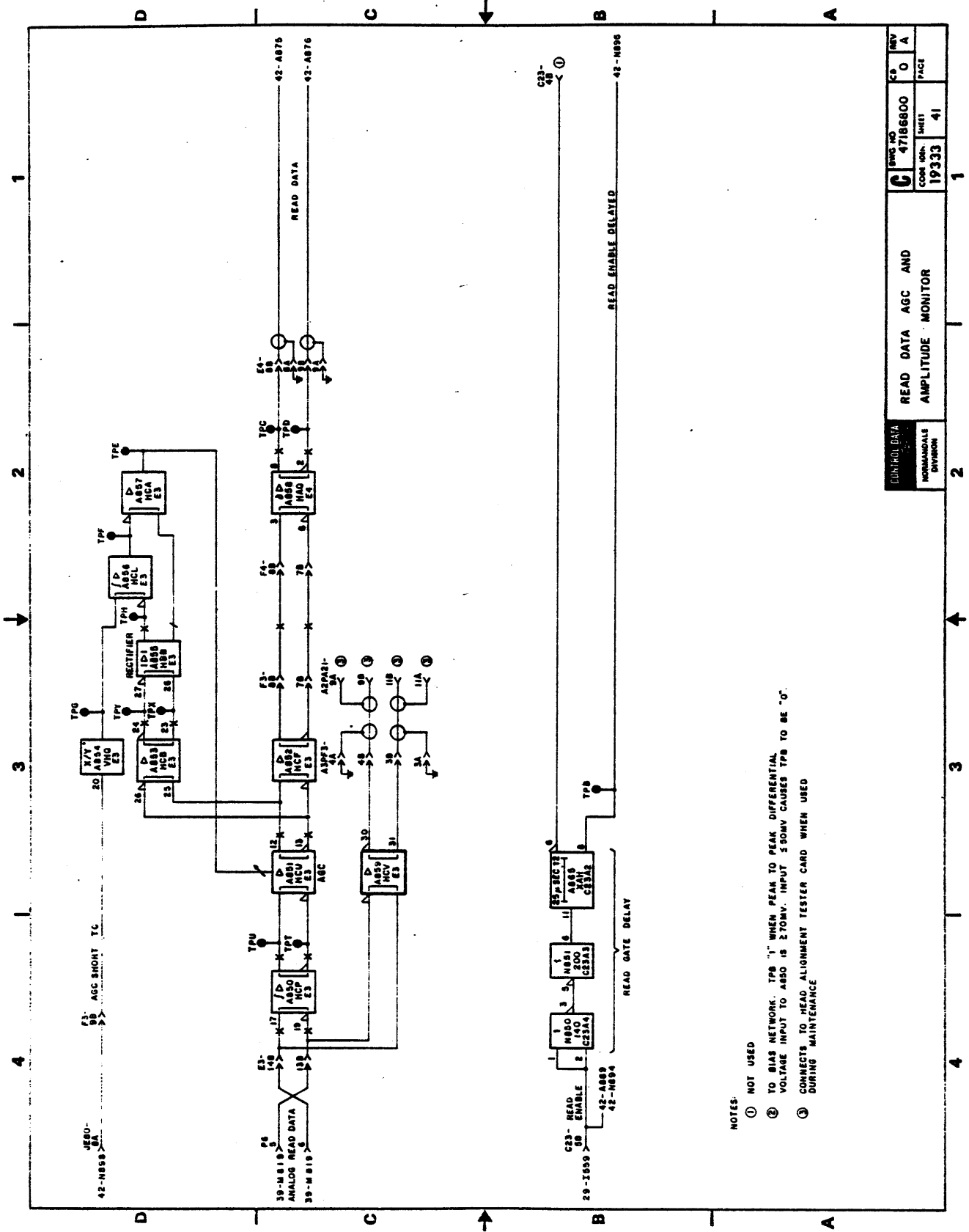


| PHYSICAL ELEC LOC IN JACK NO. CARRIAGE (UNID. CONN.) | SELECT HEAD TERM | CONN   | TERM  | CONN | TERM | TERM | TEST POINT |
|--|------------------|--------|-------|------|------|------|------------|
| 00   | I800             | E2-5B  | D800  | A800 | M800 | 00   | 08         |
| 01   | I801             | F2-1B  | D801  | A801 | M801 | 15   | 18         |
| 02   | I802             | F2-0B  | D802  | A802 | M802 | 25   | 28         |
| 03   | I803             | F2-2B  | D803  | A803 | M803 | 35   | 38         |
| 04   | I804             | F2-7B  | D804  | A804 | M804 | 4    | 4          |
| 05   | I805             | F2-3B  | D805  | A805 | M805 | 5    | 5          |
| 06   | I806             | E2-6B  | D806  | A806 | M806 | 6    | 6          |
| 07   | I807             | F2-4B  | D807  | A807 | M807 | 7    | 7          |
| 08   | I808             | F2-9B  | D808  | A808 | M808 | 8    | 8          |
| 09   | I809             | F2-5B  | D809  | A809 | M809 | 9    | 9          |
| 10   | I810             | E2-10B | F0-2A | D810 | A810 | M810 | 10         |
| 11   | I811             | F2-6B  | 3A    | D811 | A811 | M811 | 11         |
| 12   | I812             | E2-11B | 3B    | D812 | A812 | M812 | 12         |
| 13   | I813             | F2-7B  | 4B    | D813 | A813 | M813 | 13         |
| 14   | I814             | E2-12B | 6B    | D814 | A814 | M814 | 14         |
| 15   | I815             | F2-8B  | 7B    | D815 | A815 | M815 | 15         |
| 16   | I816             | E2-13B | 8B    | D816 | A816 | M816 | 16         |
| 17   | I817             | F2-9B  | 9A    | D817 | A817 | M817 | 17         |
| 18   | I818             | E2-14B | 10B   | D818 | A818 | M818 | 18         |

|               |            |
|---------------|------------|
| REV           | A          |
| SWG. NO.      | C 47186800 |
| COORD. IDENT. | 19333      |
| FRAC.         | 39         |

HEAD SELECTION  
 NORMANVILLE DIVISION



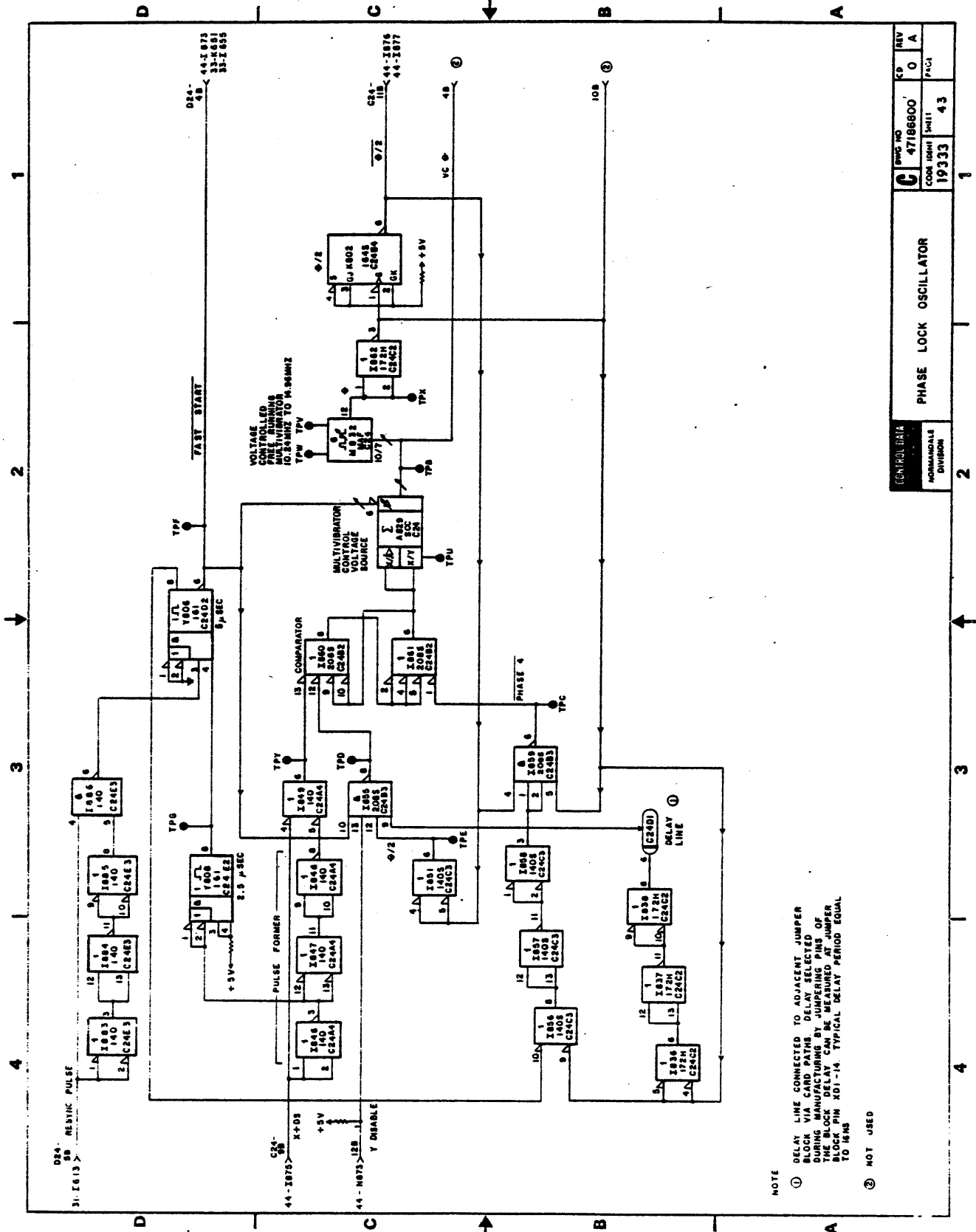


- NOTES:
- ① NOT USED
  - ② TO BIAS NETWORK. TP8 "1" WHEN PEAK TO PEAK DIFFERENTIAL VOLTAGE INPUT TO A880 IS 270MV. INPUT 550MV CAUSES TP8 TO BE "0".
  - ③ CONNECTS TO HEAD ALIGNMENT TESTER CARD WHEN USED DURING MAINTENANCE

|                                     |  |           |  |          |  |      |  |
|-------------------------------------|--|-----------|--|----------|--|------|--|
| CONTROL DATA                        |  | C         |  | 47186800 |  | O A  |  |
| READ DATA AGC AND AMPLITUDE MONITOR |  | CORE NOS. |  | 19333    |  | 41   |  |
| NONMANDALS DIVISION                 |  | SHEET     |  | 41       |  | PAGE |  |

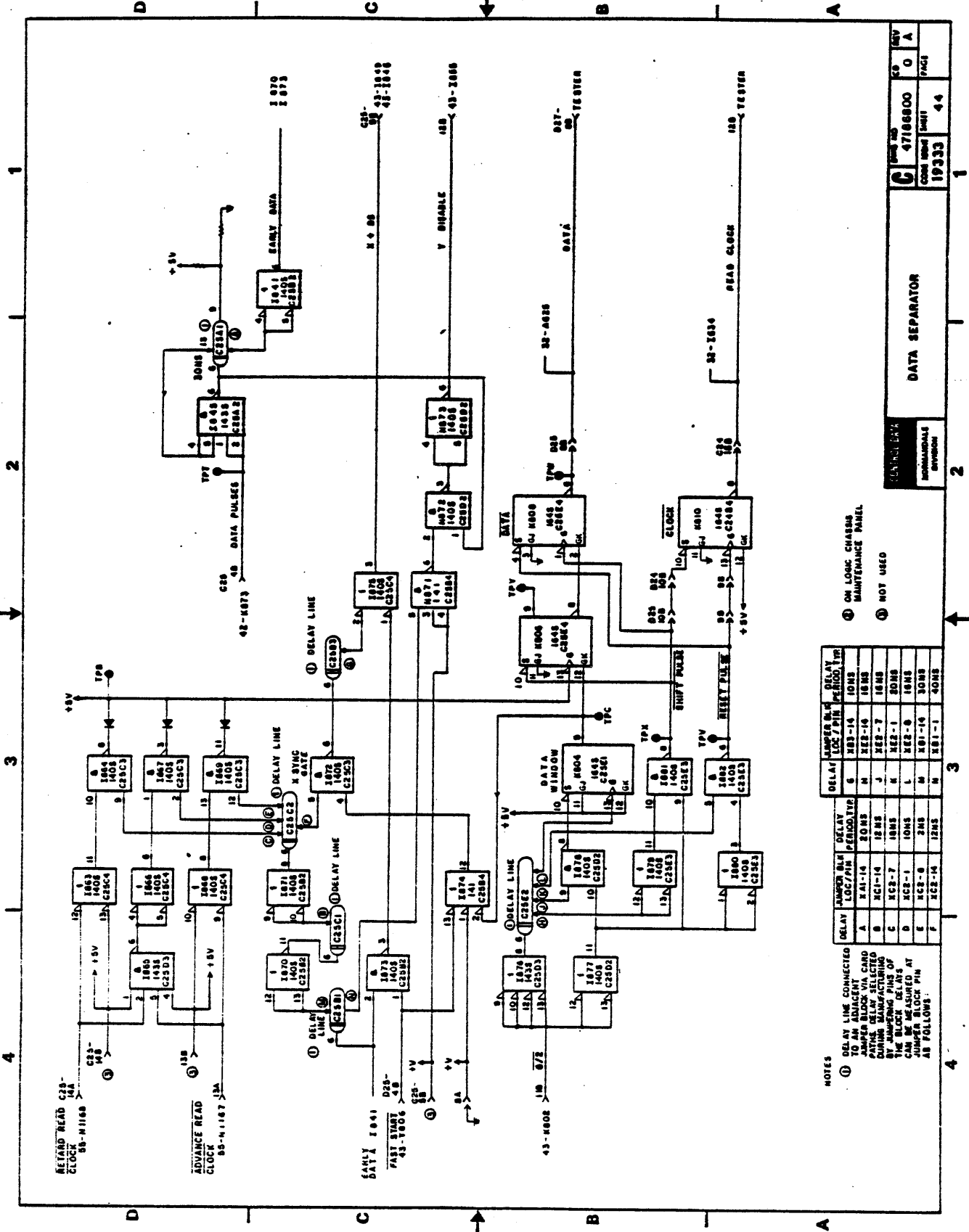






|                       |         |      |       |     |
|-----------------------|---------|------|-------|-----|
| CONTROL DATA          |         | REV  | CP    | REV |
| PHASE LOCK OSCILLATOR |         | 0    | A     |     |
| DOC NO                | 4716800 | COOR | 19333 | 43  |
| NORMANDALE DIVISION   |         | P1C1 |       |     |

NOTE  
 ① DELAY LINE CONNECTED TO ADJACENT JUMPER  
 DURING MANUFACTURING DELAY LINE NOT USED  
 THE BLOCK DELAY CAN BE MEASURED AT JUMPER  
 TO BLOCK PIN X01-14. TYPICAL DELAY PERIOD EQUAL  
 TO 16NS  
 ② NOT USED

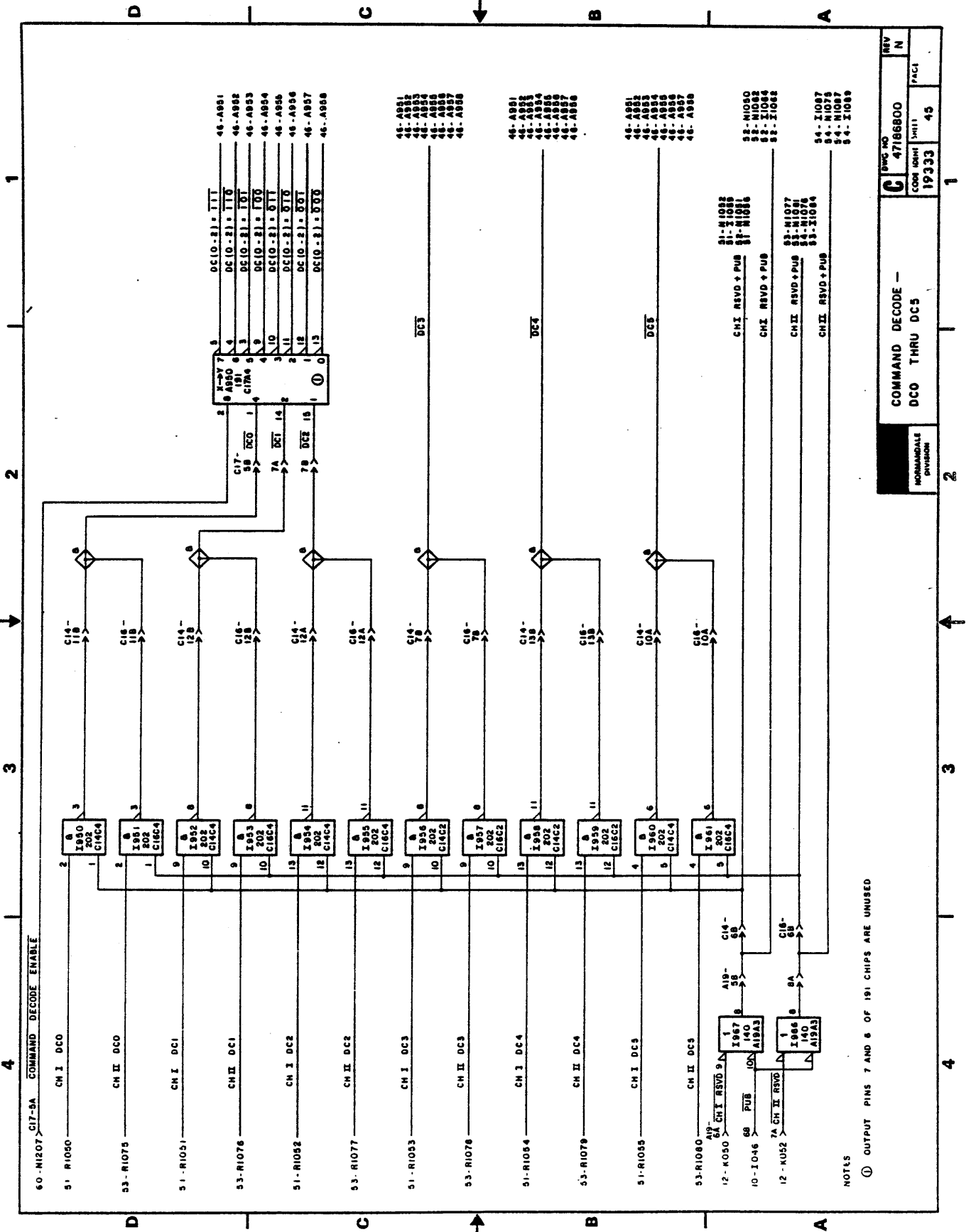


|                |  |              |         |              |    |
|----------------|--|--------------|---------|--------------|----|
| DATA SEPARATOR |  | REV. NO.     | 4718800 | REV. NO.     | 44 |
|                |  | CONTRACT NO. | 19333   | CONTRACT NO. | 44 |
|                |  | UNIT         |         | UNIT         |    |
|                |  | PAGE         |         | PAGE         |    |

| DELAY JUMPER LOC./PIN | DELAY PERIOD/STEP | DELAY LOC./PIN | DELAY PERIOD/STEP | DELAY JUMPER LOC./PIN | DELAY PERIOD/STEP |
|-----------------------|-------------------|----------------|-------------------|-----------------------|-------------------|
| A                     | X 1-14            | B              | X 2-14            | I                     | X 1-14            |
| B                     | X 1-14            | C              | X 2-14            | J                     | X 2-14            |
| C                     | X 1-14            | D              | X 2-14            | K                     | X 2-14            |
| D                     | X 1-14            | E              | X 2-14            | L                     | X 2-14            |
| E                     | X 1-14            | F              | X 2-14            | M                     | X 2-14            |
| F                     | X 1-14            |                |                   | N                     | X 2-14            |

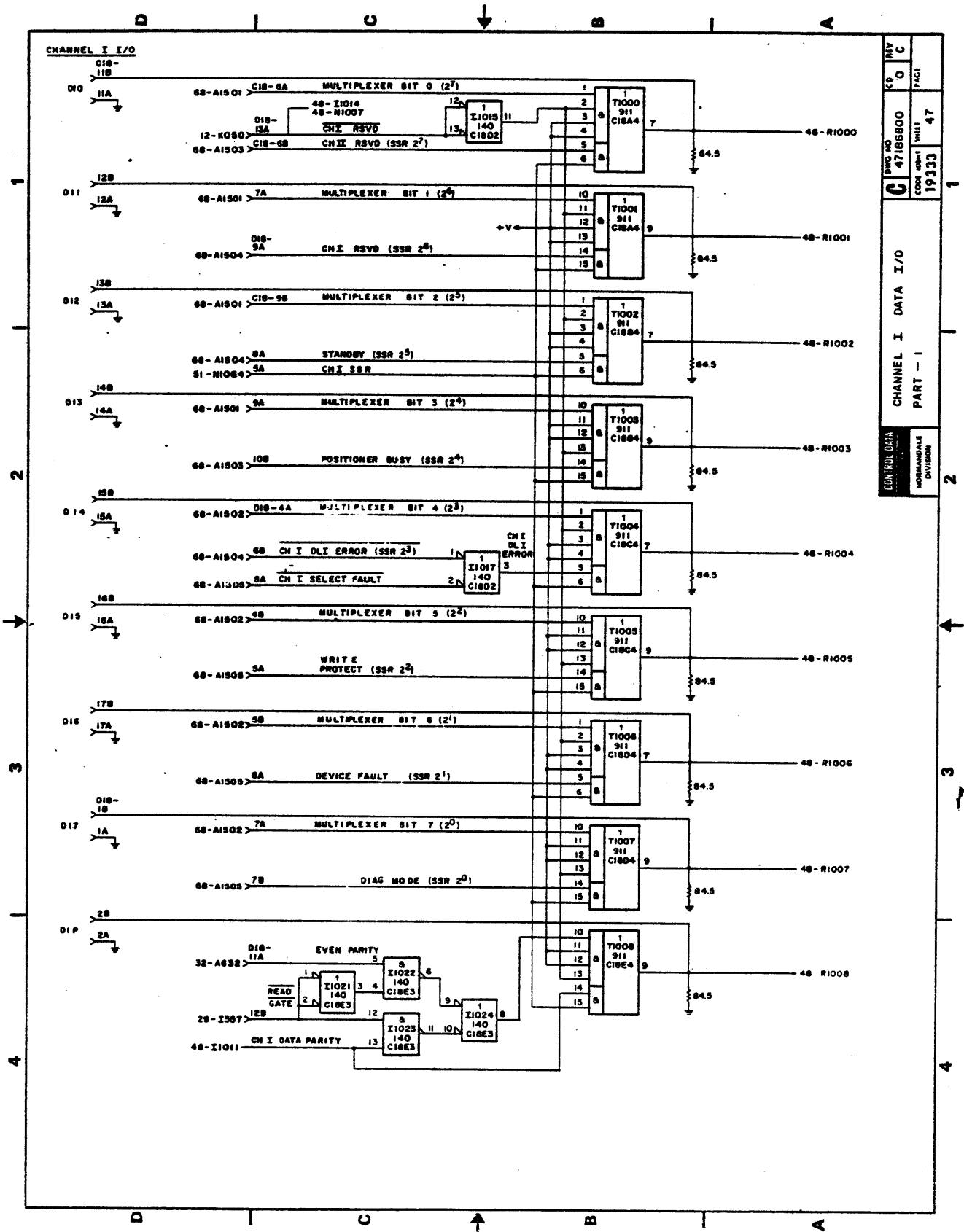
NOTES  
 ① DELAY LINE CONNECTED TO AN ADJACENT JUMPER BLOCK VIA CARD JUMPER. THIS IS REQUIRED DURING MANUFACTURING BY JUMPING PINS OF THE BLOCK DELAYS TO AN ADJACENT JUMPER BLOCK. PIN AB FOLLOWS.

② ON LOGIC CHASSIS MAINTENANCE PANEL  
 ③ NOT USED

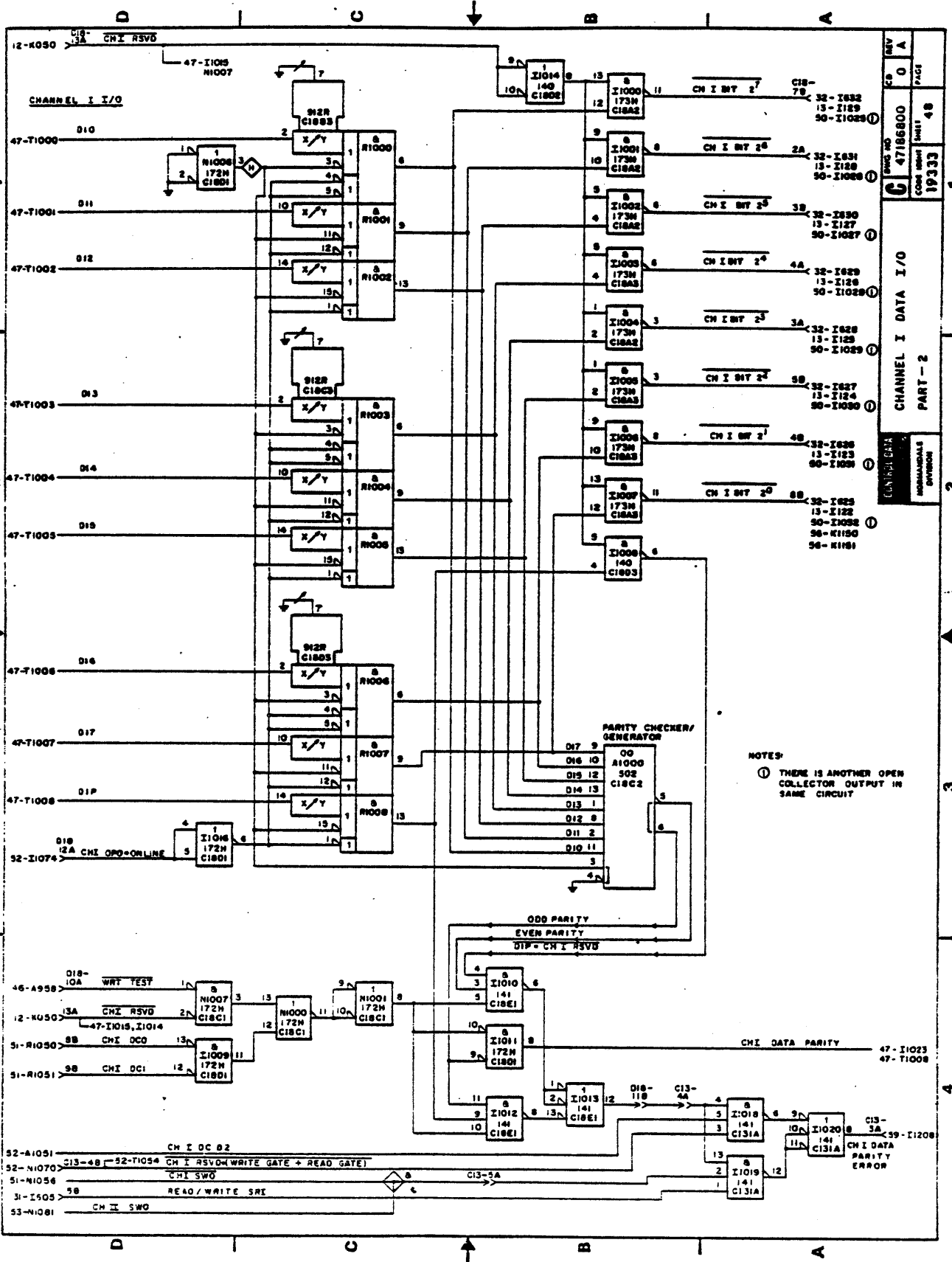


|                                  |           |
|----------------------------------|-----------|
| REV                              | N         |
| DCW NO                           | C 4718800 |
| CODE                             | 19333     |
| DATE                             | 45        |
| COMMAND DECODE -<br>DC0 THRU DC5 |           |
| NORMANDALE<br>DIVISION           |           |



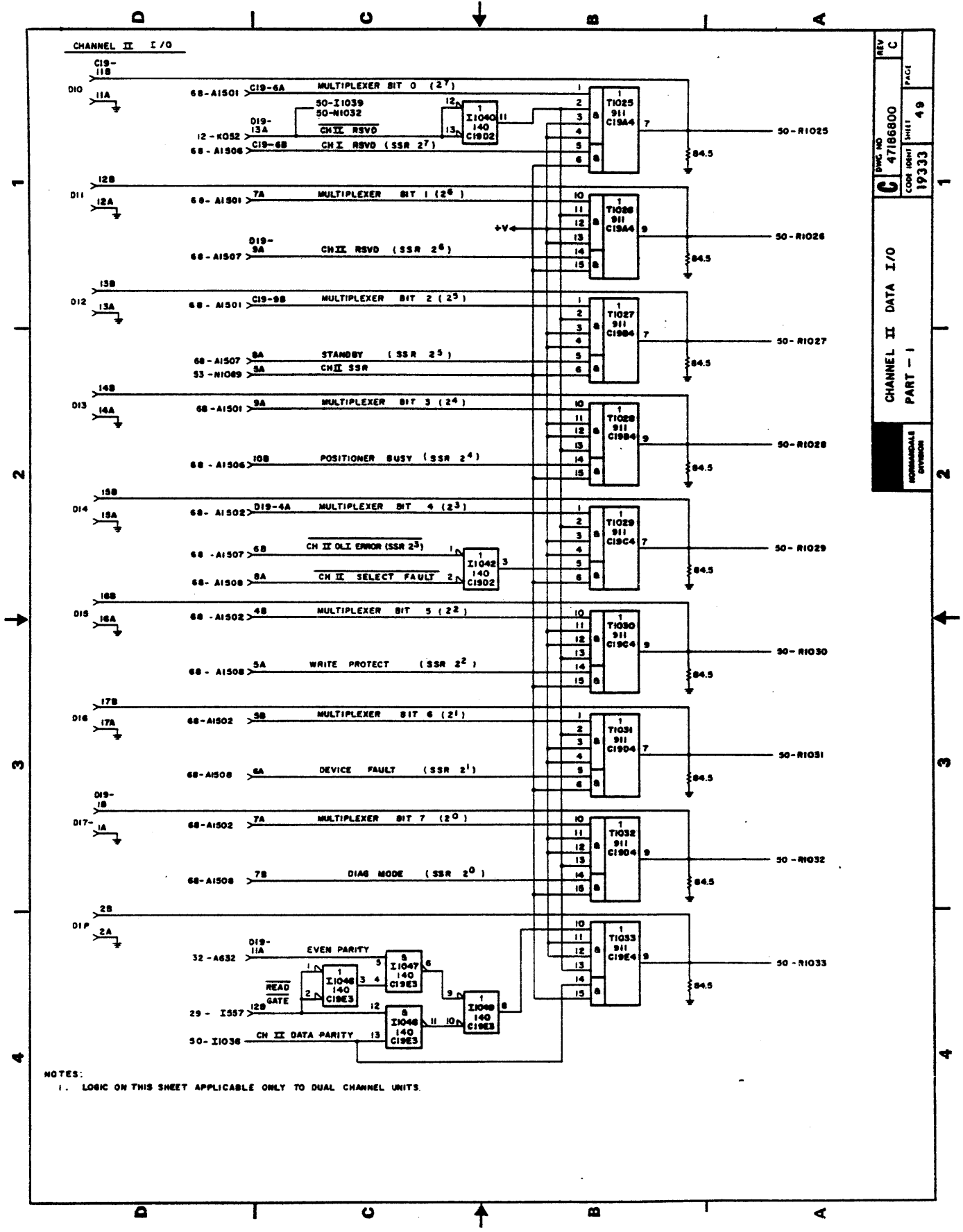


|                    |           |
|--------------------|-----------|
| REV                | C         |
| NO                 | 0         |
| DATE               | 47/186800 |
| CON. UNIT          | 19333     |
| PART               | 47        |
| CHANNEL I DATA I/O |           |
| PART - I           |           |
| CONTROL DATA       |           |
| MORANDALE DIVISION |           |



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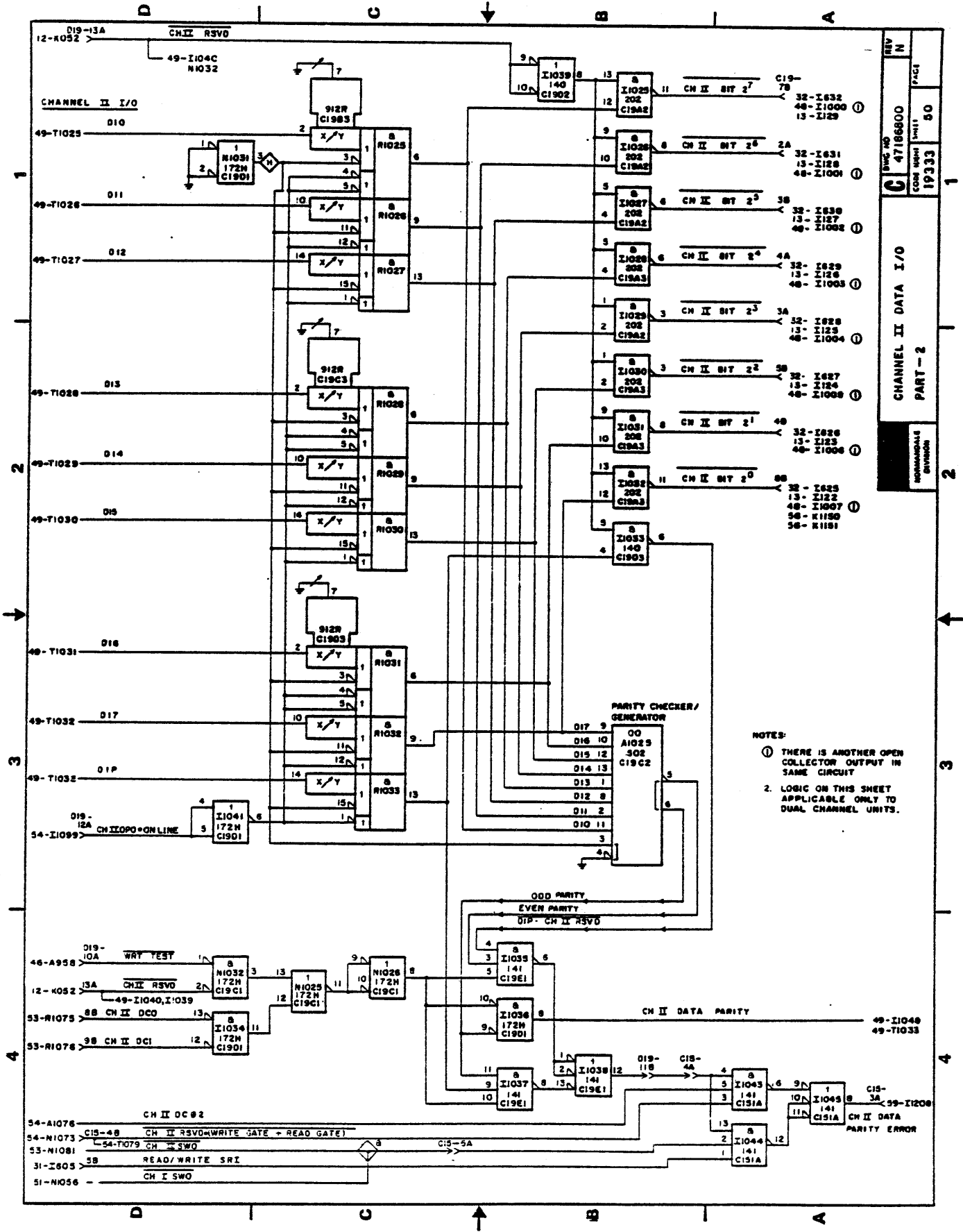
NOTES:  
 ① THERE IS ANOTHER OPEN COLLECTOR OUTPUT IN SAME CIRCUIT



REV C  
 DWG NO 47186800  
 CORR IDENT 19333  
 PART 1  
 CHANNEL II DATA I/O  
 PART - I  
 RESPONSIBLE DIVISION

NOTES:  
 1. LOGIC ON THIS SHEET APPLICABLE ONLY TO DUAL CHANNEL UNITS.





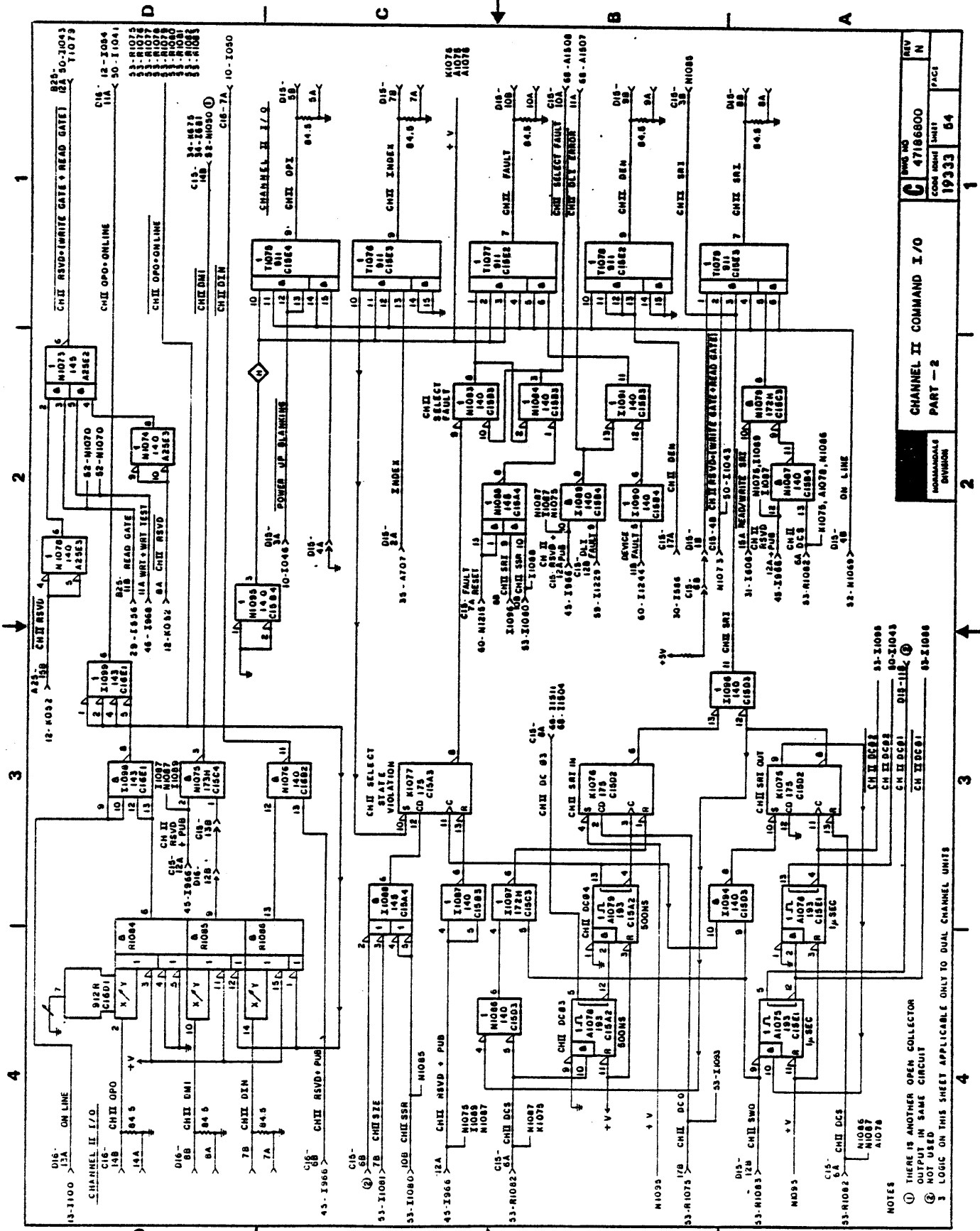
|                          |          |
|--------------------------|----------|
| REV                      | N        |
| DATE                     |          |
| BY                       |          |
| CHKD                     |          |
| APP'D                    |          |
| DESCRIPTION              |          |
| CHANNEL II DATA I/O      |          |
| PART - 2                 |          |
| NON-REPRODUCIBLE DRAWING |          |
| DOC NO                   | 47186800 |
| CONS UNIT                | SW11     |
| REV                      | 50       |
| DATE                     | 19733    |

- NOTES:
- ① THERE IS ANOTHER OPEN COLLECTOR OUTPUT IN SAME CIRCUIT
  2. LOGIC ON THIS SHEET APPLICABLE ONLY TO DUAL CHANNEL UNITS.









|                        |       |         |      |
|------------------------|-------|---------|------|
| REV NO                 | 6     | 4716800 | REV  |
| COMP                   | 19333 | 54      | PAGE |
| CHANNEL II COMMAND I/O |       |         |      |
| PART - 2               |       |         |      |
| COMMERCIAL DIVISION    |       |         |      |

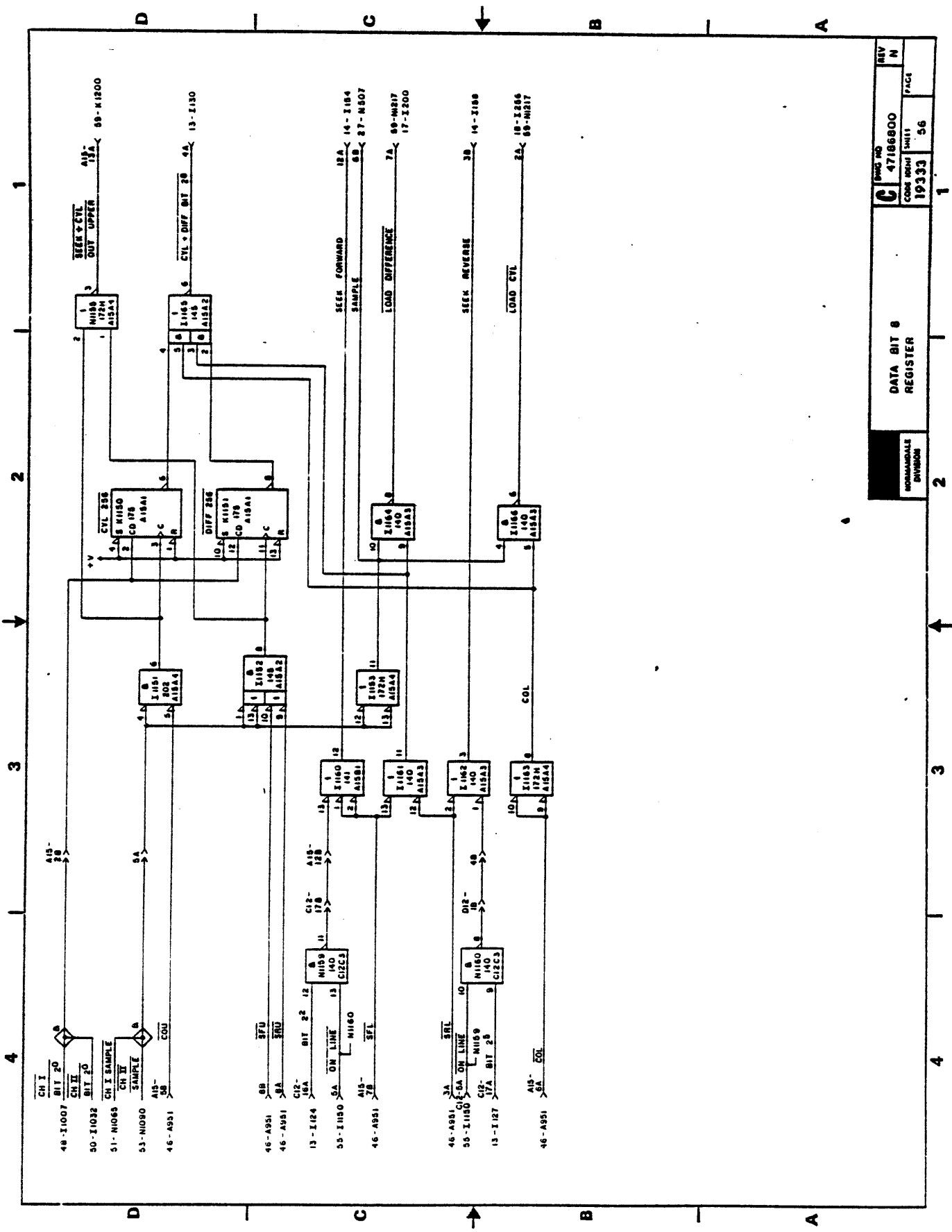
NOTES

① THERE IS ANOTHER OPEN COLLECTOR OUTPUT IN SAME CIRCUIT

② NOT USED

③ LOGIC ON THIS SHEET APPLICABLE ONLY TO DUAL CHANNEL UNITS

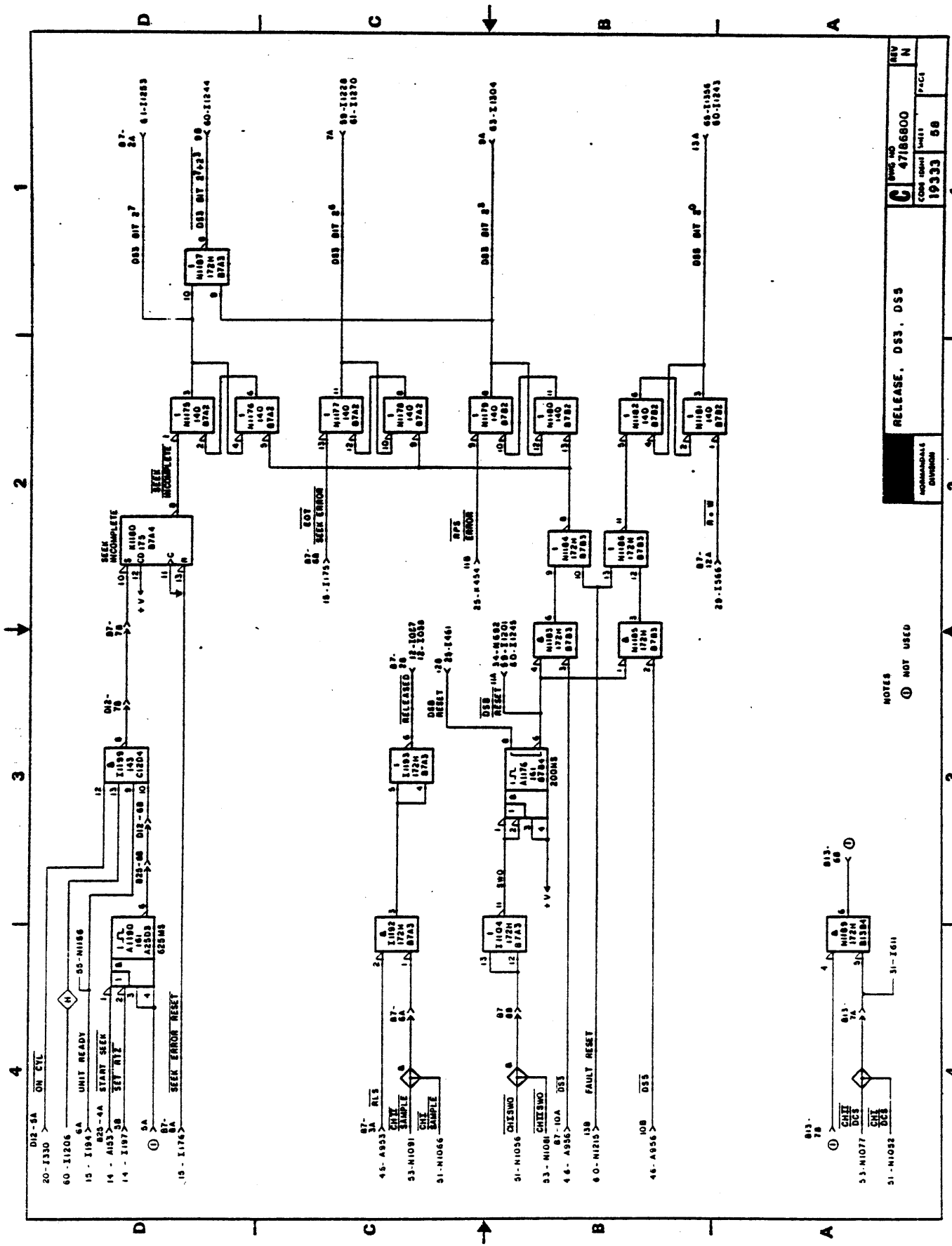




|                     |       |                     |          |
|---------------------|-------|---------------------|----------|
| DATA BIT 6 REGISTER |       | NORMANDALE DIVISION |          |
| REV                 | M     | DOC NO              | 47186800 |
| COM                 | 19333 | REV                 | 56       |
| DATE                | 19333 | REV                 | 56       |





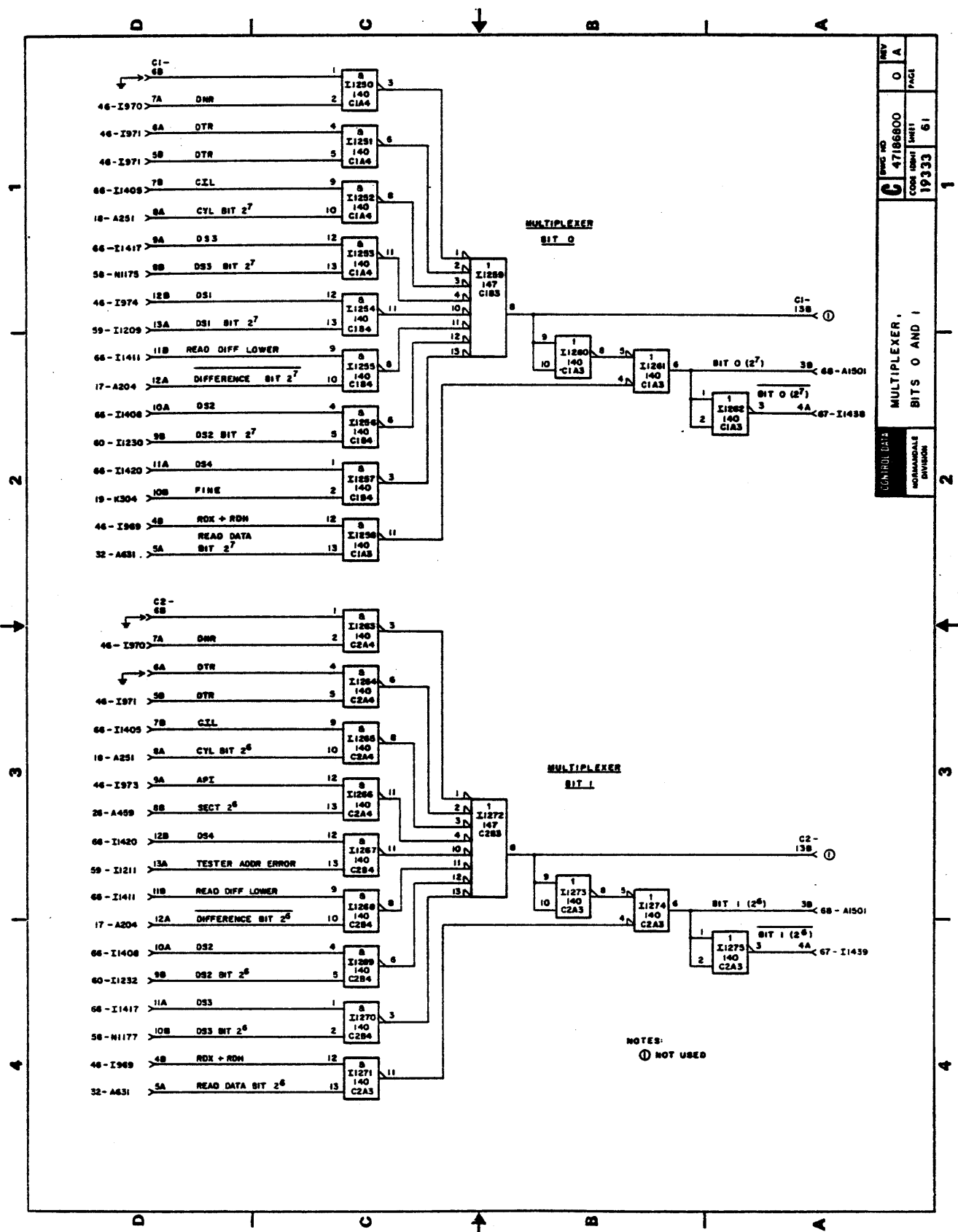


|                     |  |                   |  |                 |  |        |  |
|---------------------|--|-------------------|--|-----------------|--|--------|--|
| COMMERCIAL DIVISION |  | RELEASE, DSS, DSS |  | DSS NO 47186800 |  | REV N  |  |
| 19333 68            |  | 19333 68          |  | 19333 68        |  | PAGE 1 |  |

NOTES  
 (1) NOT USED

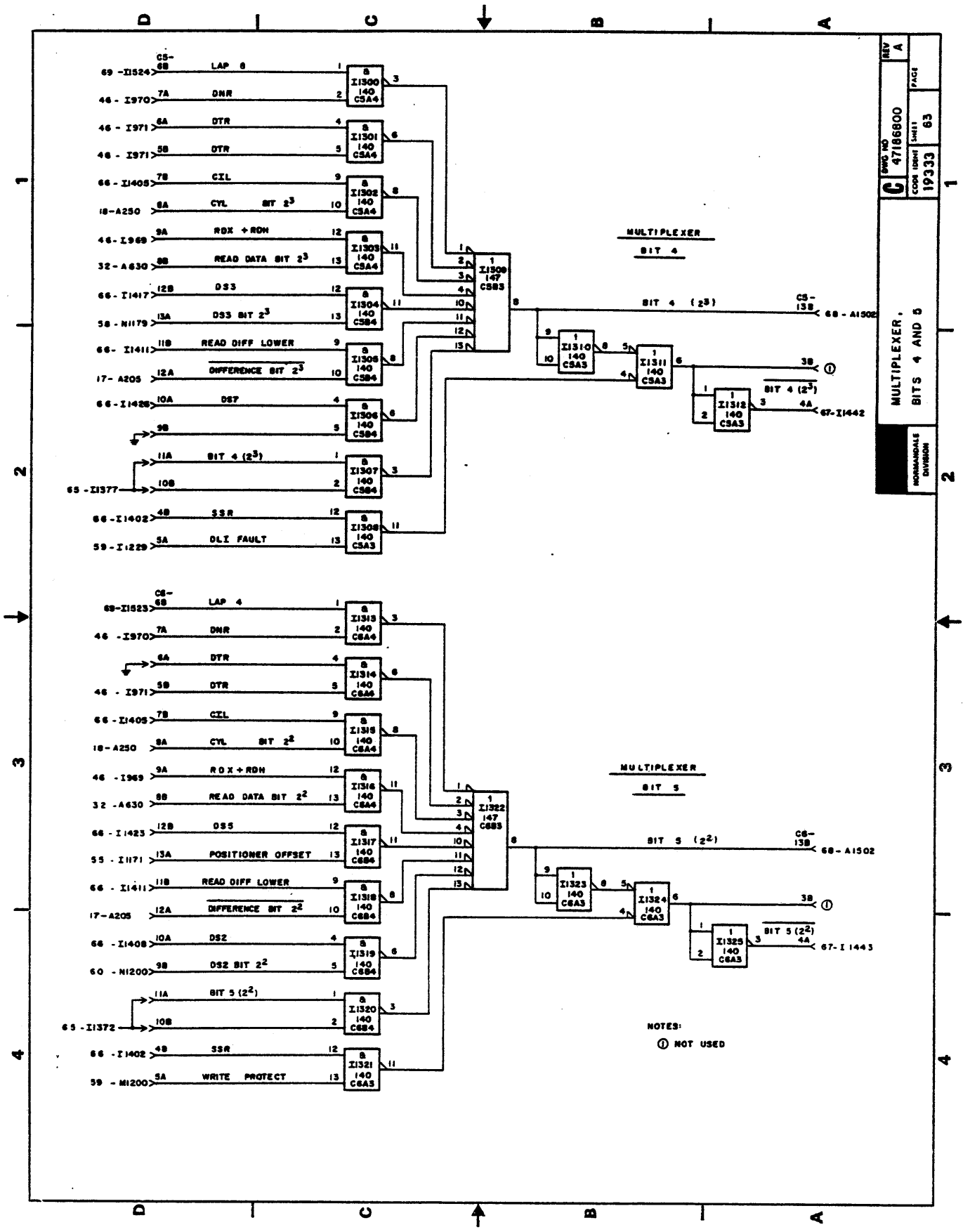






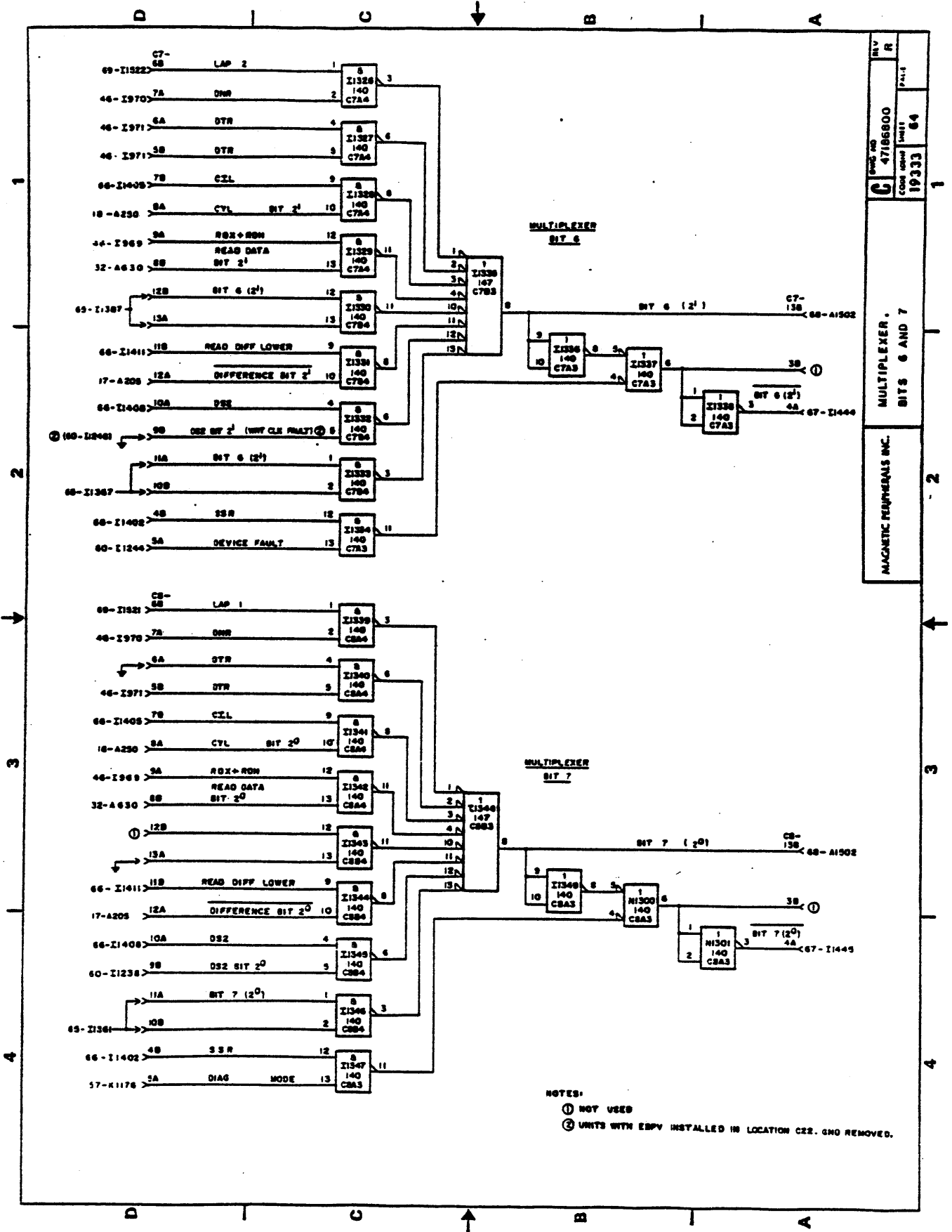
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|---------------------------------------|----------|----|
| REV                                   | 0        | A  |
| PAGE                                  | 61       |    |
| DOC NO                                | 47186800 |    |
| COPIES                                | 19333    |    |
| DATE                                  | 19333    | 61 |
| MULTIPLEXER,<br>BITS 0 AND 1          |          |    |
| CONTROL DATA<br>NORMANDIA<br>DIVISION |          |    |



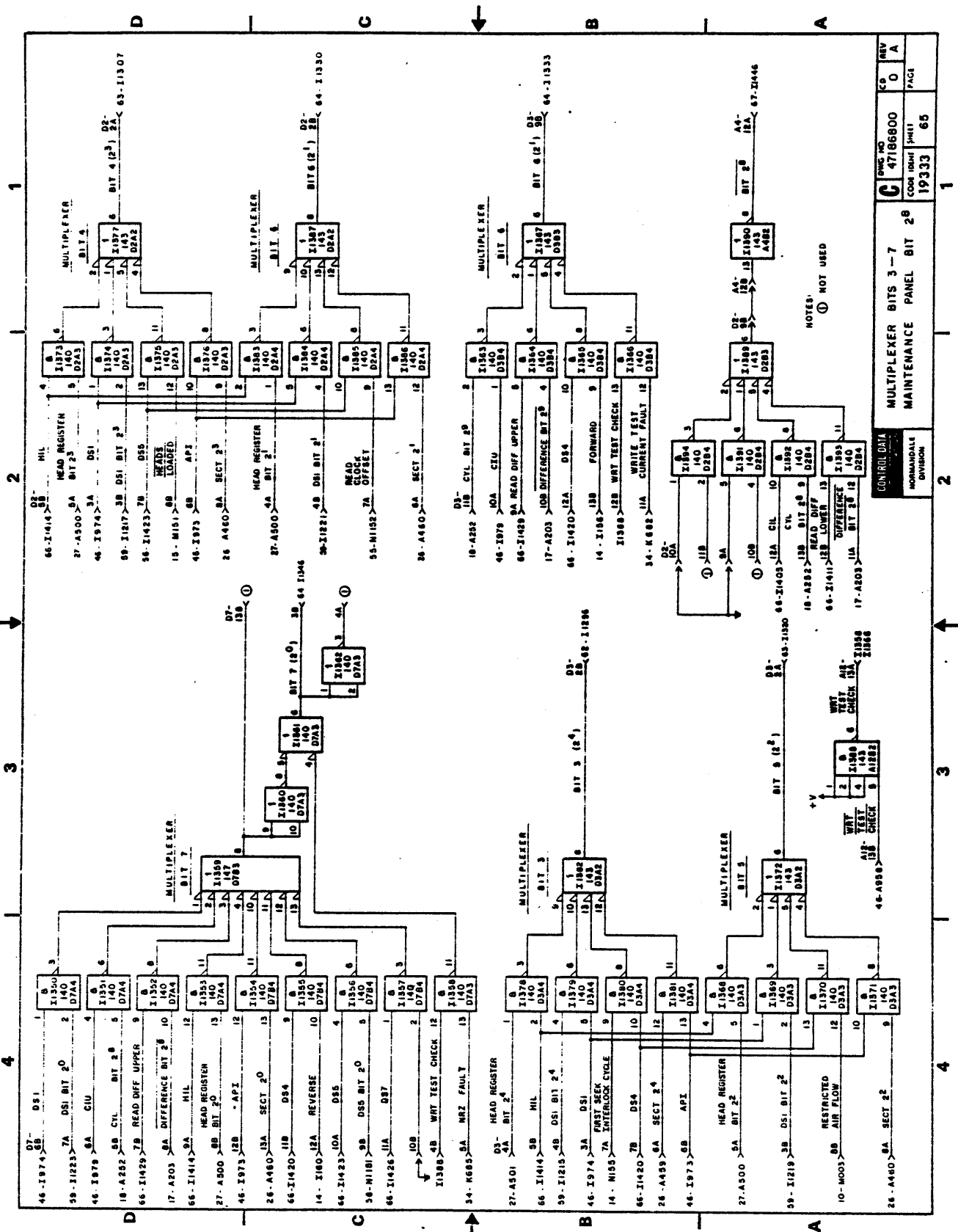


REV A  
 DWG NO 47186800  
 COOR IDENT SHEET 19333 63  
 ROMANIANE DIVISION

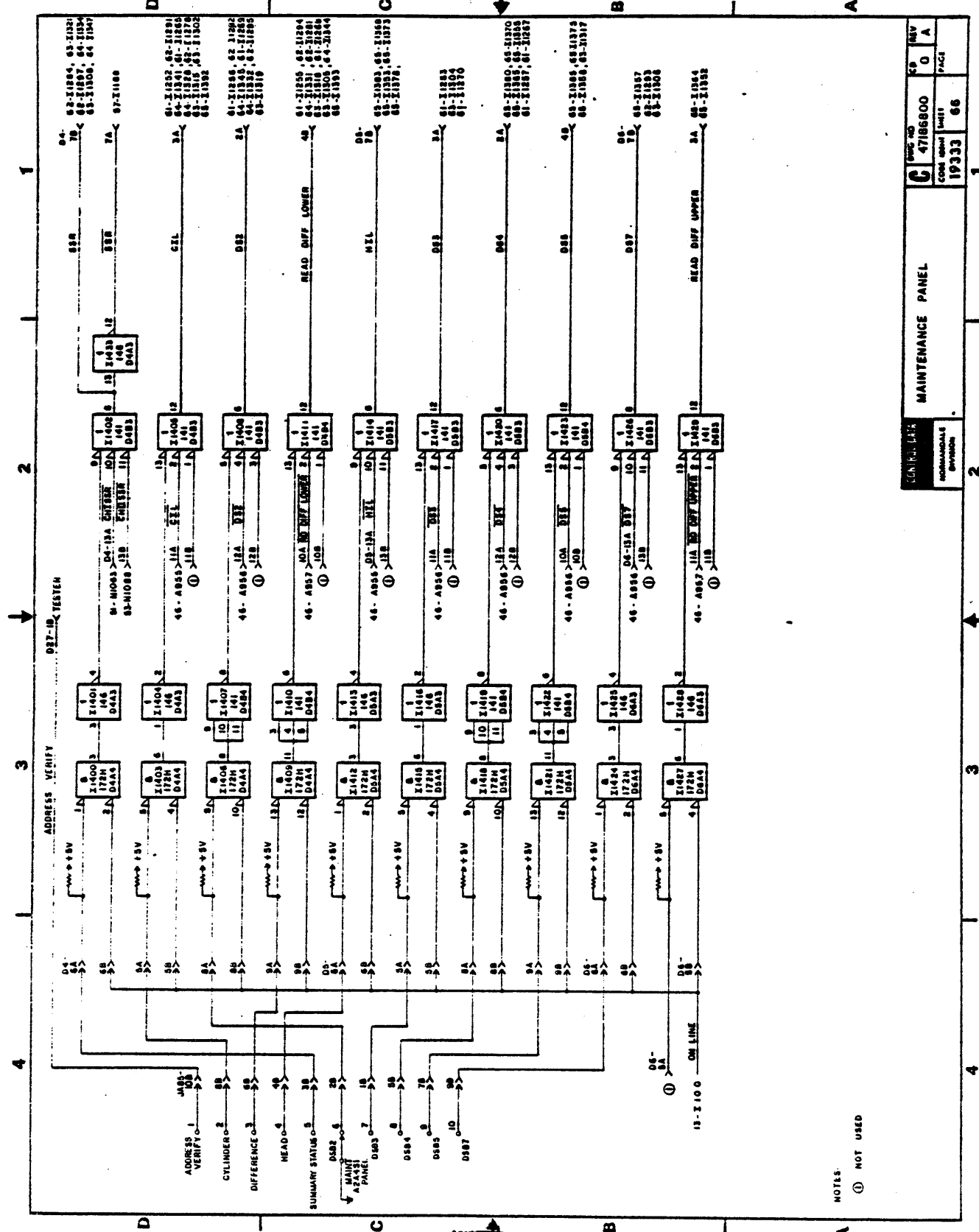
NOTES:  
 (1) NOT USED

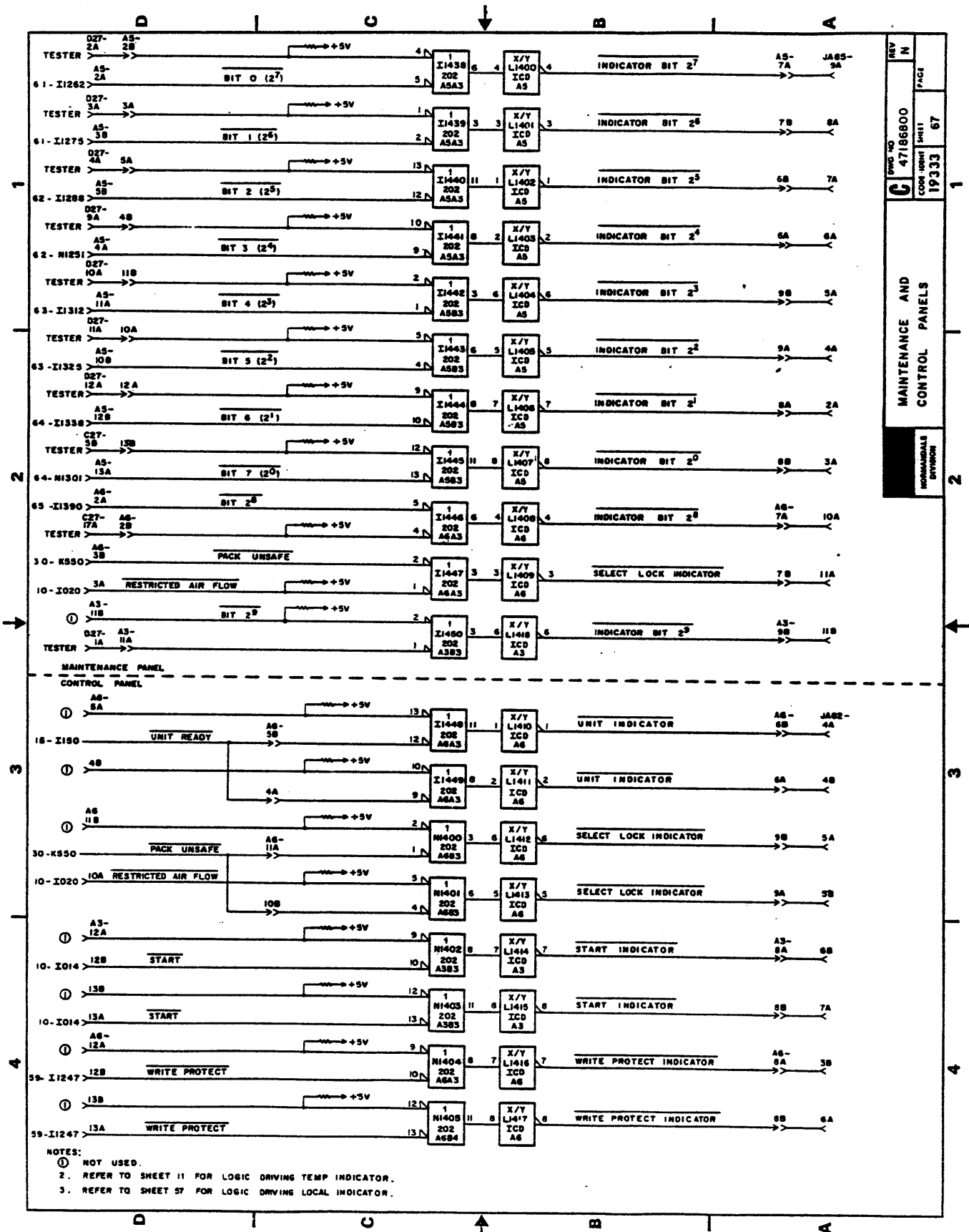


NOTES:  
 ① NOT USED  
 ② UNITS WITH ESPV INSTALLED IN LOCATION C22. AND REMOVED.



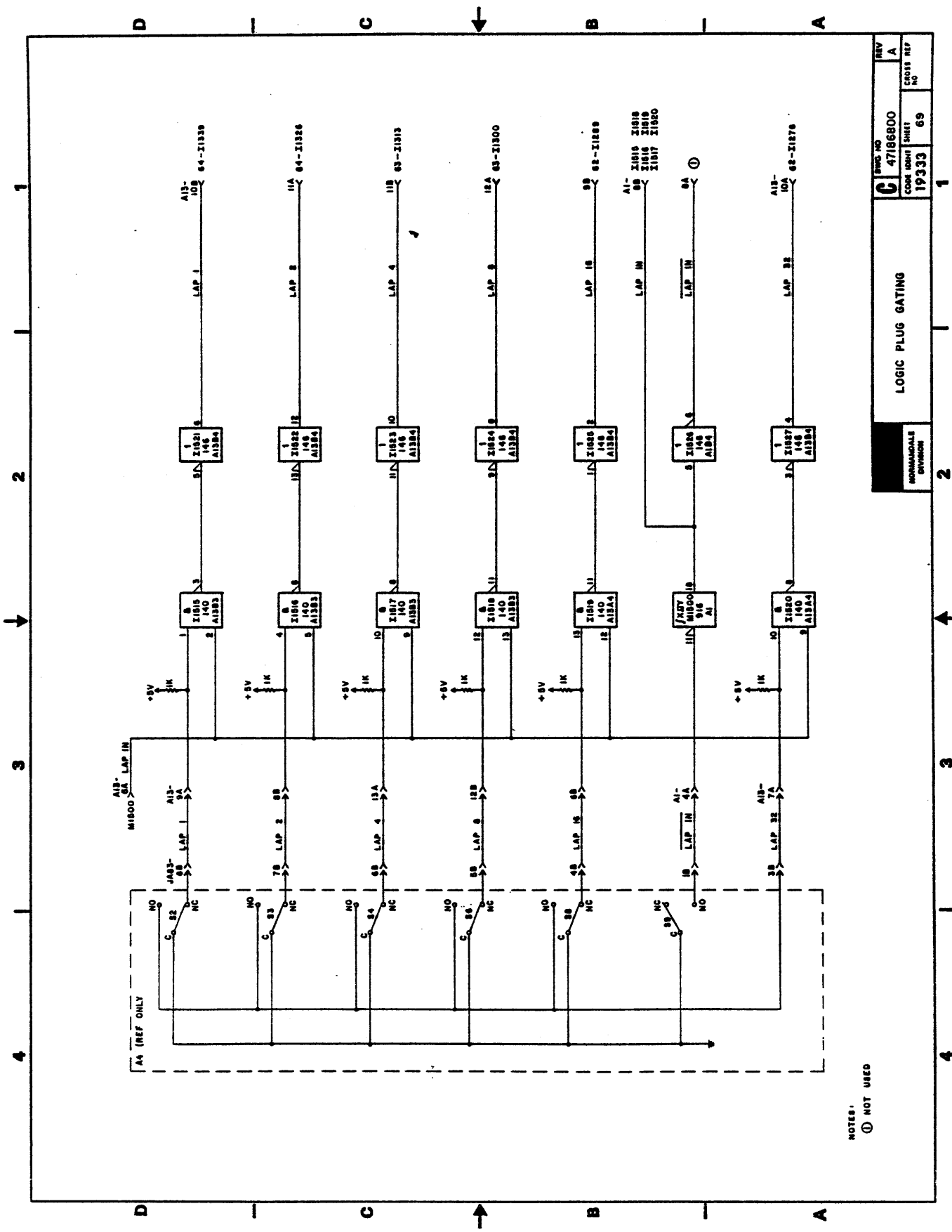






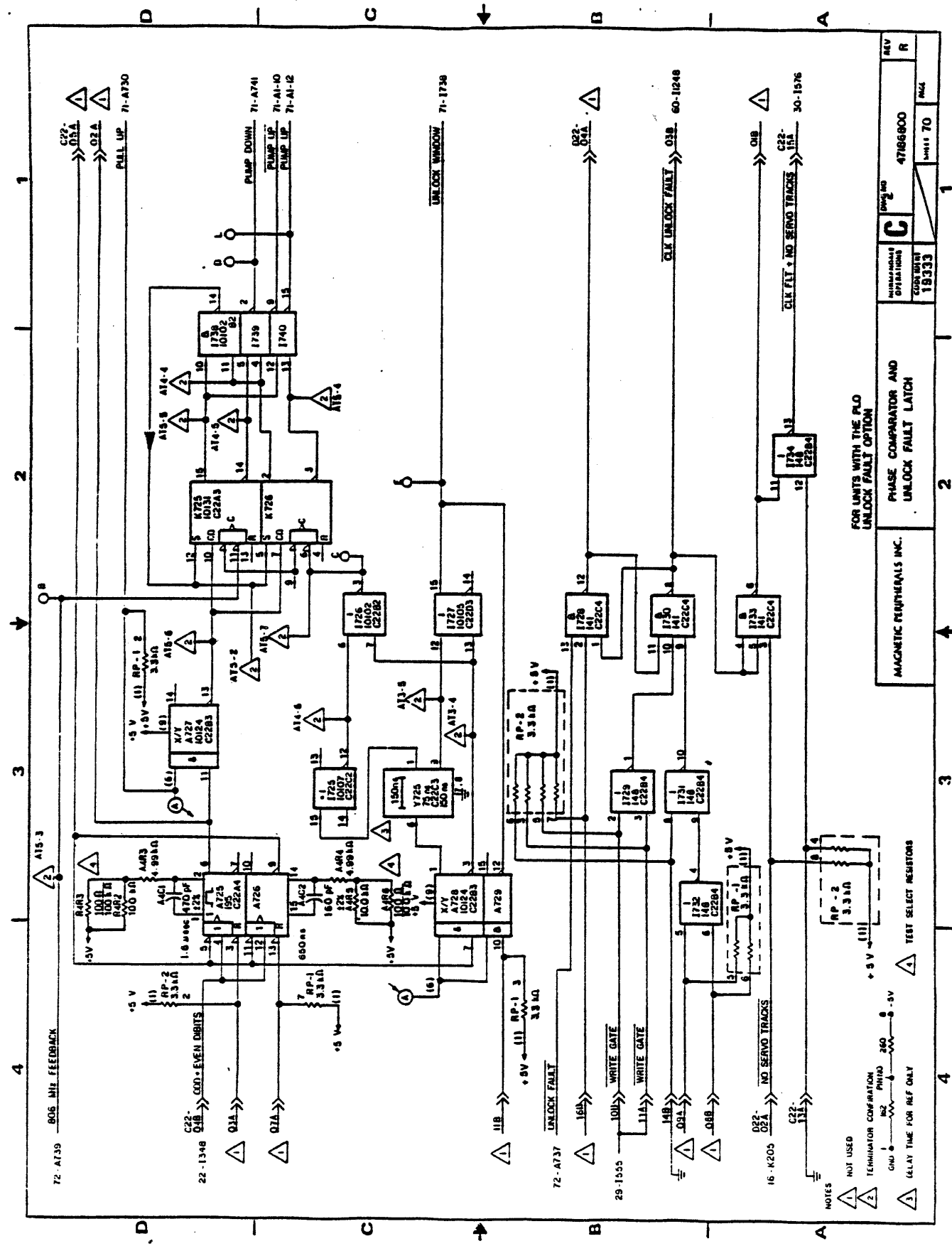
REV N  
 4718600  
 COOR UNIT UNIT  
 19333 67  
 MAINTENANCE AND CONTROL PANELS  
 REMEDIABLE DIVISION





NOTES:  
 ⓪ NOT USED

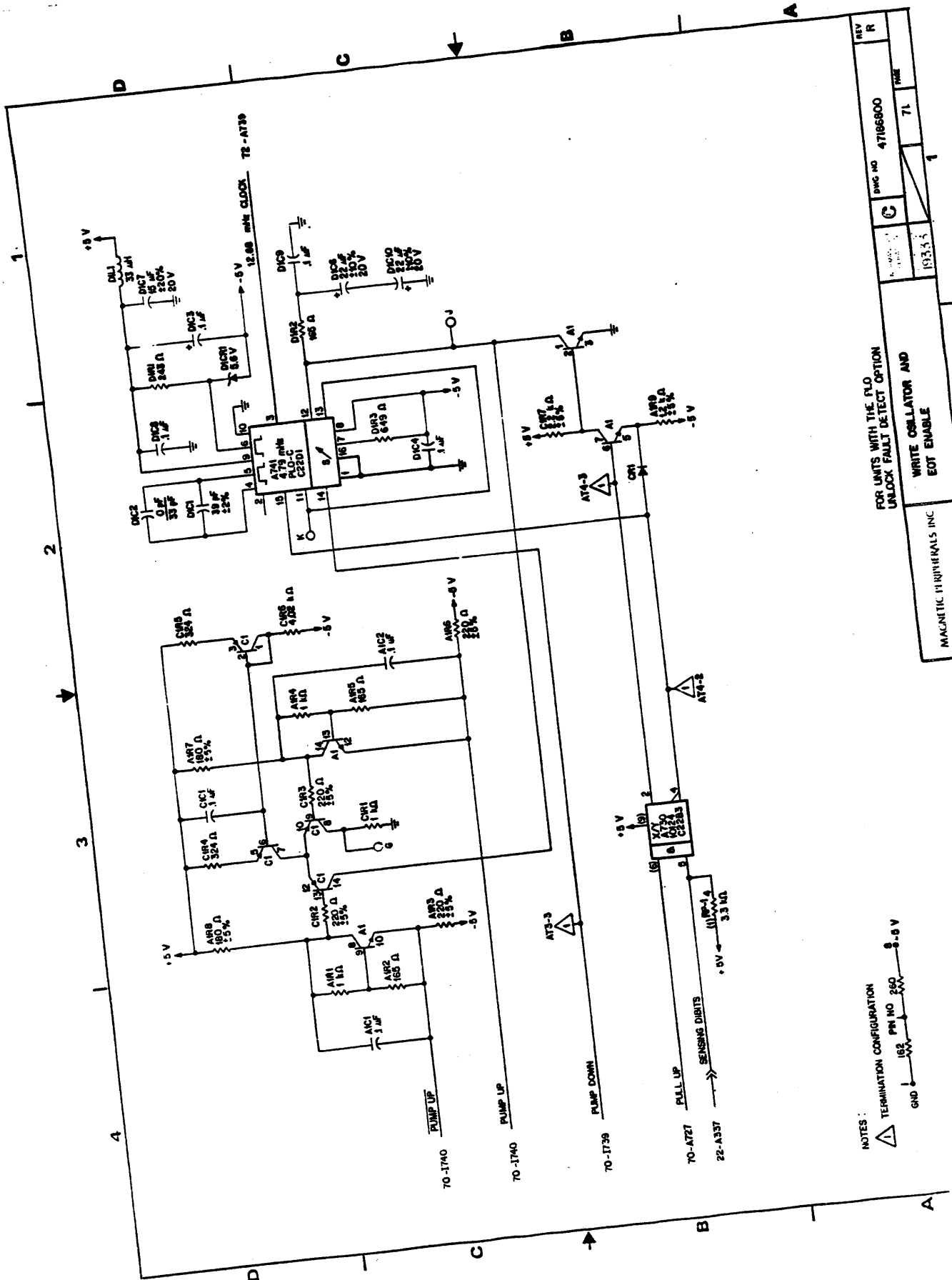
|                   |    |                      |   |
|-------------------|----|----------------------|---|
| REV               |    | A                    |   |
| C 47186800        |    | CROSS REF            |   |
| 19333             | 69 | 1                    | 1 |
| LOGIC PLUG GATING |    | NONMAGNETIC DIVISION |   |



|   |        |
|---|--------|
| REV                                     | R      |
| 4786800                                 | REV 70 |
| 19333                                   | 1      |
| PHASE COMPARATOR AND UNLOCK FAULT LATCH |        |
| MAGNETIC PERIPHERALS INC.               |        |

FOR UNITS WITH THE PLO UNLOCK FAULT OPTION

- NOTES
- 1 NOT USED
  - 2 TERMINATOR CONFIGURATION
  - 3 DELAY TIME FOR REF ONLY



|         |          |
|---------|----------|
| REV     | R        |
| DATE    | 7/1      |
| DWG NO  | 47186800 |
| 193.3.3 | 1        |

FOR UNITS WITH THE FLO  
 UNLOCK FAULT DETECT OPTION  
 WRITE OSSLATOR AND  
 EOT ENABLE

MAGNETIC INSTRUMENTALS INC

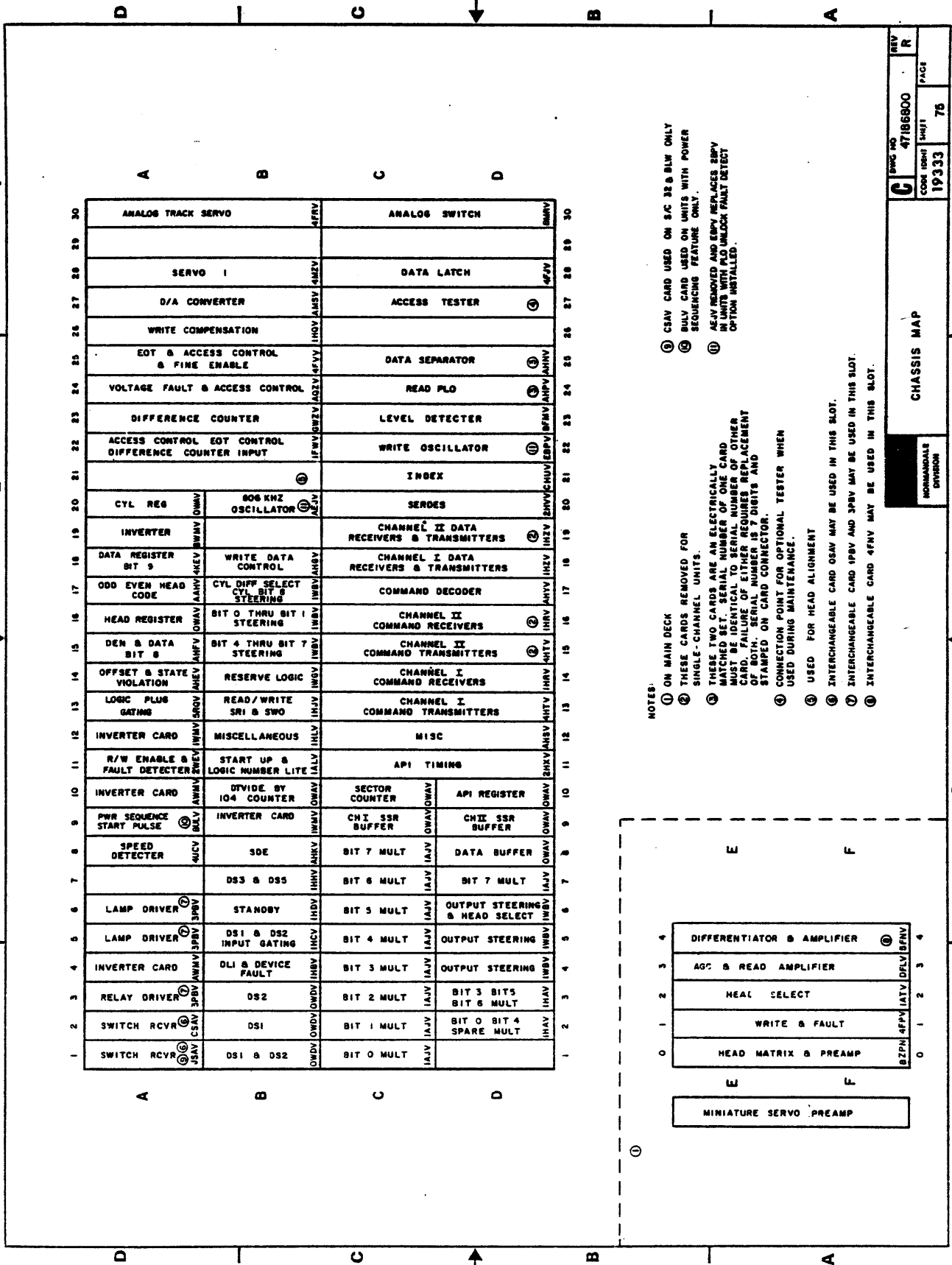
NOTES:  
 1 TERMINATION CONFIGURATION  
 GND — 182 P/N NO 260 — 5-5V





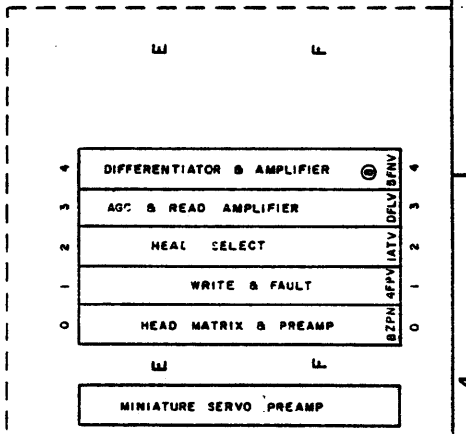






|    |   |  |      |  |  |      |
|----|---|--|------|--|--|------|
| 30 | ANALOG TRACK SERVO                                  |  | 4FVY | ANALOG SWITCH                            |  | 8MRY |
| 29 | SERVO 1   |  | 4MZY | DATA LATCH                               |  | 4FZY |
| 28 | D/A CONVERTER                                       |  | 1MZY | ACCESS TESTER                            |  | ④    |
| 27 | WRITE COMPENSATION                                  |  | 1MZY | DATA SEPARATOR                           |  | ④    |
| 26 | EOT & ACCESS CONTROL & FINE ENABLE                  |  | 4FZY | READ PLO                                 |  | ③    |
| 25 | VOLTAGE FAULT & ACCESS CONTROL                      |  | 4MZY | LEVEL DETECTOR                           |  | ③    |
| 24 | DIFFERENCE COUNTER                                  |  | 1MZY | WRITE OSCILLATOR                         |  | ⑩    |
| 23 | ACCESS CONTROL EOT CONTROL DIFFERENCE COUNTER INPUT |  | 1FZY | INDEX                                    |  | ⑩    |
| 22 | CYL REG   |  | ⑥    | SERDES                                   |  | ⑩    |
| 21 | 806 KHZ OSCILLATOR                                  |  | ⑩    | CHANNEL II DATA RECEIVERS & TRANSMITTERS |  | ③    |
| 20 | INVERTER  |  | ⑩    | CHANNEL I DATA RECEIVERS & TRANSMITTERS  |  | ③    |
| 19 | DATA REGISTER BIT 9                                 |  | ⑩    | COMMAND DECODER                          |  | ③    |
| 18 | ODD EVEN HEAD CODE                                  |  | ⑩    | CHANNEL II COMMAND RECEIVERS             |  | ③    |
| 17 | HEAD REGISTER                                       |  | ⑩    | CHANNEL III COMMAND TRANSMITTERS         |  | ③    |
| 16 | DEN & DATA BIT 8                                    |  | ⑩    | CHANNEL I COMMAND RECEIVERS              |  | ③    |
| 15 | OFFSET & STATE VIOLATION                            |  | ⑩    | CHANNEL II COMMAND TRANSMITTERS          |  | ③    |
| 14 | LOGIC PLUS GATING                                   |  | ⑩    | CHANNEL I COMMAND TRANSMITTERS           |  | ③    |
| 13 | INVERTER CARD                                       |  | ⑩    | MISC                                     |  | ③    |
| 12 | R/W ENABLE & FAULT DETECTOR                         |  | ⑩    | API TIMING                               |  | ③    |
| 11 | START UP & LOGIC NUMBER LITE                        |  | ⑩    | SECTOR COUNTER                           |  | ③    |
| 10 | INVERTER CARD                                       |  | ⑩    | API REGISTER                             |  | ③    |
| 9  | PWR SEQUENCE START PULSE                            |  | ⑩    | CHI SSR BUFFER                           |  | ③    |
| 8  | SPEED DETECTOR                                      |  | ⑩    | DATA BUFFER                              |  | ③    |
| 7  | LAMP DRIVER   |  | ⑩    | BIT 7 MULT                               |  | ③    |
| 6  | LAMP DRIVER   |  | ⑩    | BIT 6 MULT                               |  | ③    |
| 5  | LAMP DRIVER   |  | ⑩    | BIT 5 MULT                               |  | ③    |
| 4  | INVERTER CARD                                       |  | ⑩    | BIT 4 MULT                               |  | ③    |
| 3  | RELAY DRIVER  |  | ⑩    | BIT 3 MULT                               |  | ③    |
| 2  | SWITCH RCYR   |  | ⑩    | BIT 2 MULT                               |  | ③    |
| 1  | SWITCH RCYR   |  | ⑩    | BIT 1 MULT                               |  | ③    |
|    | SWITCH RCYR   |  | ⑩    | BIT 0 MULT                               |  | ③    |

- NOTES:
- ON MAIN DECK
  - THESE CARDS REMOVED FOR SINGLE - CHANNEL UNITS.
  - THESE TWO CARDS ARE AN ELECTRICALLY MATCHED SET. SERIAL NUMBER OF ONE CARD MUST BE IDENTICAL TO SERIAL NUMBER OF OTHER CARD. FAILURE OF EITHER REQUIRES REPLACEMENT OF BOTH. SERIAL NUMBER OF DIGITS AND STAMPED ON CARD CONNECTOR.
  - CONNECTION POINT FOR OPTIONAL TESTER WHEN USED DURING MAINTENANCE.
  - USED FOR HEAD ALIGNMENT
  - INTERCHANGEABLE CARD 05AV MAY BE USED IN THIS SLOT.
  - INTERCHANGEABLE CARD 1P8V AND 3P8V MAY BE USED IN THIS SLOT.
  - INTERCHANGEABLE CARD 4FVY MAY BE USED IN THIS SLOT.





**SECTION 5**  
**WIRE LISTS**



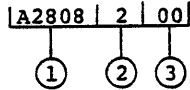
## INTRODUCTION

Wire lists are divided into two basic categories; wire wrap wire lists and non-logic wire lists.

### WIRE WRAP WIRE LISTS

Wire wrap wire lists provide wire origin/destination information for the logic back panel and the R/W pin and guide assembly.

Wires are referenced by logic term origin. The signal name is decoded as follows:



- ① A2808; is the logic term of the inverter, multiplexer, op-amp, etc., found in the logic diagrams.
- ② 2; denotes the various outputs of the same logic term.
- ③ 00; indicates daisy chain order of wires that go to various destinations from a single logic term.

Signal names that begin with a numeral, are miscellaneous wires. These wires generally

originate at some point other than a logic term (switch, bus, test point, etc.).

Z level denotes the vertical position of a wire on a pin relative to the wire wrap board. Two vertical positions are possible. A numeral 1 in this column indicates the wire is closest to the wire wrap board. A numeral 2 indicates the wire is farthest from the wire wrap board. Both ends of a wire are always at the same Z level.

### NON-LOGIC WIRE LISTS

Non-Logic wire lists provide wire origin/destination information for harness assemblies and various panels.

The number identification is used to sequence the wire list and provide engineering reference for change order activity.

Wire color coding is as follows:

|            |            |
|------------|------------|
| 0 - Black  | 5 - Green  |
| 1 - Brown  | 6 - Blue   |
| 2 - Red    | 7 - Violet |
| 3 - Orange | 8 - Gray   |
| 4 - Yellow | 9 - White  |

In multi-digit color codes, the first digit denotes base color and the remaining digits denote tracer colors.

| TITLE                                |        | 471869XX-3E4/3E5 |            | WL      | DOCUMENT NO.                   | SHEET NO. | REV. |
|--------------------------------------|--------|------------------|------------|---------|--------------------------------|-----------|------|
| LOGIC WIRE WRAP Ref 774637XX-3C9     |        |                  |            |         | HPDE-7992                      | 1         | B    |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTINATION      | WIRE COLOR | Z LEVEL | NOTES                          |           |      |
| 30009100                             | A0101A | JA8014A          |            | 1       |                                |           |      |
| 60004100                             | A0102A | JA8412B          |            | 1       |                                |           |      |
| 50000100                             | A0102B | JA8208B          |            | 1       |                                |           |      |
| 10017100                             | A0103A | JA8004B          |            | 1       |                                |           |      |
| 60005100                             | A0103B | JA8411B          |            | 2       |                                |           |      |
| 50001100                             | A0103B | JA8207B          |            | 1       |                                |           |      |
| 10006100                             | A0104A | JA8301B          |            | 1       |                                |           |      |
| 10018100                             | A0104B | JA8001A          |            | 1       | BR3C9J/K & BR3E4/5E ONLY       |           |      |
| I0086101                             | A0105A | A0406B           |            | 2       | S/C 33 & ABV ONLY              |           |      |
| I0661100                             | A0105A | A0810B           |            | 1       | S/C 33 & ABV ONLY              |           |      |
| X0650100                             | A0106A | B1107A           |            | 1       | S/C 33 & ABV ONLY              |           |      |
| X0650101                             | A0106A | D0307A           |            | 2       | S/C 33 & ABV ONLY              |           |      |
| Y0000202                             | A0106B | B1106B           |            | 1       | S/C 33 & ABV ONLY              |           |      |
| M1500100                             | A0108B | A1306A           |            | 1       |                                |           |      |
| I0021100                             | A0109A | A0903A           |            | 1       | BR3C9J/K & BR3E4/5E ONLY       |           |      |
| M0004100                             | A0109B | A0902A           |            | 1       | BR3C9J/K & BR3E4/5E ONLY       |           |      |
| I0020100                             | A0110A | A0610A           |            | 1       |                                |           |      |
| M0003100                             | A0110B | D0308B           |            | 1       |                                |           |      |
| M1200100                             | A0111A | B0506B           |            | 1       |                                |           |      |
| M1200104                             | A0111A | C0605A           |            | 2       |                                |           |      |
| I1247100                             | A0111B | A0613A           |            | 1       |                                |           |      |
| M0001100TTR                          | A0112A | D2702B           |            | 1       |                                |           |      |
| I0018100                             | A0112B | B0813A           |            | 1       |                                |           |      |
| M0000100                             | A0113A | A0902B           |            | 1       | BR3C9J/K & BR3E4/5E ONLY       |           |      |
| M0000100                             | A0113A | B0611A           |            | 1       | DELETE FOR BR3C9J/K & BR3E4/5E |           |      |
| 30007100                             | A0202A | JA8007B          |            | 1       |                                |           |      |
| 40003100                             | A0202B | JA8110B          |            | 1       |                                |           |      |
| 40001100                             | A0203A | JA8112A          |            | 1       |                                |           |      |
| 40000100                             | A0203B | JA8110A          |            | 1       |                                |           |      |
| 30002100                             | A0204A | JA8002B          |            | 1       |                                |           |      |
| 60007100                             | A0204B | JA8402B          |            | 1       |                                |           |      |
| 60007101                             | A0204B | B0310A           |            | 2       |                                |           |      |
| N0057100                             | A0208A | A0405A           |            | 1       |                                |           |      |
| M0053100                             | A0208B | B1308A           |            | 1       |                                |           |      |
| M0002100                             | A0209B | D1213A           |            | 1       |                                |           |      |
| N0156100                             | A0210A | B1207A           |            | 1       |                                |           |      |
| M0151100                             | A0210B | A0404B           |            | 1       |                                |           |      |
| M0151108                             | A0210B | D0208B           |            | 2       |                                |           |      |
| M0150100                             | A0211A | A0810B           |            | 1       | S/C 32 & BLW ONLY              |           |      |
| N0155100                             | A0211B | D0307A           |            | 1       | S/C 32 & BLW ONLY              |           |      |
| N0155101                             | A0211B | B1107A           |            | 2       | S/C 32 & BLW ONLY              |           |      |
| M0081100                             | A0212A | B1105A           |            | 1       |                                |           |      |
| M0006100                             | A0213A | A2A10B           |            | 1       |                                |           |      |
| K1179103                             | A0302A | A0305B           |            | 1       |                                |           |      |
| K1179104                             | A0302A | B1404B           |            | 2       |                                |           |      |

| TITLE<br>LOGIC WIRE WRAP                   |        | WL          | DOCUMENT NO.<br>HPDE-7992 | SHEET NO.<br>2 | REV.<br>B         |
|--|--------|-------------|---------------------------|----------------|-------------------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR             | Z<br>LEVEL     | NOTES             |
| K1179102                                   | A0305B | B0204A      |                           | 2              |                   |
| K1179103                                   | A0305B | A0302A      |                           | 1              |                   |
| L1100100MAT                                | A0306B | JA8201B     |                           | 1              |                   |
| L1101100MAT                                | A0307A | JA8201A     |                           | 1              |                   |
| L1414100                                   | A0308A | JA8206B     |                           | 1              |                   |
| L1415100                                   | A0308B | JA8207A     |                           | 1              |                   |
| L0006100MTR                                | A0309A | JA8003B     |                           | 1              |                   |
| L1418100                                   | A0309B | JA8511B     |                           | 1              |                   |
| I0088100                                   | A0310B | A0405B      |                           | 1              |                   |
| 80103100                                   | A0311A | D2701A      |                           | 1              |                   |
| I1395100                                   | A0311B | A1804A      |                           | 1              |                   |
| I0014102                                   | A0312B | A0407A      |                           | 1              |                   |
| I0014103                                   | A0312B | A0313A      |                           | 2              |                   |
| I0014103                                   | A0313A | A0312B      |                           | 2              |                   |
| I0091100                                   | A0402A | B2403B      |                           | 1              |                   |
| I0091102                                   | A0402A | A0904A      |                           | 2              |                   |
| I0086100                                   | A0402B | A0406B      |                           | 1              |                   |
| I0001100                                   | A0403A | A2811A      |                           | 1              |                   |
| I0014100                                   | A0403B | B1106A      |                           | 1              |                   |
| I0087100                                   | A0404A | A0406A      |                           | 1              |                   |
| M0151100                                   | A0404B | A0210B      |                           | 1              |                   |
| M0151101                                   | A0404B | A0802A      |                           | 2              |                   |
| N0057100                                   | A0405A | A0208A      |                           | 1              |                   |
| I0088100                                   | A0405B | A0310B      |                           | 1              |                   |
| I0087100                                   | A0406A | A0404A      |                           | 1              |                   |
| I0086100                                   | A0406B | A0402B      |                           | 1              |                   |
| I0086101                                   | A0406B | A0105A      |                           | 2              | S/C 33 & ABV ONLY |
| I0014101                                   | A0407A | B1106A      |                           | 2              |                   |
| I0014102                                   | A0407A | A0312B      |                           | 1              |                   |
| I0000100                                   | A0407B | A0811A      |                           | 1              |                   |
| I0090100                                   | A0408A | A0408B      |                           | 1              |                   |
| I0090100                                   | A0408B | A0408A      |                           | 1              |                   |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 3          | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I0090101                                   | A0406B | B2409A      |               | 2          |       |
| L0003100                                   | A0409A | JA8408A     |               | 1          |       |
| N1161100                                   | A0409B | C1205B      |               | 1          |       |
| I0557100                                   | A0410A | D2010B      |               | 1          |       |
| I0556102                                   | A0410B | A1108A      |               | 2          |       |
| I0556103                                   | A0410B | B2511B      |               | 1          |       |
| I0978100                                   | A0411A | D1101B      |               | 1          |       |
| I0968100                                   | A0411B | C1703A      |               | 1          |       |
| I0968102                                   | A0411B | B2511A      |               | 2          |       |
| I1390100                                   | A0412A | A0602A      |               | 1          |       |
| I1389100                                   | A0412B | D0209B      |               | 2          |       |
| N1162100                                   | A0413A | C1207A      |               | 1          |       |
| L0002100                                   | A0413B | JA8401A     |               | 1          |       |
| I1262100                                   | A0502A | C0104A      |               | 1          |       |
| A1438100TTR                                | A0502B | D2702A      |               | 1          |       |
| A1439100TTR                                | A0503A | D2703A      |               | 1          |       |
| I1275100                                   | A0503B | C0204A      |               | 1          |       |
| N1251100                                   | A0504A | C0404A      |               | 1          |       |
| A1441100TTR                                | A0504B | D2709A      |               | 1          |       |
| A1440100TTR                                | A0505A | D2704A      |               | 1          |       |
| I1288100                                   | A0505B | C0304A      |               | 1          |       |
|  |        |             |               |            |       |
| L1403100                                   | A0506A | JA8506A     |               | 1          |       |
| L1402100                                   | A0506B | JA8507A     |               | 1          |       |
|  |        |             |               |            |       |
| L1400100                                   | A0507A | JA8509A     |               | 1          |       |
| L1401100                                   | A0507B | JA8508A     |               | 1          |       |
| L1406100                                   | A0508A | JA8502A     |               | 1          |       |
| L1407100                                   | A0508B | JA8503A     |               | 1          |       |
| L1405100                                   | A0509A | JA8504A     |               | 1          |       |
| L1404100                                   | A0509B | JA8505A     |               | 1          |       |
| A1443100                                   | A0510A | D2711A      |               | 1          |       |
| I1325100                                   | A0510B | C0604A      |               | 1          |       |
| I1312100                                   | A0511A | C0504A      |               | 1          |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 4          | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| 81442100TTR                                | A0511B | D2710A      |               | 1          |       |
| 81444100TTR                                | A0512A | D2712A      |               | 1          |       |
| I1338100                                   | A0512B | C0704A      |               | 1          |       |
| N1301100                                   | A0513A | C0A04A      |               | 1          |       |
| 81445100TTR                                | A0513B | C2705B      |               | 1          |       |
| I1390100                                   | A0602A | A0412A      |               | 1          |       |
| 81446100                                   | A0602B | C2717A      |               | 1          |       |
| I0020101                                   | A0603A | A0610A      |               | 2          |       |
| K0550203                                   | A0603B | A0610B      |               | 2          |       |
| K0550204                                   | A0603B | 80404A      |               | 1          |       |
| I0150102                                   | A0604A | A1510B      |               | 1          |       |
| I0150103                                   | A0604A | A0605B      |               | 2          |       |
| I0150103                                   | A0605B | A0604A      |               | 2          |       |
| I0150104                                   | A0605B | 80607A      |               | 1          |       |
| L1411100                                   | A0606A | JA8204B     |               | 1          |       |
| L1410100                                   | A0606B | JA8204A     |               | 1          |       |
| L1408100                                   | A0607A | JA8501A     |               | 1          |       |
| L1409100                                   | A0607B | JA8511A     |               | 1          |       |
| L1416100                                   | A0608A | JA8203B     |               | 1          |       |
| L1417100                                   | A0608B | JA8206A     |               | 1          |       |
| L1413100                                   | A0609A | JA8205B     |               | 1          |       |
| L1412100                                   | A0609B | JA8205A     |               | 1          |       |
| I0020100                                   | A0610A | A0110A      |               | 1          |       |
| I0020101                                   | A0610A | A0603A      |               | 2          |       |
| K0550202                                   | A0610A | A0611A      |               | 1          |       |
| K0550203                                   | A0610B | A0603B      |               | 2          |       |
| K0550201                                   | A0611A | A1109A      |               | 2          |       |
| K0550202                                   | A0611A | A0610B      |               | 1          |       |
|  |        |             |               |            |       |
|  |        |             |               |            |       |
| I1247101                                   | A0612B | A0613A      |               | 2          |       |
| I1247100                                   | A0613A | A0111B      |               | 1          |       |
| I1247101                                   | A0613A | A0612B      |               | 2          |       |
| 20026100                                   | A0801A | A0809A      |               | 1          |       |
| 20040100GND                                | A0801A | JA8109B     |               | 2          |       |
| M0151101                                   | A0802A | A0404B      |               | 2          |       |





| TITLE                                |        | WL          | DOCUMENT NO. | SHEET NO. | REV.           |
|--------------------------------------|--------|-------------|--------------|-----------|----------------|
| LOGIC WIRE WRAP                      |        |             | HPDF-7992    | 7         | K              |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTINATION | WIRE COLOR   | Z LEVEL   | NOTES          |
| 60006100                             | A1103A | JA84148     |              | 1         |                |
| 60006101                             | A1103A | JA8203A     |              | 2         |                |
| I1187101                             | A1103B | 808138      |              | 2         |                |
| I1187102                             | A1103B | 814098      |              | 1         |                |
| I0580100                             | A1104A | 805078      |              | 1         |                |
| I0580102                             | A1104A | A11048      |              | 2         |                |
| I0580102                             | A1104B | A1104A      |              | 2         |                |
| A0955400                             | A1105A | C1712A      |              | 2         |                |
| I0553100                             | A1105B | D2008A      |              | 1         |                |
| I0553101                             | A1105B | 81310A      |              | 2         |                |
| N0679100                             | A1106A | D12028      |              | 1         |                |
| I0834100                             | A1106B | JA81078     |              | 1         |                |
| I0834101                             | A1106B | 81313A      |              | 2         |                |
| I0689100                             | A1107A | 81808A      |              | 1         |                |
| K0552100                             | A1107B | JA8107A     |              | 1         |                |
| I0556100                             | A1108A | 81311A      |              | 1         |                |
| I0556102                             | A1108A | A04108      |              | 2         |                |
| I0558100                             | A1108B | C21108      |              | 1         |                |
| K0550200                             | A1109A | A22038      |              | 1         |                |
| K0550201                             | A1109A | A0611A      |              | 2         |                |
| I0175100                             | A1109B | A24088      |              | 2         |                |
| I0175101                             | A1109B | 807068      |              | 1         |                |
| N0681100                             | A1110A | C1211A      |              | 2         |                |
| N0681101                             | A1110A | 813098      |              | 1         |                |
| N0683100                             | A1110B | C12168      |              | 1         |                |
| I0555100                             | A1111A | C2007A      |              | 1         |                |
| K0552200                             | A1111B | A10048      |              | 2         |                |
| N0552100                             | A1112A | 824058      |              | 2         |                |
| N0552101                             | A1112A | 80109A      |              | 1         |                |
| I0734000                             | A1112B | C2215A      |              | 1         | S/C 49 & Above |
| K0205200                             | A1112B | A22118      |              | 1         | S/C 48 & Below |
| I0566100                             | A1113A | 80712A      |              | 1         |                |
| I0331105                             | A1113B | D12098      |              | 2         |                |
| I1081100                             | A1202A | 814068      |              | 1         |                |

| TITLE<br>LOGIC WIRE WRAP                   |        | WL          | DOCUMENT NO.<br>HPDE-7992 | SHEET NO.<br>8 | REV.<br>A |
|--|--------|-------------|---------------------------|----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR             | Z<br>LEVEL     | NOTES     |
| I008100                                    | A1202B | B1406A      |                           | 1              |           |
| I0085101                                   | A1203A | A1205A      |                           | 2              |           |
| 20019100GND                                | A1203B | C1302A      |                           | 1              |           |
| I0080100                                   | A1204A | B1405A      |                           | 1              |           |
| 20018100GND                                | A1204B | C1502A      |                           | 1              |           |
| I0085100                                   | A1205A | B1402B      |                           | 1              |           |
| I0085101                                   | A1205A | A1203A      |                           | 2              |           |
| N1147100                                   | A1205B | B2809A      |                           | 1              |           |
| N1148100                                   | A1206A | A2812A      |                           | 1              |           |
| N1148101                                   | A1206A | A1206B      |                           | 2              |           |
| N1148101                                   | A1206B | A1206A      |                           | 2              |           |
| N10761                                     | A1207A | C1607A      |                           | 1              |           |
| N10511                                     | A1207B | C1407A      |                           | 1              |           |
| I00501                                     | A1208A | B0810B      |                           | 1              |           |
| I1079100                                   | A1208B | C1604A      |                           | 1              |           |
| I1054101                                   | A1209A | C1404A      |                           | 2              |           |
| I1056100                                   | A1209B | C1307B      |                           | 1              |           |
| N1157100                                   | A1210A | A1511B      |                           | 1              |           |
| N1157101                                   | A1210A | B1207B      |                           | 2              |           |
| N1154100                                   | A1210B | D1209A      |                           | 1              |           |
| N1154101                                   | A1210B | C0912B      |                           | 2              |           |
| I1185100                                   | A1212A | C0909B      |                           | 1              |           |
| I1185102                                   | A1212A | C0305A      |                           | 2              |           |
| N1192100                                   | A1212B | B0608B      |                           | 1              |           |
| N1192101                                   | A1212B | B1210B      |                           | 2              |           |
| I1388100                                   | A1213A | D0704B      |                           | 2              |           |
| A0958600                                   | A1213B | C1715A      |                           | 1              |           |
| A0958602                                   | A1213B | B1809A      |                           | 2              |           |
| M1500100                                   | A1306A | A0108B      |                           | 1              |           |
| 10008100B3                                 | A1306B | JA8304B     |                           | 1              |           |
| 10007100B2                                 | A1307A | JA8303B     |                           | 1              |           |
| 10011100B6                                 | A1308B | JA8307B     |                           | 1              |           |
| 10012100B7                                 | A1309A | JA8308B     |                           | 1              |           |
| I1525100                                   | A1309B | C0406B      |                           | 1              |           |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 10         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| K0052101                                   | A14038 | B14078      |               | 2          |       |
| K0052102                                   | A14038 | D09118      |               | 1          |       |
| I1020100                                   | A14044 | C1303A      |               | 1          |       |
| K0050101                                   | A14048 | B14048      |               | 2          |       |
| K0050102                                   | A14048 | D09138      |               | 1          |       |
| N1173100                                   | A1405A | A1911A      |               | 1          |       |
| K1152100                                   | A14058 | C12068      |               | 1          |       |
| K1153100                                   | A14068 | C12088      |               | 1          |       |
| I11021                                     | A1407A | A25088      |               | 1          |       |
| A0954300                                   | A14078 | D17088      |               | 1          |       |
| I0163100                                   | A1408A | A22058      |               | 1          |       |
| N1152100                                   | A14088 | D0207A      |               | 1          |       |
| N1153100                                   | A1409A | D1209A      |               | 1          |       |
| N0203101                                   | A14098 | A22098      |               | 1          |       |
| I1172100                                   | A1418A | B0812A      |               | 1          |       |
| I11711                                     | A14108 | B14108      |               | 2          |       |
| I1171100                                   | A14108 | C0613A      |               | 1          |       |
| N1065102                                   | A1411A | A1505A      |               | 1          |       |
| N1065103                                   | A1411A | A1807A      |               | 2          |       |
| A0954400                                   | A14118 | D1708A      |               | 1          |       |
| A0954600                                   | A1412A | D1707A      |               | 1          |       |
| A0954500                                   | A14128 | D17078      |               | 1          |       |
| K1156100                                   | A1413A | C12048      |               | 1          |       |
| K1157100                                   | A14138 | C1208A      |               | 1          |       |
| I1166100                                   | A1502A | B1710A      |               | 1          |       |
| I1166101                                   | A1502A | D12138      |               | 2          |       |
| I1007103                                   | A15028 | B15138      |               | 1          |       |
| I1007104                                   | A15028 | B1513A      |               | 2          |       |
| A0951300                                   | A1503A | C1709A      |               | 1          |       |
| A0951301                                   | A1503A | A18068      |               | 2          |       |
| I1162100                                   | A15038 | A2511A      |               | 1          |       |
| I1165100                                   | A1504A | B1713A      |               | 1          |       |
| N1160100                                   | A15048 | D12018      |               | 1          |       |
| N1165101                                   | A1505A | D1501A      |               | 2          |       |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 11         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| N1065102                                   | A1505A | A1411A      |               | 1          |       |
| A0951200                                   | A1505B | C1708B      |               | 1          |       |
| A0951201                                   | A1505B | A1808A      |               | 2          |       |
| A0951100                                   | A1506A | C1706A      |               | 1          |       |
| A0951101                                   | A1506A | A1810B      |               | 2          |       |
| I1153100                                   | A1506B | B1312A      |               | 1          |       |
| I1164100                                   | A1507A | D1211A      |               | 1          |       |
| I1164101                                   | A1507A | B1712A      |               | 2          |       |
| A0951500                                   | A1507B | C1710A      |               | 1          |       |
| A0951501                                   | A1507B | A1803B      |               | 2          |       |
| A0951400                                   | A1508A | C1709B      |               | 1          |       |
| A0951401                                   | A1508A | A1807B      |               | 2          |       |
| A0951600                                   | A1508B | C1704A      |               | 1          |       |
| A0951601                                   | A1508B | A1803A      |               | 2          |       |
| K0052200                                   | A1509A | B1407A      |               | 2          |       |
| K0052201                                   | A1509A | D1913A      |               | 1          |       |
| I0585100                                   | A1509B | C1317A      |               | 1          |       |
| I0150101                                   | A1510B | B2405A      |               | 2          |       |
| I0150102                                   | A1510B | A0604A      |               | 1          |       |
| K0050200                                   | A1511A | B1404A      |               | 1          |       |
| K0050201                                   | A1511A | D1813A      |               | 2          |       |
| N1157100                                   | A1511B | A1210A      |               | 1          |       |
| I1160100                                   | A1512A | B2501B      |               | 1          |       |
| N1159100                                   | A1512B | C1217B      |               | 1          |       |
| N1155100                                   | A1513A | D1212B      |               | 1          |       |
| I0586100                                   | A1513B | C1517A      |               | 1          |       |
| 20013100GND                                | A1601A | A1602B      |               | 1          |       |
| N1188101                                   | A1602A | A2517A      |               | 2          |       |
| 20013100                                   | A1602B | A1601A      |               | 1          |       |
| 20013101GND                                | A1602B | A1609B      |               | 2          |       |
| I0510100                                   | A1603A | D0604B      |               | 1          |       |
| A0500100                                   | A1603B | A1713A      |               | 1          |       |
| I0122100                                   | A1604A | B1507B      |               | 1          |       |
| I0122101                                   | A1604A | A2004A      |               | 2          |       |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 12        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| I0124100                                   | A1604B | B1502A      |               | 1            |           |      |
| I0124101                                   | A1604B | A2004B      |               | 2            |           |      |
| A0500300                                   | A1605A | A1709A      |               | 1            |           |      |
| A0500200                                   | A1605B | A1711B      |               | 1            |           |      |
| I0123100                                   | A1606A | B1503A      |               | 1            |           |      |
| I0123101                                   | A1606A | A2006A      |               | 2            |           |      |
| I0125100                                   | A1606B | B1504B      |               | 1            |           |      |
| I0125101                                   | A1606B | A2006B      |               | 2            |           |      |
| I0181101                                   | A1607A | B1703B      |               | 2            |           |      |
| A0500400                                   | A1607B | A1711A      |               | 1            |           |      |
| A0500401                                   | A1607B | D0205A      |               | 2            |           |      |
| I0126100                                   | A1608A | B1607B      |               | 1            |           |      |
| I0126101                                   | A1608A | A2008A      |               | 2            |           |      |
| A0501100                                   | A1606B | A1713B      |               | 1            |           |      |
| A0501101                                   | A1608B | D0304A      |               | 2            |           |      |
| 20013101GND                                | A1609B | A1602B      |               | 2            |           |      |
| 20013102GND                                | A1609B | A1610A      |               | 1            |           |      |
| 20013102GND                                | A1610A | A1609B      |               | 2            |           |      |
| 20013103GND                                | A1610A | A1611B      |               | 2            |           |      |
| 20013103GND                                | A1611B | A1610A      |               | 2            |           |      |
| 20013104GND                                | A1611B | A1612B      |               | 1            |           |      |
| 20013104GND                                | A1612B | A1611B      |               | 1            |           |      |
| 20013105GND                                | A1612B | A1613B      |               | 2            |           |      |
| 20013105GND                                | A1613B | A1612B      |               | 2            |           |      |
| 20013106GND                                | A1613B | A1614A      |               | 1            |           |      |
| 20013106GND                                | A1614A | A1613B      |               | 1            |           |      |
| I0540100                                   | A1702A | C2114B      |               | 1            |           |      |
| I0002100                                   | A1702B | A1703A      |               | 1            |           |      |
| I0002100                                   | A1703A | A1702B      |               | 1            |           |      |
| I0331103                                   | A1703B | A2213A      |               | 2            |           |      |
| I0331104                                   | A1703B | D1209B      |               | 1            |           |      |
| I0531100                                   | A1705A | JA8111A     |               | 1            |           |      |
| I0543100                                   | A1706A | JA8103B     |               | 1            |           |      |
| I0542100                                   | A1706B | JA8103A     |               | 1            |           |      |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO.    | REV. |
|--|--------|-------------|---------------|--------------|--------------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 13           | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES        |      |
| I0545100                                   | A1707A | JA8104B     |               | 1            |              |      |
| I0544100                                   | A1707B | JA8104A     |               | 1            |              |      |
| A0500300                                   | A1709A | A1605A      |               | 1            |              |      |
| A0500301                                   | A1709A | D0305A      |               | 2            |              |      |
| I0518100                                   | A1709B | D0604A      |               | 1            |              |      |
| I0536100                                   | A1710A | JA8101A     |               | 1            |              |      |
| I0537100                                   | A1710B | JA8101B     |               | 1            |              |      |
| A0500400                                   | A1711A | A1607B      |               | 1            |              |      |
| A0500200                                   | A1711B | A1605B      |               | 1            |              |      |
| A0500201                                   | A1711B | D0204A      |               | 2            |              |      |
| I0539100                                   | A1712A | JA8102B     |               | 1            |              |      |
| I0538100                                   | A1712B | JA8102A     |               | 1            |              |      |
| A0500100                                   | A1713A | A1603B      |               | 1            |              |      |
| A0500101                                   | A1713A | D0708B      |               | 2            |              |      |
| A0501100                                   | A1713B | A1608B      |               | 1            |              |      |
| I1006104                                   | A1802A | B1511A      |               | 1            |              |      |
| I1158100                                   | A1802B | A1808B      |               | 1            |              |      |
| A0951601                                   | A1803A | A1508B      |               | 2            |              |      |
| A0951501                                   | A1803B | A1507B      |               | 2            |              |      |
| I1395100                                   | A1804A | A0311B      |               | 1            |              |      |
| I1405109                                   | A1804B | D0403A      |               | 2            |              |      |
| A0252201                                   | A1805A | A1908B      |               | 2            |              |      |
| A0252203                                   | A1805A | D0311B      |               | 1            |              |      |
| I1411109                                   | A1805B | D0404B      |               | 2            |              |      |
| A0203202                                   | A1806A | A2309A      |               | 2            |              |      |
| A0951301                                   | A1806B | A1503A      |               | 2            |              |      |
| N1065103                                   | A1807A | A1411A      |               | 2            |              |      |
| A0951401                                   | A1807B | A1508A      |               | 2            |              |      |
| A0951201                                   | A1808A | A1505B      |               | 2            |              |      |
| I115A100                                   | A1808B | A1802B      |               | 1            |              |      |
| N0193100                                   | A1809A | A1813B      |               | 1            |              |      |
| 20028100                                   | A1809A | A1801A      |               | 2            | BR3E4/5 ONLY |      |
| I0100126                                   | A1809B | B1102B      |               | 2            |              |      |
| 80113100TTR                                | A1810A | C2709A      |               | 1            |              |      |
| A0951101                                   | A1810B | A1506A      |               | 2            |              |      |

| TITLE                                      |        |             | WL            | DOCUMENT NO. | SHEET NO.    | REV. |
|--|--------|-------------|---------------|--------------|--------------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 14           | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES        |      |
| I0787100                                   | A1811A | B2801B      |               | 1            |              |      |
| I0788100                                   | A1811B | B1804A      |               | 1            |              |      |
| N0195100                                   | A1812A | A2314B      |               | 1            |              |      |
| 20049100                                   | A1812A | A1814A      |               | 2            | BR3E4/5 ONLY |      |
| I0184101                                   | A1812B | A2212A      |               | 2            |              |      |
| K0200202                                   | A1813A | A2216A      |               | 2            |              |      |
| N0193100                                   | A1813B | A1809A      |               | 1            |              |      |
| N0193101                                   | A1813B | A2012B      |               | 2            |              |      |
| 20043100                                   | A1901A | JA8308A     |               | 1            |              |      |
| I0278100                                   | A1902A | JA8108B     |               | 1            |              |      |
| I1504100                                   | A1902B | D2007B      |               | 1            |              |      |
| K0052104                                   | A1903A | C0913B      |               | 1            |              |      |
| A1078101                                   | A1903B | D0903A      |               | 2            |              |      |
| I1503100                                   | A1904A | D2008B      |               | 1            |              |      |
| K0050104                                   | A1904B | C0911B      |               | 1            |              |      |
| A1053101                                   | A1905A | C0903A      |               | 2            |              |      |
| I0967100                                   | A1905B | C1406B      |               | 1            |              |      |
| K0050202                                   | A1906A | D1813A      |               | 1            |              |      |
| I0046102                                   | A1906B | B1110A      |               | 2            |              |      |
| I0046103                                   | A1906B | A2804B      |               | 1            |              |      |
|  |        |             |               |              |              |      |
| K0052202                                   | A1907A | D1913A      |               | 2            |              |      |
| A0251302                                   | A1907B | A2716B      |               | 1            |              |      |
|  |        |             |               |              |              |      |
| I0966100                                   | A1908A | C1606B      |               | 1            |              |      |
| A0252200                                   | A1908B | A2012A      |               | 1            |              |      |
| A0252201                                   | A1908B | A1805A      |               | 2            |              |      |
| A0251400                                   | A1909A | A2011A      |               | 2            |              |      |
| A0251401                                   | A1909A | C0108A      |               | 1            |              |      |
| I0279100                                   | A1909B | JA8105B     |               | 1            |              |      |
| N1165100                                   | A1910A | C1203A      |               | 1            |              |      |
| 60000100                                   | A1910B | JA8404A     |               | 1            |              |      |
| N1173100                                   | A1911A | A1405A      |               | 1            |              |      |
| N1170100                                   | A1911B | B1209A      |               | 1            |              |      |
| N1166100                                   | A1912A | C1209B      |               | 1            |              |      |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 15        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| L0001100                                   | A1912B | JAA409A     |               | 1            |           |      |
| I02A0100                                   | A1913A | JA8106B     |               | 1            |           |      |
| A0252100                                   | A1913B | A2013A      |               | 1            |           |      |
| A0252101                                   | A1913B | D0705B      |               | 2            |           |      |
| 20014100GND                                | A2001A | A2002B      |               | 1            |           |      |
| N0220100                                   | A2002A | B2509A      |               | 1            |           |      |
| 20014100GND                                | A2002B | A2001A      |               | 1            |           |      |
| I0256100                                   | A2003A | B1704B      |               | 1            |           |      |
| A0250100                                   | A2003B | B2313B      |               | 1            |           |      |
| A0250101                                   | A2003B | C0808A      |               | 2            |           |      |
| I0122101                                   | A2004A | A1604A      |               | 2            |           |      |
| I0122102                                   | A2004A | B2 07B      |               | 1            |           |      |
| I0124101                                   | A2004B | A1604B      |               | 2            |           |      |
| I0124102                                   | A2004B | B2209A      |               | 1            |           |      |
| A0250300                                   | A2005A | C0608A      |               | 1            |           |      |
| A0250301TTR                                | A2005A | C2712A      |               | 2            |           |      |
| A0250200                                   | A2005B | C0708A      |               | 1            |           |      |
| I0123101                                   | A2006A | A1606A      |               | 2            |           |      |
| I0123102                                   | A2006A | B2207A      |               | 1            |           |      |
| I0125101                                   | A2006B | A1606B      |               | 2            |           |      |
| I0125102                                   | A2006B | B2209B      |               | 1            |           |      |
| I0188100                                   | A2007A | A2210B      |               | 1            |           |      |
| A0250400                                   | A2007B | C0508A      |               | 1            |           |      |
| A0250401TTR                                | A2007B | C2713B      |               | 2            |           |      |
| I0126101                                   | A2008A | A1608A      |               | 2            |           |      |
| I0126102                                   | A2008A | B2206B      |               | 1            |           |      |
| A0251100                                   | A2008B | C0408A      |               | 1            |           |      |
| A0251101TTR                                | A2008B | C2713A      |               | 2            |           |      |
| A0251300                                   | A2009A | C2716B      |               | 1            |           |      |
| A0251301                                   | A2009A | C0208A      |               | 2            |           |      |
| I0128101                                   | A2009B | B1602A      |               | 2            |           |      |
| I0128102                                   | A2009B | B2211A      |               | 1            |           |      |
| I0127100                                   | A2010A | B1603A      |               | 1            |           |      |
| I0127101                                   | A2010A | C1217A      |               | 2            |           |      |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.         |
|--|--------|-------------|---------------|------------|--------------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 16         | B            |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES        |
| A0251200                                   | A20108 | C0308A      |               | 1          |              |
| A0251201TTR                                | A20108 | C27148      |               | 2          |              |
| A0251400                                   | A2011A | A1909A      |               | 2          |              |
| A0251402TTR                                | A2011A | C2716A      |               | 1          |              |
| I0129100                                   | A20118 | B16048      |               | 1          |              |
| I0129101                                   | A20118 | B2204A      |               | 2          |              |
| A0252200                                   | A2012A | A1908A      |               | 1          |              |
| A0252202                                   | A2012A | C2714A      |               | 2          |              |
| N0193101                                   | A20128 | A16138      |               | 2          |              |
| A0252100                                   | A2013A | A19138      |               | 1          |              |
| A0252102                                   | A2013A | D02138      |               | 2          |              |
| I0130100                                   | A20138 | B17078      |               | 1          |              |
| I0130101                                   | A20138 | B22058      |               | 2          |              |
| A0352100                                   | A21138 | B30038      |               | 1          |              |
| 40006100                                   | A2115A | C2815B      |               | 1          |              |
| A0351100                                   | A21158 | B30058      |               | 1          |              |
| N0156101                                   | A2202A | D1207A      |               | 2          |              |
| N0156102                                   | A2202A | B2004A      |               | 1          |              |
| I0192100                                   | A22028 | B27068      |               | 1          |              |
| M0150101                                   | A2203A | A08108      |               | 2          | S/C 32 & BLW |
| I0661101                                   | A2203A | A08108      |               | 2          | S/C 33 & ABV |
| K0550200                                   | A22038 | A1109A      |               | 1          |              |
| N0202100                                   | A2204A | A2310A      |               | 1          |              |
| I0197100                                   | A22048 | B25058      |               | 1          |              |
| I0154100                                   | A2205A | B2501A      |               | 1          |              |
| I0163100                                   | A22058 | A1408A      |               | 1          |              |
| I0158100                                   | A2206A | A25118      |               | 1          |              |
| I0156100                                   | A22068 | D03138      |               | 1          |              |
| I0160100                                   | A2207A | D0712A      |               | 1          |              |
| I0166100                                   | A22078 | A2712A      |               | 1          |              |
| I0166100                                   | A2208A | A25078      |               | 1          |              |
| I0167100                                   | A22088 | A27098      |               | 1          |              |
| A0153200                                   | A2209A | B23128      |               | 1          |              |
| N0203100                                   | A22098 | A2306A      |               | 2          |              |
| N0203101                                   | A22098 | A14098      |               | 1          |              |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.           |
|--|--------|-------------|---------------|------------|----------------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 17         | K              |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES          |
| I0174102                                   | A2210A | 80912B      |               | 1          |                |
| I0188100                                   | A2210B | A2007A      |               | 1          |                |
| I0188101                                   | A2210B | A2307A      |               | 2          |                |
| I0169100                                   | A2211A | 82707B      |               | 1          |                |
| K0205202                                   | A2211B | D2202A      |               | 1          | S/C 49 & Above |
| K0205200                                   | A2211B | A1112B      |               | 1          | S/C 48 & Below |
| I0184100                                   | A2212A | A2416A      |               | 1          |                |
| I0184101                                   | A2212A | A1812B      |               | 2          |                |
| I0331102                                   | A2213A | C2715A      |               | 1          |                |
| I0331103                                   | A2213A | A1703B      |               | 2          |                |
| I0189100                                   | A2213B | A2410B      |               | 1          |                |
| I0051102                                   | A2214A | 82311A      |               | 1          |                |
| M0151103                                   | A2214B | 81807B      |               | 2          |                |
| M0151104                                   | A2214B | 82504B      |               | 1          |                |
| A0210200                                   | A2215A | 82510A      |               | 1          |                |
| K0200200                                   | A2216A | A2309B      |               | 1          |                |
| K0200202                                   | A2216A | A1813A      |               | 2          |                |
| N0216100                                   | A2217B | A2407A      |               | 1          |                |
| N0216102                                   | A2217B | C2116B      |               | 2          |                |
| 20044100                                   | A2301A | JA8410A     |               | 1          |                |
| N0207100                                   | A2302A | A2311B      |               | 1          |                |
| N0207102                                   | A2302A | A2311A      |               | 2          |                |
| A0365100                                   | A2303A | A3007B      |               | 1          |                |
| I0201101                                   | A2304A | A2308A      |               | 2          |                |
| A0364100                                   | A2304B | A3006B      |               | 1          |                |
| I0330101                                   | A2305B | A2509B      |               | 1          |                |
| I0330102                                   | A2305B | D1205A      |               | 2          |                |
| N0203100                                   | A2306A | A2209B      |               | 2          |                |
| I01661                                     | A2306B | A2507B      |               | 2          |                |
| I0188101                                   | A2307A | A2210B      |               | 2          |                |
| I0188102                                   | A2307A | 82507B      |               | 1          |                |
| A0203100                                   | A2307B | 82307B      |               | 1          |                |
| I0201100                                   | A2308A | 81702B      |               | 1          |                |
| I0201101                                   | A2308A | A2304A      |               | 2          |                |
| A0203200                                   | A2309A | 82306A      |               | 1          |                |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 18         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| A0203202                                   | A2309A | A1806A      |               | 2          |       |
| K0200200                                   | A2309B | A2216A      |               | 1          |       |
| K0200201                                   | A2309B | B2313A      |               | 2          |       |
| N0202100                                   | A2310A | A2204A      |               | 1          |       |
| N0208100                                   | A2310B | A2510B      |               | 1          |       |
| N0207102                                   | A2311A | A2302A      |               | 2          |       |
| N0207100                                   | A2311B | A2302A      |               | 1          |       |
| N0207101                                   | A2311B | A2512A      |               | 2          |       |
| A0204100                                   | A2312A | A2809B      |               | 1          |       |
| A0204101                                   | A2312A | C0412A      |               | 2          |       |
| A0204200                                   | A2312B | C0312A      |               | 1          |       |
| A0204201                                   | A2312B | B2813B      |               | 2          |       |
| I0217100                                   | A2313A | B2213A      |               | 1          |       |
| A0204300                                   | A2313B | C0212A      |               | 1          |       |
| A0204301                                   | A2313B | B2808B      |               | 2          |       |
| I0219100                                   | A2314A | B2211B      |               | 1          |       |
| N0195100                                   | A2314B | A1812A      |               | 1          |       |
| I0220100                                   | A2315A | B2212A      |               | 1          |       |
| I0221100                                   | A2315B | B2206A      |               | 1          |       |
| A0204400                                   | A2316A | B2307A      |               | 1          |       |
| I0218100                                   | A2316B | B2205A      |               | 1          |       |
| A0205100                                   | A2317A | B2811A      |               | 1          |       |
| A0205101                                   | A2317A | C0812A      |               | 2          |       |
| A0205200                                   | A2317B | B2810B      |               | 1          |       |
| A0205201                                   | A2317B | C0712A      |               | 2          |       |
| 20012100GND                                | A2401A | A2416B      |               | 1          |       |
| 20012101                                   | A2401A | A2409B      |               | 2          |       |
| I0176102                                   | A2406B | A2407B      |               | 1          |       |
| I0176103                                   | A2406B | B0708A      |               | 2          |       |
| N0216100                                   | A2407A | A2217B      |               | 1          |       |
| N0216101                                   | A2407A | A2514A      |               | 2          |       |
| I0176101                                   | A2407B | A2415B      |               | 2          |       |
| I0176102                                   | A2407B | A2406B      |               | 1          |       |
| I0175100                                   | A2408B | A1109B      |               | 2          |       |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 19         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I0175102TTR                                | A24088 | C27128      |               | 1          |       |
| 20012101                                   | A24098 | A2401A      |               | 2          |       |
| 20012102                                   | A24098 | A24118      |               | 1          |       |
| I0189100                                   | A24108 | A22138      |               | 1          |       |
| 20012102                                   | A24118 | A24098      |               | 1          |       |
| I0194100                                   | A24128 | A25128      |               | 1          |       |
| I0194101                                   | A24128 | D1206A      |               | 2          |       |
| I0176100                                   | A24158 | 825068      |               | 1          |       |
| I0176101                                   | A24158 | A24078      |               | 2          |       |
| I0184100                                   | A2416A | A2212A      |               | 1          |       |
| 20012100GND                                | A24168 | A2401A      |               | 1          |       |
| I0051100                                   | A2504A | 82401A      |               | 1          |       |
| A0385100                                   | A25048 | 822138      |               | 1          |       |
| A0386100                                   | A25058 | 822038      |               | 2          |       |
| I0188103                                   | A2507A | 825078      |               | 2          |       |
| I0188104                                   | A2507A | A28038      |               | 1          |       |
| I01661                                     | A25078 | A23068      |               | 2          |       |
| I0166100                                   | A25078 | A2208A      |               | 1          |       |
| I11711                                     | A2508A | C0613A      |               | 2          |       |
| I11021                                     | A25088 | A1407A      |               | 1          |       |
| I0330100                                   | A25098 | A2808A      |               | 2          |       |
| I0330101                                   | A25098 | A23058      |               | 1          |       |
| A0312100                                   | A2510A | A27148      |               | 1          |       |
| N0206100                                   | A25108 | A23108      |               | 1          |       |
| N0206101                                   | A25108 | A28068      |               | 2          |       |
| I1162100                                   | A2511A | A15038      |               | 1          |       |
| I0158100                                   | A25118 | A2206A      |               | 1          |       |
| N0207101                                   | A2512A | A23118      |               | 2          |       |
| I0194100                                   | A25128 | A24128      |               | 1          |       |
| A0211100                                   | A25138 | 82201A      |               | 1          |       |
| N0216101                                   | A2514A | A2407A      |               | 2          |       |
| K0050203                                   | A2515A | 81404A      |               | 2          |       |
| K0050204                                   | A2515A | 825098      |               | 1          |       |
| K0052203                                   | A25158 | 81407A      |               | 1          |       |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 20        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| K0052204                                   | A2515B | B2508A      |               | 2            |           |      |
| K0550100                                   | A2516A | A1102A      |               | 1            |           |      |
| I0380100                                   | A2516B | A2816A      |               | 1            |           |      |
| N1188100                                   | A2517A | B0605A      |               | 1            |           |      |
| N1188101                                   | A2517A | A1602A      |               | 2            |           |      |
| I0181100                                   | A2517B | B1703B      |               | 1            |           |      |
| K0728101                                   | A2604B | D2010A      |               | 2            |           |      |
| K0728201                                   | A2605B | B1802B      |               | 2            |           |      |
| K0679100                                   | A2609B | B1802A      |               | 1            |           |      |
| N0752100                                   | A2610B | B2611B      |               | 1            |           |      |
| N0753100                                   | A2614B | B2610A      |               | 1            |           |      |
| A0302100                                   | A2703A | D3002B      |               | 1            |           |      |
| I0324100                                   | A2703B | B2805A      |               | 1            |           |      |
| I0325100                                   | A2704A | B2806B      |               | 1            |           |      |
| I0326100                                   | A2704B | B2807B      |               | 1            |           |      |
| I0327100                                   | A2705A | B2806A      |               | 1            |           |      |
| I0323100                                   | A2705B | B2805B      |               | 1            |           |      |
| I0322100                                   | A2706A | B2804A      |               | 1            |           |      |
| I0321100                                   | A2706B | B2804B      |               | 1            |           |      |
| I0187100                                   | A2709B | A2208B      |               | 1            |           |      |
| K0304200                                   | A2710A | A2806A      |               | 1            |           |      |
| A0384100                                   | A2710B | C3008B      |               | 1            |           |      |
| K0305200                                   | A2711A | A2802A      |               | 1            |           |      |
| 30004100                                   | A2711B | JA8005B     |               | 1            |           |      |
| I0186100                                   | A2712A | A2207B      |               | 1            |           |      |
| A0310100                                   | A2712B | B2802B      |               | 1            |           |      |
| I0332100                                   | A2713B | A2802B      |               | 1            |           |      |
| A0309100                                   | A2714A | B2802A      |               | 1            |           |      |
| A0312100                                   | A2714B | A2510A      |               | 1            |           |      |
| 30003100                                   | A2715A | JA8005A     |               | 1            |           |      |
| A0311100                                   | A2715B | B2502B      |               | 1            |           |      |
| K0305200                                   | A2802A | A2711A      |               | 1            |           |      |
| I0332100                                   | A2802B | A2713B      |               | 1            |           |      |
| K0304100                                   | A2803A | C0110B      |               | 1            |           |      |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.           |
|--|--------|-------------|---------------|------------|----------------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 21         | K              |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES          |
| I01A8104                                   | A2803B | A2507A      |               | 1          |                |
| I0090102                                   | A2804A | B2409A      |               | 1          |                |
| I0046104                                   | A2804B | A1906B      |               | 1          |                |
| I0046104                                   | A2804B | D0806B      |               | 2          |                |
| A0153202                                   | A2805B | B2504A      |               | 1          |                |
| K0304200                                   | A2806A | A2710A      |               | 1          |                |
| N0208101                                   | A2806B | A2510B      |               | 2          |                |
| I0334100                                   | A2807A | B2709B      |               | 1          |                |
| I0249100                                   | A2807B | B2305B      |               | 1          |                |
| I0330100                                   | A2808A | A2509B      |               | 2          |                |
| I0330104                                   | A2808A | B2005A      |               | 1          |                |
| I0331100                                   | A2808B | C2709B      |               | 1          |                |
| N1163101                                   | A2809A | C3017B      |               | 2          |                |
| A0204100                                   | A2809B | A2312A      |               | 1          |                |
| M0151109                                   | A2810A | A2811B      |               | 1          |                |
| M0006100                                   | A2810B | A0213A      |               | 1          |                |
| I0001100                                   | A2811A | A0403A      |               | 1          |                |
| M0151107                                   | A2811B | B2803B      |               | 2          |                |
| M0151109                                   | A2811B | A2810A      |               | 1          |                |
| N1148100                                   | A2812A | A1206A      |               | 1          |                |
| N1164101                                   | A2812B | D3001B      |               | 2          |                |
| I0380100                                   | A2816A | A2516B      |               | 1          |                |
| N0200100                                   | A2816B | B2305A      |               | 1          |                |
| N1227102                                   | A2817A | B1410A      |               | 1          |                |
| I0100112                                   | A2817B | B1709B      |               | 1          |                |
| I0100113                                   | A2817B | D1413A      |               | 2          |                |
| 70003100TP3                                | A3001B | JA8514A     |               | 1          |                |
| 70001100TP1                                | A3002B | JA8513A     |               | 1          |                |
| A0365100                                   | A3007B | A2303A      |               | 1          |                |
| A0364100                                   | A3008B | A2304B      |               | 1          |                |
| A0320100                                   | A3009B | C3007B      |               | 1          |                |
| I0348102                                   | A3010B | C2204B      |               | 2          | S/C 49 & Above |
| I0348100                                   | A3010B | B2011B      |               | 1          |                |
| K0311100                                   | A3011B | B2202A      |               | 1          |                |
| K0310200                                   | A3012B | D2105B      |               | 1          |                |
| I1202105                                   | B0102B | B0205A      |               | 1          |                |
| I0730000                                   | B0107A | D2203B      |               | 1          | S/C 49 & Above |
| I1248000                                   | B0107B | B0406B      |               | 1          | S/C 49 & Above |
| I1248000                                   | B0107B | C0709B      |               | 2          | S/C 49 & Above |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
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| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 22        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| I1202106                                   | 801028 | 80105A      |               | 2            |           |      |
| I1223100                                   | 80103A | 804128      |               | 1            |           |      |
| I1208100                                   | 801038 | A14028      |               | 1            |           |      |
| K0603100                                   | 80104A | 81304A      |               | 1            |           |      |
| I1221100                                   | 801048 | 80412A      |               | 1            |           |      |
| I1202106                                   | 80105A | 801028      |               | 2            |           |      |
| I1246105                                   | 80106A | 803028      |               | 2            |           |      |
| I1246106                                   | 80106A | 80108A      |               | 1            |           |      |
|  |        |             |               |              |           |      |
|  |        |             |               |              |           |      |
| I1244100                                   | 801078 | 804068      |               | 1            |           |      |
| I1246106                                   | 80108A | 80106A      |               | 1            |           |      |
| N0552101                                   | 80109A | A112A       |               | 1            |           |      |
| I1238100                                   | 801098 | 80406A      |               | 1            |           |      |
| I0580103                                   | 802028 | 80507A      |               | 1            |           |      |
| I1211100                                   | 80203A | 80407A      |               | 1            |           |      |
| A1211100TTR                                | 802038 | D27038      |               | 1            |           |      |
| I1200100                                   | 80204A | 80510A      |               | 1            |           |      |
| I1209100                                   | 802048 | 804098      |               | 1            |           |      |
| I1209101                                   | 802048 | C0113A      |               | 2            |           |      |
| I1202104                                   | 80205A | 80206A      |               | 2            |           |      |
| I1202105                                   | 80205A | 801028      |               | 1            |           |      |
| I1202103                                   | 80206A | 80208A      |               | 1            |           |      |
| I1202104                                   | 80206A | 80205A      |               | 2            |           |      |
| K1172200                                   | 80207A | 806138      |               | 1            |           |      |
| I1213100                                   | 802078 | 80409A      |               | 1            |           |      |
| I1202102                                   | 80208A | 80211A      |               | 2            |           |      |
| I1202103                                   | 80208A | 80206A      |               | 1            |           |      |
| I1203100                                   | 80209A | D1212A      |               | 2            |           |      |
| I1215100                                   | 802098 | 804108      |               | 1            |           |      |
| N1212100                                   | 80210A | 81210A      |               | 1            |           |      |
| I1202101                                   | 80211A | 802128      |               | 1            |           |      |
| I1202102                                   | 80211A | 80208A      |               | 2            |           |      |
| I1217100                                   | 802118 | 80411A      |               | 1            |           |      |

| TITLE                                |        | WL          | DOCUMENT NO. | SHEET NO. | REV.           |
|--------------------------------------|--------|-------------|--------------|-----------|----------------|
| LOGIC WIRE WRAP                      |        |             | HPDE-7992    | 23        | K.             |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTINATION | WIRE COLOR   | Z LEVEL   | NOTES          |
| I1202100                             | 80212B | 80510B      |              | 2         |                |
| I1202101                             | 80212B | 80211A      |              | 1         |                |
| I1219100                             | 80213A | 80411B      |              | 1         |                |
| I1207100                             | 80213B | 80504A      |              | 1         |                |
| I1207101                             | 80213B | 81212A      |              | 2         |                |
| I1246104                             | 80302B | 80305A      |              | 1         |                |
| I1246105                             | 80302B | 80106A      |              | 2         |                |
| I1232100                             | 80303A | 80403A      |              | 1         |                |
| N1222100                             | 80303B | A1009B      |              | 1         |                |
| N1220100                             | 80304A | A1002A      |              | 1         |                |
| I1230100                             | 80304B | 80403B      |              | 1         |                |
| I1246103                             | 80305A | 80306A      |              | 2         |                |
| I1246104                             | 80305A | 80302B      |              | 1         |                |
| I1246102                             | 80306A | 80308A      |              | 1         |                |
| I1246103                             | 80306A | 80305A      |              | 2         |                |
| N1224100                             | 80307A | A1013A      |              | 1         |                |
| I1234100                             | 80307B | 80404B      |              | 1         |                |
| I1246101                             | 80308A | 80312B      |              | 2         |                |
| I1246102                             | 80308A | 80306A      |              | 1         |                |
| N1226100                             | 80309A | A1012A      |              | 1         |                |
| I1236100                             | 80309B | 80405A      |              | 1         |                |
| 60007101                             | 80310A | A0204B      |              | 2         |                |
| 60007102                             | 80310A | 80311A      |              | 1         |                |
| 60007102                             | 80311A | 80310A      |              | 1         |                |
| I1246100                             | 80312B | 80513B      |              | 1         |                |
| I1246101                             | 80312B | 80308A      |              | 2         |                |
| N1200100                             | 80313A | 80408B      |              | 1         |                |
| K1203200                             | 80313B | D1211B      |              | 1         |                |
| 20052100 GND                         | B0401A | B0406B      |              | 1         | S/C 48 & Below |
| N1187100                             | 80402B | 80709B      |              | 1         |                |
| I1232100                             | 80403A | 80303A      |              | 1         |                |
| I1232101                             | 80403A | C0209B      |              | 2         |                |
| I1230100                             | 80403B | 80304B      |              | 1         |                |
| I1230101                             | 80403B | C0109B      |              | 2         |                |
| K0550204                             | 80404A | A0603B      |              | 1         |                |

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| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 24             | K    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES          |      |
| K0550205                                   | 80404A | JA8106A     |               | 2            |                |      |
| I1234100                                   | 80404B | 80307B      |               | 1            |                |      |
| I1234101                                   | 80404B | C0309B      |               | 2            |                |      |
| I1236100                                   | 80405A | 80309B      |               | 1            |                |      |
| I1236101                                   | 80405A | C0409B      |               | 2            |                |      |
| N1181100                                   | 80405B | 80713A      |               | 1            |                |      |
| N1181101                                   | 80405B | D0709B      |               | 2            |                |      |
| I1238100                                   | 80406A | 80109B      |               | 1            |                |      |
| I1238101                                   | 80406A | C0809B      |               | 2            |                |      |
| I1248000                                   | B0406B | B0107B      |               | 1            | S/C 49 & Above |      |
| 20052100 GND                               | 80406B | B0401A      |               | 1            | S/C 48 & Below |      |
| I1211100                                   | 80407A | 80203A      |               | 1            |                |      |
| I1211101                                   | 80407A | C0213A      |               | 2            |                |      |
| I1244100                                   | 80407B | C1311B      |               | 1            |                |      |
| N1200100                                   | 80408B | 80313A      |               | 1            |                |      |
| N1200101                                   | 80408B | C0609B      |               | 2            |                |      |
| I1213100                                   | 80409A | 80207B      |               | 1            |                |      |
| I1213101                                   | 80409A | C0313A      |               | 2            |                |      |
| I1213101                                   | 80409A | C0313A      |               | 2            |                |      |
| I1209100                                   | 80409B | 80204B      |               | 1            |                |      |
| I1215100                                   | 80410B | 80209B      |               | 1            |                |      |
| I1215101                                   | 80410B | D0304B      |               | 2            |                |      |
| I1217100                                   | 80411A | 80211B      |               | 1            |                |      |
| I1217101                                   | 80411A | D0203B      |               | 2            |                |      |
| I1219100                                   | 80411B | 80213A      |               | 1            |                |      |
| I1219101                                   | 80411B | D0303B      |               | 2            |                |      |
| I1221100                                   | 80412A | 80104B      |               | 1            |                |      |
| I1221101                                   | 80412A | D0204B      |               | 2            |                |      |
| I1223100                                   | 80412B | 80103A      |               | 1            |                |      |
| I1223101                                   | 80412B | D0707A      |               | 2            |                |      |
| N1177100                                   | 80413A | 80707A      |               | 1            |                |      |
| N1177101                                   | 80413A | C0210B      |               | 2            |                |      |
| I1229100                                   | 80413B | C1512B      |               | 1            |                |      |
| 20021100                                   | 80501A | 80502B      |               | 1            |                |      |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE-7992     | 25         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| T1204100                                   | B0502A | B1212B      |               | 1          |       |
| 20021100GND                                | B0502B | B0501A      |               | 1          |       |
| T0330103                                   | B0503A | D1205A      |               | 1          |       |
| K0050100                                   | B0503B | B1404B      |               | 1          |       |
| K0050105                                   | B0503B | B0904B      |               | 2          |       |
| T1207100                                   | B0504A | B0213B      |               | 1          |       |
| N12271                                     | B0504B | B1410A      |               | 2          |       |
| N1227100                                   | B0504B | C1112B      |               | 1          |       |
| A0952300                                   | B0505A | D1210B      |               | 2          |       |
| A0952301                                   | B0505A | D0611A      |               | 1          |       |
| A0952603                                   | B0505B | B1A09A      |               | 1          |       |
| T0975100                                   | B0506A | A1010B      |               | 1          |       |
| N1200100                                   | B0506B | A0111A      |               | 1          |       |
| N1200101                                   | B0506B | C1212A      |               | 2          |       |
| T0580101                                   | B0507A | B0507B      |               | 2          |       |
| T0580103                                   | B0507A | B0202B      |               | 1          |       |
| T0580100                                   | B0507B | A1104A      |               | 1          |       |
| T0580101                                   | B0507B | B0507A      |               | 2          |       |
| N1215100                                   | B0508A | C1507A      |               | 1          |       |
| T1060100                                   | B0508B | C1405B      |               | 1          |       |
| T1065100                                   | B0509A | C1605B      |               | 1          |       |
| K0052100                                   | B0509B | B1407B      |               | 1          |       |
| K0052105                                   | B0509B | B0906B      |               | 2          |       |
| T1200100                                   | B0510A | B0204A      |               | 1          |       |
| T1202100                                   | B0510B | B0212B      |               | 2          |       |
| N1216100                                   | B0511A | B1213A      |               | 2          |       |
| A0956600                                   | B0511B | C1216A      |               | 1          |       |
| A0956500                                   | B0512B | C1216B      |               | 1          |       |
| A0956501                                   | B0512B | D0412A      |               | 2          |       |
| A1176200                                   | B0513A | B0711A      |               | 1          |       |
| A1176201                                   | B0513A | B1810A      |               | 2          |       |
| T1246100                                   | B0513B | B0312B      |               | 1          |       |
| T09651                                     | B0602A | D1211B      |               | 1          |       |
| T0963100                                   | B0602B | D1212A      |               | 1          |       |
| K11752                                     | B0603A | B1409A      |               | 2          |       |
| K1175200                                   | B0603A | B0A02B      |               | 1          |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.   |
|--|--------|-------------|---------------|------------|--|
| LOGIC WIRE WRAP                            |        |             | HP DE-7992    | 26         | B  |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES  |
| I1175100                                   | 80603B | 8080AA      |               | 1          |  |
| A0953500                                   | 80604A | D1703A      |               | 1          |  |
| I1187100                                   | 80604B | 80913B      |               | 1          |  |
| N1188100                                   | 80605A | A2517A      |               | 1          |  |
| A0953203                                   | 80605B | 80805A      |               | 1          |  |
| I1194100                                   | 80606A | D0602B      |               | 1          |  |
| I1182100                                   | 80606B | D1204A      |               | 1          |  |
| I0150104                                   | 80607A | A0605B      |               | 1          |  |
| N1198100                                   | 80607B | B1104A      |               | 1          |  |
| N1198101                                   | 80607B | A0802B      |               | 2          |  |
| A0953400                                   | 80608A | B1205B      |               | 1          |  |
| N1192100                                   | 80608B | A1212B      |               | 1          |  |
| I0128100                                   | 80609A | B1602A      |               | 1          |  |
| K1179200                                   | 80609B | 80703B      |               | 1          |  |
| I0003100                                   | 80610A | B2408A      |               | 1          |  |
| K0002200                                   | 80610B | A0A06B      |               | 1          |  |
| A1550100                                   | 80611A | A0908B      |               | 1          | BR3C9J/K & 3E4/5E ONLY<br>DELETE FOR BR3C9J/K & 3E4/5E |
| M0000100                                   | 80611A | A0113A      |               | 1          |  |
| N1066105                                   | 80611B | 80706A      |               | 1          |  |
| I0611102                                   | 80612A | C1215A      |               | 1          |  |
| I0611103                                   | 80612A | B1804A      |               | 2          |  |
| K1178100                                   | 80613A | D1208B      |               | 1          |  |
|  |        |             |               |            |  |
| K1177200                                   | 80613B | 80207A      |               | 1          |  |
| K1177201                                   | 80613B | B1202B      |               | 2          |  |
| N1175100                                   | 80702A | C0108B      |               | 2          |  |
| I1193101                                   | 80702B | B0903A      |               | 2          |  |
| A0953600                                   | 80703A | D1702B      |               | 1          |  |
| K1179200                                   | 80703B | 80609B      |               | 1          |  |
| K1179201                                   | 80703B | B1103A      |               | 2          |  |
| K1179100                                   | 80704A | B1113A      |               | 1          |  |
| K1179102                                   | 80704A | A0305B      |               | 2          |  |
| N1193100                                   | 80705A | 80809B      |               | 1          |  |
| N1196100                                   | 80705B | D1201A      |               | 1          |  |
| N1066104                                   | 80706A | C1215B      |               | 2          |  |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV   |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HP DE-7992    | 27         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| N1066105                                   | 80706A | 806118      |               | 1          |       |
| I0175101                                   | 80706B | A11098      |               | 1          |       |
| I0175103                                   | 80706B | 820048      |               | 2          |       |
| N1177100                                   | 80707A | 80413A      |               | 1          |       |
| I1199100                                   | 80707B | D12078      |               | 1          |       |
| I0176103                                   | 80708A | A24068      |               | 2          |       |
| N1056100                                   | 80708B | C1409A      |               | 1          |       |
| N1179100                                   | 80709A | C0513A      |               | 1          |       |
| N1187100                                   | 80709B | 804028      |               | 1          |       |
| A0956400                                   | 80710A | C1717A      |               | 1          |       |
| A0956401                                   | 80710A | D0511A      |               | 2          |       |
| A0956200                                   | 80710B | D1701A      |               | 2          |       |
| A0956201                                   | 80710B | D0510       |               | 1          |       |
| A1176200                                   | 80711A | 80517A      |               | 1          |       |
|  |        |             |               |            |       |
| K0454200                                   | 80711B | D11128      |               | 1          |       |
| I0566100                                   | 80712A | A1113A      |               | 1          |       |
| A1176100                                   | 80712B | D11038      |               | 1          |       |
| N11A1100                                   | 80713A | 804058      |               | 1          |       |
| N1215102                                   | 80713B | C1307A      |               | 1          |       |
| K1176100                                   | 80A02A | C0A05A      |               | 2          |       |
| K1175200                                   | 80A02B | 80603A      |               | 1          |       |
| K1175201                                   | 80A02B | C11158      |               | 2          |       |
| A0954201                                   | 80A03A | D1202A      |               | 1          |       |
| K11751                                     | 80A03B | 80A048      |               | 1          |       |
| K1175102                                   | 80A03B | C11168      |               | 2          |       |
| A0957200                                   | 80A04A | D0410A      |               | 1          |       |
| A0957201                                   | 80A04A | D1710A      |               | 2          |       |
| K11751                                     | 80A04B | 80A038      |               | 1          |       |
| K11751                                     | 80A04B | C1007A      |               | 2          |       |
| A0953202                                   | 80A05A | 81204A      |               | 2          |       |
| A0953203                                   | 80A05A | 806058      |               | 1          |       |
| I0976100                                   | 80A05B | A1010A      |               | 1          |       |
| A0954101                                   | 80A06A | 81205A      |               | 2          |       |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO.                | REV. |
|--|--------|-------------|---------------|--------------|--------------------------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 28                       | B    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES                    |      |
| A0954102                                   | B0A06A | D1203A      |               | 1            |                          |      |
| N1066101                                   | B0A06B | D1302B      |               | 1            |                          |      |
| N1066102                                   | B0A06B | C1117A      |               | 2            |                          |      |
| A0958500                                   | B0A07A | D1205A      |               | 1            |                          |      |
| A0958501                                   | B0A07A | B1A09B      |               | 2            |                          |      |
| A09584                                     | B0A07B | D1206A      |               | 2            |                          |      |
| I1175100                                   | B0A08A | B0603B      |               | 1            |                          |      |
| A0957102                                   | B0A08B | D1102A      |               | 1            |                          |      |
| I0047100                                   | B0A09A | B1110B      |               | 1            |                          |      |
| I0047101                                   | B0809A | A0908A      |               | 2            | BR3C9J/K & BR3C4/5E ONLY |      |
| N1193100                                   | B0A09B | B0205A      |               | 1            |                          |      |
| K1179101                                   | B0A10A | B1113A      |               | 2            |                          |      |
| I00501                                     | B0A10B | A1208A      |               | 1            |                          |      |
| I1186100                                   | B0A11A | C1316B      |               | 1            |                          |      |
| I1176100                                   | B0A11B | C1003A      |               | 1            |                          |      |
| I1176101                                   | B0A11B | D1002A      |               | 2            |                          |      |
| I1172100                                   | B0A12A | A1410A      |               | 1            |                          |      |
| I0174101                                   | B0A12B | B2502A      |               | 2            |                          |      |
| I0174102                                   | B0A12B | A2210A      |               | 1            |                          |      |
| I001A100                                   | B0A13A | A0112B      |               | 1            |                          |      |
| I1187100                                   | B0183B | B0604B      |               | 1            |                          |      |
| I1187101                                   | B0813B | A1103B      |               | 2            |                          |      |
| I0053100                                   | B0902A | B0905A      |               | 1            |                          |      |
| I0057100                                   | B0902B | B0913B      |               | 1            |                          |      |
| I1193100                                   | B0903A | B0907A      |               | 1            |                          |      |
| I1193101                                   | B0903A | B0702B      |               | 2            |                          |      |
| I0055100                                   | B0903B | B0904A      |               | 1            |                          |      |
| I0055100                                   | B0904A | B0903A      |               | 1            |                          |      |
| K0050105                                   | B0904B | B0503B      |               | 2            |                          |      |
| I0053100                                   | B0905A | B0902A      |               | 1            |                          |      |
| I0056100                                   | B0905B | B0907B      |               | 1            |                          |      |
| I0054100                                   | B0906A | B0909B      |               | 1            |                          |      |
| K0052105                                   | B0906B | B0509B      |               | 2            |                          |      |
| I0056100                                   | B0907B | B0905B      |               | 1            |                          |      |
| I1193100                                   | B0907A | B0903A      |               | 1            |                          |      |
| I0058100                                   | B0908A | B0912B      |               | 1            |                          |      |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.              |
|--|--------|-------------|---------------|------------|-------------------|
| LOGIC WIRE WRAP                            |        |             | HPDF-7992     | 30         | B                 |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES             |
| 20023103GND                                | 81008A | 81009B      |               | 2          |                   |
| A0450300                                   | 81009A | C1114A      |               | 1          |                   |
| 20023103GND                                | 81009B | 81008A      |               | 2          |                   |
| 20023104GND                                | 81009B | 81010A      |               | 1          |                   |
| 20023104GND                                | 81010A | 81009B      |               | 1          |                   |
| 20023105GND                                | 81010A | 81011B      |               | 2          |                   |
| A0450200                                   | 81010B | C1113B      |               | 1          |                   |
| 20023105GND                                | 81011B | 81010A      |               | 2          |                   |
| 20023106GND                                | 81011B | 81012B      |               | 1          |                   |
| 20023106GND                                | 81012B | 81011B      |               | 1          |                   |
| 20023107GND                                | 81012B | 81013B      |               | 2          |                   |
| 20023107GND                                | 81013B | 81012B      |               | 2          |                   |
| 20023108GND                                | 81013B | 81014A      |               | 1          |                   |
| 20023108GND                                | 81014A | 81013B      |               | 1          |                   |
| 20000100GND                                | 81101A | 81102A      |               | 1          |                   |
| 20000100GND                                | 81102A | 81101A      |               | 1          |                   |
| 20000101GND                                | 81102A | 81103B      |               | 2          |                   |
| I0100100                                   | 81102B | 81505B      |               | 1          |                   |
| I0100126                                   | 81102B | A1A09B      |               | 2          |                   |
| K1179201                                   | 81103A | 80703B      |               | 2          |                   |
| K1179202                                   | 81103A | 81112A      |               | 1          |                   |
| 20000101GND                                | 81103B | 81102A      |               | 2          |                   |
| 20000102GND                                | 81103B | 81109B      |               | 1          |                   |
| N1198100                                   | 81104A | 80607B      |               | 1          |                   |
| I0569100                                   | 81104B | 82409B      |               | 1          |                   |
| M0081100                                   | 81105A | A0212A      |               | 1          |                   |
|  |        |             |               |            |                   |
| K1203201                                   | 81105B | D1211B      |               | 2          |                   |
| I0014100                                   | 81106A | A0403B      |               | 1          |                   |
| I0014101                                   | 81106A | A0407A      |               | 2          |                   |
| Y0000202                                   | B1106B | A0106B      |               | 1          | S/C 33 & ABV ONLY |
| Y0000201                                   | 81106B | A0A04A      |               | 2          |                   |
| X0650100                                   | B1107A | A0106A      |               | 1          | S/C 33 & ABV ONLY |
| N0155101                                   | 81107A | A0211B      |               | 2          | S/C 32 & BLW ONLY |
| N1299100                                   | 81107B | D1210A      |               | 1          |                   |
|  |        |             |               |            |                   |

| TITLE                                |        | WL          | DOCUMENT NO. | SHEET NO. | REV.  |
|--------------------------------------|--------|-------------|--------------|-----------|-------|
| LOGIC WIRE WRAP                      |        |             | HPDE-7992    | 31        | A     |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN | DESTINATION | WIRE COLOR   | Z LEVEL   | NOTES |
| 200007.02GND                         | 81109A | 81109B      |              | 2         |       |
| 200007.02GND                         | 81109B | 81103B      |              | 1         |       |
| 200007.02GND                         | 81109B | 81109A      |              | 2         |       |
| T00467.00                            | 81110A | D1303A      |              | 1         |       |
| T00467.02                            | 81110A | A1906B      |              | 2         |       |
| T00471.00                            | 81110B | 80A09A      |              | 1         |       |
| K1179202                             | 81112A | 81103A      |              | 1         |       |
| K1179203                             | 81112A | C2104A      |              | 2         |       |
| N10697.00                            | 81112B | C1206A      |              | 1         |       |
| K11797.00                            | 81113A | 80704A      |              | 1         |       |
| K11797.01                            | 81113A | 80A10A      |              | 2         |       |
| T11507.00                            | 81113B | C1205A      |              | 1         |       |
| 200467                               | 81201A | 81207A      |              | 1         |       |
| N12071.00                            | 81202A | C1205A      |              | 1         |       |
| K1172201                             | 81202B | 80613B      |              | 2         |       |
| K06257                               | 81203A | D2011B      |              | 2         |       |
| K06257                               | 81203A | 81A03B      |              | 1         |       |
| T06111.00                            | 81203B | 81304B      |              | 1         |       |
| T06111.01                            | 81203B | C1215A      |              | 2         |       |
| A0953201                             | 81204A | D1203B      |              | 1         |       |
| A0953202                             | 81204A | 80805A      |              | 2         |       |
| T06397                               | 81204B | D2012A      |              | 2         |       |
| A09541.00                            | 81205A | D1709B      |              | 1         |       |
| A09541.01                            | 81205A | 80A06A      |              | 2         |       |
| A09534.00                            | 81205B | 80608A      |              | 1         |       |
| A09534.01                            | 81205B | D1204B      |              | 2         |       |
| T06177                               | 81206A | 81302B      |              | 1         |       |
| N12027.00                            | 81206B | C1714B      |              | 1         |       |
| 200467                               | 81207A | 81201A      |              | 1         |       |
| N11571.01                            | 81207B | A1210A      |              | 2         |       |
| A09543.00                            | 81208A | C1215B      |              | 1         |       |
| A09543.01                            | 81208A | C1309B      |              | 2         |       |
| T09271.00                            | 81208B | C2111A      |              | 1         |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE -7992    | 32         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| N1170100                                   | 81209A | A1911B      |               | 1          |       |
| N1052105                                   | 81209B | C2007B      |               | 2          |       |
| N1212100                                   | 81210A | B0210A      |               | 1          |       |
| N1192101                                   | 81210B | A1212B      |               | 2          |       |
| 100031                                     | 81211A | B1213B      |               | 1          |       |
| I11011                                     | 81211B | B1211B      |               | 1          |       |
| I1207101                                   | 81212A | B0213B      |               | 2          |       |
| I1204100                                   | 81212B | B0502A      |               | 1          |       |
| N1216100                                   | 81213A | B0511A      |               | 2          |       |
| 100031                                     | 81213B | B1211A      |               | 1          |       |
| N1227101                                   | 81302A | C1117B      |               | 2          |       |
| I06171                                     | 81302B | B1206A      |               | 1          |       |
| K0652100                                   | 81303A | D2012B      |               | 1          |       |
| I0605100                                   | 81303B | C1305B      |               | 1          |       |
| K0603100                                   | 81304A | B0104A      |               | 1          |       |
| I0611100                                   | 81304B | B1203B      |               | 1          |       |
| I0611104                                   | 81304B | C2115A      |               | 2          |       |
| I0693100                                   | 81305A | B1A07A      |               | 1          |       |
| I0606100                                   | 81305B | C1315A      |               | 1          |       |
| N1056102                                   | 81306A | C1305A      |               | 1          |       |
| N1056103                                   | 81306A | C1609A      |               | 2          |       |
| N1052100                                   | 81307A | C1408B      |               | 1          |       |
| N1052101                                   | 81307A | C1608B      |               | 2          |       |
| M0053100                                   | 81308A | A0208B      |               | 1          |       |
|  |        |             |               |            |       |
| I0568100                                   | 81308B | B2406B      |               | 1          |       |
| I0552100                                   | 81309A | A1011B      |               | 1          |       |
| N0681101                                   | 81309B | A1110A      |               | 1          |       |
| I0553101                                   | 81310A | A1105B      |               | 2          |       |
| I0636100                                   | 81310B | C2015A      |               | 1          |       |
| I0556100                                   | 81311A | A1108A      |               | 1          |       |
| I0556101                                   | 81311A | C2105B      |               | 2          |       |
| I0639100                                   | 81311B | D2012A      |               | 1          |       |
| I1153100                                   | 81312A | A1506B      |               | 1          |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 33         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| N0507100                                   | 81312B | D0610A      |               | 1          |       |
| I0A34101                                   | 81313A | A1106B      |               | 2          |       |
| A0952200                                   | 81313B | C1711A      |               | 1          |       |
| I0085100                                   | 81402B | A1205A      |               | 1          |       |
| 81082101                                   | 81403A | C1506A      |               | 2          |       |
| 81057101                                   | 81403B | C1306A      |               | 2          |       |
| K0050200                                   | 81404A | A1511A      |               | 1          |       |
| K0050203                                   | 81404A | A2515A      |               | 2          |       |
| K0050100                                   | 81404B | B0503B      |               | 1          |       |
| K0050101                                   | 81404B | A1404B      |               | 2          |       |
| I0080100                                   | 81405A | A1204A      |               | 1          |       |
| I1056101                                   | 81405B | C1307B      |               | 2          |       |
| I0081100                                   | 81406A | A1202B      |               | 1          |       |
| I1081100                                   | 81406B | A1202A      |               | 1          |       |
| I1081101                                   | 81406B | C1507B      |               | 2          |       |
| K0052200                                   | 81407A | A1509A      |               | 2          |       |
| K0052203                                   | 81407A | A2515B      |               | 1          |       |
| K0052100                                   | 81407B | B0509B      |               | 1          |       |
| K0052101                                   | 81407B | A1403B      |               | 2          |       |
| I1193100                                   | 81408A | B0702B      |               | 1          |       |
| I0059100                                   | 81408A | B0913A      |               | 1          |       |
| K1179104                                   | 81408B | A0302A      |               | 2          |       |
| K11752                                     | 81409A | B0603A      |               | 2          |       |
| I1187102                                   | 81409B | A1103B      |               | 1          |       |
| I1187103                                   | 81409B | B1412B      |               | 2          |       |
| N12271                                     | 81410A | B0504B      |               | 2          |       |
| N1227102                                   | 81410A | A2817A      |               | 1          |       |
| I11711                                     | 81410B | A1410B      |               | 2          |       |
| I0060100                                   | B1411A | B0912A      |               | 1          |       |
| I11931101                                  | B1411A | B1408A      |               | 2          |       |
| I11011                                     | 81411B | B1211B      |               | 1          |       |
| I1187103                                   | 81412B | B1409B      |               | 2          |       |
| I0124100                                   | 81502A | A1604B      |               | 1          |       |
| I0124103                                   | 81502A | C1216A      |               | 2          |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 34         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I0123100                                   | 81503A | A1606A      |               | 1          |       |
| I0123103                                   | 81503A | C1210A      |               | 2          |       |
| I0125100                                   | 81504B | A1606B      |               | 1          |       |
| 80105100TTR                                | 81505A | C2705A      |               | 1          |       |
| I0100100                                   | 81505B | B1102B      |               | 1          |       |
| I0100101                                   | 81505B | 81506B      |               | 2          |       |
| 80104100TTR                                | 81506A | C2703B      |               | 1          |       |
| I0100101                                   | 81506B | B1505B      |               | 2          |       |
| I0100102                                   | 81506B | B1506B      |               | 1          |       |
| I0122100                                   | 81507B | A1604A      |               | 1          |       |
| I0122103                                   | 81507B | C1202A      |               | 2          |       |
| 80106100TTR                                | 81508A | C2704A      |               | 1          |       |
| I0100100                                   | 81508B | 81506B      |               | 1          |       |
| I0100103                                   | 81508B | 81509B      |               | 2          |       |
| 80107100TTR                                | 81509A | C2703A      |               | 1          |       |
| I0100103                                   | 81509B | B1508B      |               | 2          |       |
| I0100104                                   | 81509B | B1605B      |               | 1          |       |
| I1004101                                   | 81510A | B1510B      |               | 2          |       |
| I1004100                                   | 81510B | C1803A      |               | 1          |       |
| I1004101                                   | 81510B | B1510A      |               | 2          |       |
| I1006101                                   | 81511A | B1511B      |               | 2          |       |
| I1006104                                   | 81511A | A1802A      |               | 1          |       |
| I1006100                                   | 81511B | C1804B      |               | 1          |       |
| I1006101                                   | 81511B | B1511A      |               | 2          |       |
| I1005103                                   | 81512A | B1512B      |               | 2          |       |
| I1005100                                   | 81512B | C1805B      |               | 1          |       |
| I1005103                                   | 81512B | B1512A      |               | 2          |       |
| I1007104                                   | 81513A | A1502B      |               | 2          |       |
| I1007102                                   | 81513B | C1808B      |               | 2          |       |
| I1007103                                   | 81513B | A1502B      |               | 1          |       |
| I0128100                                   | 81602A | B0609A      |               | 1          |       |
| I0128101                                   | 81602A | A2009B      |               | 2          |       |
| I0127100                                   | 81603A | A2010A      |               | 1          |       |
| 00129100                                   | 81604B | A2011B      |               | 1          |       |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDF - 7992   | 35         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| 80109100TTR                                | 81605A | C2707B      |               | 1          |       |
| I0100104                                   | 81605B | 81509B      |               | 1          |       |
| I0100105                                   | 81605B | 81606B      |               | 2          |       |
| 80106100                                   | 81606A | C2707A      |               | 1          |       |
| I0100105                                   | 81606B | 81605B      |               | 2          |       |
| I0100106                                   | 81606B | 81608B      |               | 1          |       |
| I0126100                                   | 81607B | A1608A      |               | 1          |       |
| 80110100TTR                                | 81608A | C2706A      |               | 1          |       |
| I0100106                                   | 81608B | 81606B      |               | 1          |       |
| I0100107                                   | 81608B | 81609B      |               | 2          |       |
| 80111100TTR                                | 81609A | C2706B      |               | 1          |       |
| I0100107                                   | 81609B | 81608B      |               | 2          |       |
| I0100108                                   | 81609B | 81705B      |               | 1          |       |
| I1000101                                   | 81610A | 81610B      |               | 2          |       |
| I1000100                                   | 81610B | C1807B      |               | 1          |       |
| I1000101                                   | 81610B | 81610A      |               | 2          |       |
| I1002101                                   | 81611A | 81611B      |               | 2          |       |
| I1002100                                   | 81611B | C1803B      |               | 1          |       |
| I1002101                                   | 81611B | 81611A      |               | 2          |       |
| I1001103                                   | 81612A | 81612B      |               | 2          |       |
| I1001100                                   | 81612B | C1802A      |               | 1          |       |
| I1001103                                   | 81612B | 81612A      |               | 2          |       |
| I1003103                                   | 81613A | 81613B      |               | 2          |       |
| I1003100                                   | 81613B | C1804A      |               | 1          |       |
| I1003103                                   | 81613B | 81613A      |               | 2          |       |
| I0201100                                   | 81702B | A2308A      |               | 1          |       |
| I0180100                                   | 81703A | C1212B      |               | 1          |       |
| I0181100                                   | 81703B | A2517B      |               | 1          |       |
| I0181101                                   | 81703B | A1607A      |               | 2          |       |
| I0256100                                   | 81704B | A2003A      |               | 1          |       |
| 80178100TTR                                | 81705A | D2708A      |               | 1          |       |
| I0100108                                   | 81705B | 81609       |               | 1          |       |
| I0100109                                   | 81705A | 81706B      |               | 2          |       |
| 80112100TTR                                | 81706A | C2711B      |               | 1          |       |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO.               | REV. |
|--|--------|-------------|---------------|--------------|-------------------------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 36                      | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES                   |      |
| I0100110                                   | 81706B | 8170AB      |               | 1            |                         |      |
| I0100109                                   | 81706B | 81705B      |               | 2            |                         |      |
| I0130100                                   | 81707B | A2013B      |               | 1            |                         |      |
| 80204100TTR                                | 8170AA | D2706B      |               | 1            |                         |      |
| I0100110                                   | 8170AB | 81706B      |               | 1            |                         |      |
| I0100111                                   | 8170AB | 81709B      |               | 2            |                         |      |
| 80254100TTR                                | 81709A | D2705A      |               | 1            |                         |      |
| I0100111                                   | 81709B | 8170AB      |               | 2            |                         |      |
| I0100112                                   | 81709B | A2A17B      |               | 1            |                         |      |
| I1166100                                   | 81710A | A1502A      |               | 1            |                         |      |
| N1057101                                   | 81711A | C1516A      |               | 1            |                         |      |
| I1164101                                   | 81712A | A1507A      |               | 2            |                         |      |
| I1165100                                   | 81713A | A1504A      |               | 1            |                         |      |
| K0679100                                   | 81A02A | A2609B      |               | 1            |                         |      |
| K0679101                                   | 81A02A | C2103B      |               | 2            |                         |      |
| K0728200                                   | 81A02B | D2210B      |               | 1            |                         |      |
| K0728201                                   | 81A02B | A2605B      |               | 2            |                         |      |
| K06251                                     | 81A03B | 81203A      |               | 1            |                         |      |
| K0625102                                   | 81A03B | C210AA      |               | 2            |                         |      |
| I0611103                                   | 81A04A | 80612A      |               | 2            |                         |      |
| I07A8100                                   | 81A04B | A1811B      |               | 1            | DELETE FOR BR3E4/5 ONLY |      |
| I0765100                                   | 81A05A | 82611A      |               | 1            |                         |      |
| 80676100TTR                                | 81A05B | D2710B      |               | 1            |                         |      |
| I0693100                                   | 81A07A | 81305A      |               | 1            |                         |      |
| M0151102                                   | 81A07B | A0A02A      |               | 1            |                         |      |
| M0151103                                   | 81A07B | A2214B      |               | 2            |                         |      |
| I0689100                                   | 81A08A | A1107A      |               | 1            |                         |      |
| N1050100                                   | 81A08B | C1314B      |               | 1            |                         |      |
| N1050101                                   | 81A08B | C1514B      |               | 2            |                         |      |
| A0958602                                   | 81A09A | A1213B      |               | 2            |                         |      |
| A0958603                                   | 81A09A | 80505B      |               | 1            |                         |      |
| A0958501                                   | 81A09B | 80807A      |               | 2            |                         |      |
| A1176201                                   | 81A10A | 80513A      |               | 2            |                         |      |
| K0682100                                   | 81A10B | D0311A      |               | 1            |                         |      |

| TITLE                                      |         | WL          | DOCUMENT NO.  | SHEET NO.  | REV.           |
|--|---------|-------------|---------------|------------|----------------|
| LOGIC WIRE WRAP                            |         |             | HPDE-7992     | 37         | K              |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN  | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES          |
| A0151100                                   | 820038  | 82404A      |               | 1          |                |
| N0156102                                   | 82004A  | A2202A      |               | 1          |                |
| I0175103                                   | 820048  | 807068      |               | 2          |                |
| I0330104                                   | 82005A  | A2A08A      |               | 1          |                |
| K0203100                                   | 820058  | 822048      |               | 1          |                |
|  |         |             |               |            |                |
| K0351200                                   | 820088  | D21078      |               | 1          |                |
| K0351101                                   | 820088  | C22048      |               | 2          | S/C 48 & Below |
| A0731000                                   | 820088  | D2208A      |               | 2          | S/C 49 & Above |
| A0732000                                   | 820098  | D2209B      |               | 2          | S/C 49 & Above |
| K0351100                                   | 820098  | C11118      |               | 1          |                |
| I0348100                                   | 820118  | A30108      |               | 1          |                |
| I0348101                                   | 8200118 | D2108A      |               | 2          |                |
|  |         |             |               |            |                |
|  |         |             |               |            |                |
| A0211100                                   | 82201A  | A25138      |               | 1          |                |
| K0311100                                   | 82202A  | A30118      |               | 1          |                |
| A0386101                                   | 822028  | 822038      |               | 1          |                |
| K0310100                                   | 82203A  | 83012A      |               | 1          |                |
| A0386100                                   | 822038  | A25058      |               | 2          |                |
| A0386101                                   | 822038  | 822028      |               | 1          |                |
| I0129101                                   | 82204A  | A20118      |               | 2          |                |
| K0203100                                   | 822048  | 820058      |               | 1          |                |
| I0218100                                   | 82205A  | A23168      |               | 1          |                |
| I0130101                                   | 822058  | A20138      |               | 2          |                |
| I0221100                                   | 82206A  | A23158      |               | 1          |                |
| I0126102                                   | 822068  | A2008A      |               | 1          |                |
| I0123102                                   | 82207A  | A2006A      |               | 1          |                |
| I0122102                                   | 822078  | A2004A      |               | 1          |                |
| I0225100                                   | 82208A  | 823028      |               | 1          |                |
| I0224100                                   | 822088  | 82302A      |               | 1          |                |
| I0124102                                   | 82209A  | A20048      |               | 1          |                |
| I0125102                                   | 822098  | A20068      |               | 1          |                |
| I0222100                                   | 82210A  | 823038      |               | 1          |                |
| I0223100                                   | 822108  | 82301A      |               | 1          |                |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE-7992    | 38        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| I0128102                                   | 82211A | A2009B      |               | 1            |           |      |
| I0219100                                   | 82211B | A2315A      |               | 1            |           |      |
| I0220100                                   | 82212A | C1217A      |               | 1            |           |      |
| I0217100                                   | 82213A | A2313A      |               | 1            |           |      |
| A0385100                                   | 82213B | A2504B      |               | 1            |           |      |
| I0223100                                   | 82391A | 82210B      |               | 1            |           |      |
| A0205300                                   | 82301B | 82812B      |               | 1            |           |      |
| A0205301                                   | 82301B | C0612A      |               | 2            |           |      |
| I0224100                                   | 82302A | 82208B      |               | 1            |           |      |
| I0225100                                   | 82302B | 82208A      |               | 1            |           |      |
| A0205400                                   | 82303A | 82812A      |               | 1            |           |      |
| A0205401                                   | 82303A | C0512A      |               | 2            |           |      |
| I0222100                                   | 82303B | 82210A      |               | 1            |           |      |
| I0246100                                   | 82304A | 82807A      |               | 1            |           |      |
| I0001100                                   | 82304B | 82309A      |               | 1            |           |      |
| N0200100                                   | 82305A | A2816B      |               | 1            |           |      |
| I0249100                                   | 82305B | A2807B      |               | 1            |           |      |
| A0203200                                   | 82306A | A2309A      |               | 1            |           |      |
| A0203201                                   | 82306A | D0310B      |               | 2            |           |      |
| A0204400                                   | 82307A | A2316A      |               | 1            |           |      |
| A0204401                                   | 82307A | C0112A      |               | 2            |           |      |
| A0203100                                   | 82307B | A2307B      |               | 1            |           |      |
| A0203101                                   | 82307B | D0211A      |               | 2            |           |      |
| I0001100                                   | 82309A | 82304B      |               | 1            |           |      |
| I0001101                                   | 82309A | 82811B      |               | 2            |           |      |
| A0204302                                   | B2310B | B2808B      |               | 1            |           |      |
| I0051101                                   | 82311A | 82401A      |               | 2            |           |      |
| I0051102                                   | 82311A | A2214A      |               | 1            |           |      |
| K0250100                                   | 82312A | C3013B      |               | 1            |           |      |
| A0153200                                   | 82312B | A2209A      |               | 1            |           |      |
| A0153201                                   | 82312B | 82504A      |               | 2            |           |      |
| K0200201                                   | 82313A | A2309B      |               | 2            |           |      |
| A0250100                                   | 82313B | A2003B      |               | 1            |           |      |
| A0250102                                   | 82313B | C2711A      |               | 2            |           |      |
| I0051100                                   | 82401A | A2504A      |               | 1            |           |      |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 39         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I0051101                                   | 82401A | 82311A      |               | 2          |       |
| I0091100                                   | 82403B | A0402A      |               | 1          |       |
| I0091101                                   | 82403B | 82503A      |               | 2          |       |
| A0151100                                   | 82404A | 82003B      |               | 1          |       |
| I0173100TTR                                | 82404B | D2705B      |               | 1          |       |
| I0150100                                   | 82405A | 82506A      |               | 1          |       |
| I0150101                                   | 82405A | A1510B      |               | 2          |       |
| N0552100                                   | 82405B | A1112A      |               | 2          |       |
| I0568100                                   | 82406B | B1308B      |               | 1          |       |
| I0002100                                   | 82407A | A1011A      |               | 1          |       |
| I0046105                                   | 82407B | D1503       |               | 1          |       |
| Y0000200                                   | 82308B | A0804A      |               | 1          |       |
| I0003100                                   | 82408A | B0610A      |               | 1          |       |
| I0090101                                   | 82409A | A0408B      |               | 2          |       |
| I0090102                                   | 82409A | A2804A      |               | 1          |       |
| I0569100                                   | 82409B | B1104B      |               | 1          |       |
| I0165100                                   | 82411B | 82503B      |               | 1          |       |
| 30005100                                   | 82412A | JA8008A     |               | 1          |       |
| I0154100                                   | 82501A | A2205A      |               | 1          |       |
| I1160100                                   | 82501B | A1512A      |               | 1          |       |
| I0174101                                   | 82502A | B0812B      |               | 2          |       |
| A0311100                                   | 82502B | A2715B      |               | 1          |       |
| I0091101                                   | 82503A | 82403B      |               | 2          |       |
| I0165100                                   | 82503B | 82411B      |               | 1          |       |
| A0153201                                   | 82504A | 82312B      |               | 2          |       |
| A0153202                                   | 82504A | A2805B      |               | 1          |       |
| M0151104                                   | 82504B | A2214B      |               | 1          |       |
| M0151105                                   | 82504B | 82708B      |               | 2          |       |
| I0197100                                   | 82505B | A2204B      |               | 1          |       |
| I0150100                                   | 82506A | 82405A      |               | 1          |       |
| I0176100                                   | 82506B | A2415B      |               | 1          |       |
| I0188102                                   | 82507B | A2307A      |               | 1          |       |
| I10A8103                                   | 82507B | A2507A      |               | 2          |       |
| K0052204                                   | 82508A | A2515B      |               | 2          |       |
| A1190100                                   | 82508B | D1206B      |               | 1          |       |
| N0220100                                   | 82509A | A2002A      |               | 1          |       |
| K0050204                                   | 82509B | A2515A      |               | 1          |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.                    |
|--|--------|-------------|---------------|------------|-------------------------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 40         | A                       |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES                   |
| A0210200                                   | 82510A | A2215A      |               | 1          |                         |
| I0346100                                   | 82510B | B3013A      |               | 1          |                         |
| I0968102                                   | 82511A | A0411B      |               | 2          |                         |
| I0556103                                   | 82511B | A0410B      |               | 1          |                         |
| N1073100                                   | 82512A | C1504B      |               | 1          |                         |
| N1070100                                   | 82512B | C1304B      |               | 1          |                         |
| A0627100                                   | 82608B | C2114A      |               | 1          |                         |
| N0753100                                   | 82610A | A2614B      |               | 1          |                         |
| I0765100                                   | 82611A | B1805A      |               | 1          |                         |
| N0752100                                   | 82611B | A2610B      |               | 1          |                         |
| 40004100                                   | 82705B | JA8112B     |               | 1          |                         |
| 40002100                                   | 82706A | JA8111B     |               | 1          |                         |
| I0192100                                   | 82706B | A2202B      |               | 1          |                         |
| I0169100                                   | 82707B | A2211A      |               | 1          |                         |
| M0151105                                   | 82708B | B2504B      |               | 2          |                         |
| M0151106                                   | 82708B | B2803B      |               | 1          |                         |
| I0334100                                   | 82709B | A2807A      |               | 1          |                         |
| A0317200                                   | 82711B | JA8006B     |               | 1          |                         |
| A0317100                                   | 82712B | JA8006A     |               | 1          |                         |
| I0787100                                   | 82801B | A1811A      |               | 1          | DELETE FOR BR3E4/5 ONLY |
| I0787100                                   | B2801B | A1211B      |               | 1          | BR3E4/5 ONLY            |
| A0309100                                   | 82802A | A2714A      |               | 1          |                         |
| A0310100                                   | 82802B | A2712B      |               | 1          |                         |
| M0151106                                   | 82803B | B2708B      |               | 1          |                         |
| M0151107                                   | 82803B | A2811B      |               | 2          |                         |
| I0322100                                   | 82804A | A2706A      |               | 1          |                         |
| I0321100                                   | 82804B | A2706B      |               | 1          |                         |
| I0324100                                   | 82805A | A2703B      |               | 1          |                         |
| I0323100                                   | 82805B | A2705B      |               | 1          |                         |
| I0327100                                   | 82806A | A2705A      |               | 1          |                         |
| I0325100                                   | 82806B | A2704A      |               | 1          |                         |
| I0246100                                   | 82807A | B2304A      |               | 1          |                         |
| I0326100                                   | 82807B | A2704B      |               | 1          |                         |
| A0204302                                   | B2808B | B2310B      |               | 1          |                         |
| A0204301                                   | 82808B | A2313B      |               | 2          |                         |
| N1147100                                   | 82809A | A1205B      |               | 1          |                         |



| TITLE                                      |                  | WL               |               | DOCUMENT NO. | SHEET NO.      | REV. |
|--|------------------|------------------|---------------|--------------|----------------|------|
| LOGIC WIRE WRAP                            |                  |                  |               | HPDE - 7992  | 42             | K    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN           | DESTINATION      | WIRE<br>COLOR | Z<br>LEVEL   | NOTES          |      |
| A0352100                                   | B3003B           | A2113B           |               | 1            |                |      |
| A0351100                                   | B3005B           | A2115B           |               | 1            |                |      |
| A0337001<br>K0310100                       | B3011A<br>B3012A | C2212B<br>B2203A |               | 1<br>1       | S/C 49 & Above |      |
| I0346100                                   | B3013A           | B2510B           |               | 1            |                |      |
| 70002100 TP2                               | B3013B           | JA8512A          |               | 1            |                |      |
| 70004100 TP4                               | B3014B           | JA8501A          |               | 1            |                |      |
| 20027100GND<br>20053100GND                 | C0101A<br>C0101A | C0106A<br>C0106B |               | 1<br>1       |                |      |
| I1261100                                   | C0103B           | D0811B           |               | 1            |                |      |
| I1262100                                   | C0104A           | A0502A           |               | 1            |                |      |
| I0969108                                   | C0104B           | C0204B           |               | 1            |                |      |
| A0631400                                   | C0105A           | C2011B           |               | 1            |                |      |
| I0971110                                   | C0105B           | C0106A           |               | 1            |                |      |
| I0971109<br>20027100 GND                   | C0105B<br>C0106A | C0205B<br>C0101A |               | 2<br>1       |                |      |
| I0971111<br>20053100                       | C0106A<br>C0106B | C0406A<br>C0101A |               | 2<br>1       |                |      |
| I0970107                                   | C0107A           | C0207A           |               | 1            |                |      |
| I1405100                                   | C0107B           | D0403A           |               | 1            |                |      |
| I1405101                                   | C0107B           | C0207B           |               | 2            |                |      |
| A0251401                                   | C0108A           | A1909A           |               | 1            |                |      |
| N1175100                                   | C0108B           | B0702A           |               | 2            |                |      |
| I1417102                                   | C0109A           | C0211A           |               | 1            |                |      |
| I1230101                                   | C0109B           | B0403B           |               | 2            |                |      |
| I1408100                                   | C0110A           | D0402A           |               | 1            |                |      |
| I1408101                                   | C0110A           | C0210A           |               | 2            |                |      |
| K0304100                                   | C0110B           | A2803A           |               | 1            |                |      |
| I1420103                                   | C0111A           | D0312A           |               | 1            |                |      |
| I1420104                                   | C0111A           | C0212B           |               | 2            |                |      |
| I1411100                                   | C0111B           | D0404B           |               | 1            |                |      |
| I1411101                                   | C0111B           | C0211B           |               | 2            |                |      |
| A0204401                                   | C0112A           | B2307A           |               | 2            |                |      |
| I0974101                                   | C0112B           | C0312B           |               | 2            |                |      |
| I0974102                                   | C0112B           | D0203A           |               | 1            |                |      |
| I1209101                                   | C0113A           | B0204B           |               | 2            |                |      |
| 20029100 GND<br>I1274100                   | C0201A<br>C0203B | C0206A<br>D0809B |               | 1<br>1       |                |      |
| I1275100                                   | C0204A           | A0503B           |               | 1            |                |      |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 43         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I0969107                                   | C0204B | C0311A      |               | 2          |       |
| T0969108                                   | C0204B | C0104B      |               | 1          |       |
| A0631300                                   | C0205A | C2011A      |               | 1          |       |
| 10971109                                   | C0205B | C0105B      |               | 2          |       |
| 10971108                                   | C0205B | C0305B      |               | 1          |       |
| I0971108                                   | C0206A | C0305B      |               | 1          |       |
| 20029101GND                                | C0206A | C0206B      |               | 2          |       |
| 20029100GND                                | C0206A | C0201A      |               | 1          |       |
| 20019101GND                                | C0206B | C0206A      |               | 2          |       |
| I0970106                                   | C0207A | C0307A      |               | 2          |       |
| I0970107                                   | C0207A | C0107A      |               | 1          |       |
| T1405101                                   | C0207B | C0107B      |               | 2          |       |
| T1405102                                   | C0207B | C0307B      |               | 1          |       |
| A0251301                                   | C0208A | A2009A      |               | 2          |       |
| A0459300                                   | C0208B | D1009A      |               | 1          |       |
| I0973100                                   | C0209A | D2007A      |               | 2          |       |
| I0973101                                   | C0209A | C0309A      |               | 1          |       |
| T1232101                                   | C0209B | B0403A      |               | 2          |       |
| T1408101                                   | C0210A | C0110A      |               | 2          |       |
| T1408102                                   | C0210A | C0310A      |               | 1          |       |
| N1177101                                   | C0210B | B0413A      |               | 2          |       |
| T1417101                                   | C0211A | D0503A      |               | 2          |       |
| T1417102                                   | C0211A | C0109A      |               | 1          |       |
| T1411101                                   | C0211B | C0111B      |               | 2          |       |
| T1411102                                   | C0211B | C0311B      |               | 1          |       |
| A0204300                                   | C0212A | A2313B      |               | 1          |       |
| T1420104                                   | C0212B | C0111A      |               | 2          |       |
| T1211101                                   | C0213A | B0407A      |               | 2          |       |
| 20028100 GND                               | C0301A | C0306A      |               | 1          |       |
| I1288100                                   | C0304A | A0505B      |               | 1          |       |
| I1402100                                   | C0304B | D0407B      |               | 2          |       |
| I1402101                                   | C0304B | C0404B      |               | 1          |       |
| I1185102                                   | C0305A | A1212A      |               | 2          |       |
| I0971107                                   | C0305B | C0405B      |               | 1          |       |
| I0971108                                   | C0305B | C0205B      |               | 1          |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.                    |
|--|--------|-------------|---------------|------------|-------------------------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 44         | A                       |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES                   |
| 20028100 GND                               | C0306A | C0301A      |               | 1          | DELETE FOR BR3E4/5 ONLY |
| 20021800 GND                               | C0306A | D1713A      |               | 2          |                         |
| I1527100                                   | C0306B | A1310A      |               | 1          |                         |
| I0970105                                   | C0307A | C0407A      |               | 1          |                         |
| I0970106                                   | C0307A | C0207A      |               | 2          |                         |
| I1405102                                   | C0307B | C0207B      |               | 1          |                         |
| I1405103                                   | C0307B | C0407B      |               | 2          |                         |
| A0251200                                   | C0308A | A2010B      |               | 1          |                         |
| A0459200                                   | C0308B | D1010B      |               | 1          |                         |
| I0973101                                   | C0309A | C0209A      |               | 1          |                         |
| I0973102                                   | C0309A | D0206B      |               | 2          |                         |
| I1234101                                   | C0309B | B0404B      |               | 2          |                         |
| I1408102                                   | C0310A | C0210A      |               | 1          |                         |
| I1408103                                   | C0310A | C0410A      |               | 2          |                         |
| A0631200                                   | C0310B | C2010B      |               | 1          |                         |
| I0969106                                   | C0311A | C0409A      |               | 1          |                         |
| I0969107                                   | C0311A | C0204B      |               | 2          |                         |
| I1411102                                   | C0311B | C0211B      |               | 1          |                         |
| I1411103                                   | C0311B | C0411B      |               | 2          |                         |
| A0204200                                   | C0312A | A2312B      |               | 1          |                         |
| I0974100                                   | C0312B | C2006B      |               | 1          |                         |
| I0974101                                   | C0312B | C0112B      |               | 2          |                         |
| I1213101                                   | C0313A | B0409A      |               | 2          |                         |
| I1285100                                   | C0313B | D0810A      |               | 1          |                         |
| N1251100                                   | C0404A | A0504A      |               | 1          |                         |
| I1402101                                   | C0404B | C0304B      |               | 1          |                         |
| I1402102                                   | C0404B | C0504B      |               | 2          |                         |
| N1154103                                   | C0405A | D1209A      |               | 2          |                         |
| I0971106                                   | C0405B | C0506A      |               | 1          |                         |
| I0971107                                   | C0405B | C0305B      |               | 2          |                         |
| I0971111                                   | C0406A | C0106A      |               | 2          |                         |
|  |        |             |               |            |                         |
| I1525100                                   | C0406B | A1309B      |               | 1          |                         |
| I0970104                                   | C0407A | C0507A      |               | 2          |                         |
| I0970105                                   | C0407A | C0307A      |               | 1          |                         |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 45        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| I1405103                                   | C0407B | C0307B      |               | 2            |           |      |
| I1405104                                   | C0407B | C0507B      |               | 1            |           |      |
| A0251100                                   | C0408A | A2008B      |               | 1            |           |      |
| A0631100                                   | C0408B | C2008B      |               | 1            |           |      |
| I0969105                                   | C0409A | C0509A      |               | 2            |           |      |
| I0969106                                   | C0409A | C0311A      |               | 1            |           |      |
| I1236101                                   | C0409B | B0405A      |               | 2            |           |      |
| I1408103                                   | C0410A | C0310A      |               | 2            |           |      |
| I1408104                                   | C0410A | C0610A      |               | 1            |           |      |
| I1382100                                   | C0410B | D0302B      |               | 2            |           |      |
| I1382101                                   | C0410B | C0411A      |               | 1            |           |      |
| I1382101                                   | C0411A | C0410B      |               | 1            |           |      |
| I1411103                                   | C0411B | C0311B      |               | 2            |           |      |
| I1411104                                   | C0411B | C0511B      |               | 1            |           |      |
| A0204101                                   | C0412A | A2312A      |               | 2            |           |      |
| I1426101                                   | C0412B | D0607B      |               | 2            |           |      |
| I1426102                                   | C0412B | C0510A      |               | 1            |           |      |
| 20050100                                   | C0413A | C0414A      |               | 1            |           |      |
| I1298100                                   | C0413B | D0808A      |               | 1            |           |      |
| 20050100                                   | C0414A | C0413A      |               | 1            |           |      |
|  |        |             |               |              |           |      |
| I1312100                                   | C0504A | A0511A      |               | 1            |           |      |
| I1402102                                   | C0504B | C0404B      |               | 2            |           |      |
| I1402103                                   | C0504B | C0604B      |               | 1            |           |      |
| I1229102                                   | C0505A | C1312B      |               | 1            |           |      |
| I0971104                                   | C0505B | C0605B      |               | 1            |           |      |
| I0971105                                   | C0505B | C0506A      |               | 2            |           |      |
| I0971106                                   | C0506A | C0405B      |               | 1            |           |      |
| I0971105                                   | C0506A | C0505B      |               | 2            |           |      |
| I1524100                                   | C0506B | A1312A      |               | 1            |           |      |
| I0970103                                   | C0507A | C0607A      |               | 1            |           |      |
| I0970104                                   | C0507A | C0407A      |               | 2            |           |      |
| I1405104                                   | C0507B | C0407B      |               | 1            |           |      |
| I1405105                                   | C0507B | C0607B      |               | 2            |           |      |
| A0250400                                   | C0508A | A2007B      |               | 1            |           |      |

| TITLE<br>LOGIC WIRE WRAP                   |        |             | WL            | DOCUMENT NO.<br>HPDE - 7992 | SHEET NO.<br>46 | REV.<br>A |
|--|--------|-------------|---------------|-----------------------------|-----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL                  | NOTES           |           |
| A0630400                                   | C0508B | C2009A      |               | 1                           |                 |           |
| I0969104                                   | C0509A | C0609A      |               | 1                           |                 |           |
| I0969105                                   | C0509A | C0409A      |               | 2                           |                 |           |
|  |        |             |               |                             |                 |           |
| 20051100                                   | C0509B | C0514A      |               | 1                           |                 |           |
| I1426102                                   | C0510A | C0412B      |               | 1                           |                 |           |
| I1377100                                   | C0510B | D0202A      |               | 2                           |                 |           |
| I1377101                                   | C0510B | C0511A      |               | 1                           |                 |           |
| I1377101                                   | C0511A | C0510B      |               | 1                           |                 |           |
| I1411104                                   | C0511B | C0411B      |               | 1                           |                 |           |
| I1411105                                   | C0511B | C0611B      |               | 2                           |                 |           |
| A0205401                                   | C0512A | B2303A      |               | 2                           |                 |           |
| I1417100                                   | C0512B | D0503A      |               | 1                           |                 |           |
| N1179100                                   | C0513A | B0709A      |               | 1                           |                 |           |
| I1309100                                   | C0513B | D0806B      |               | 1                           |                 |           |
| 20051100                                   | C0514A | C0509B      |               | 1                           |                 |           |
| 200030100 GND                              | C0601A | C0606A      |               | 1                           |                 |           |
| I1325100                                   | C0604A | A0510B      |               | 1                           |                 |           |
| I1402103                                   | C0604B | C0504B      |               | 1                           |                 |           |
| I1402104                                   | C0604B | C0704B      |               | 2                           |                 |           |
| M1200104                                   | C0605A | A0111A      |               | 2                           |                 |           |
| I0971103                                   | C0605B | C0706A      |               | 2                           |                 |           |
| I0971104                                   | C0605B | C0505B      |               | 1                           |                 |           |
|  |        |             |               |                             |                 |           |
| 20030100 GND                               | C0606A | C0601A      |               | 1                           |                 |           |
| I1523100                                   | C0606B | A1311B      |               | 1                           |                 |           |
| I0970102                                   | C0607A | C0707A      |               | 2                           |                 |           |
| I0970103                                   | C0607A | C0507A      |               | 1                           |                 |           |
| I1405105                                   | C0607B | C0507B      |               | 2                           |                 |           |
| I1405106                                   | C0607B | C0707B      |               | 1                           |                 |           |
| A0250300                                   | C0608A | A2005A      |               | 1                           |                 |           |
| A0630300                                   | C0608B | C2009B      |               | 1                           |                 |           |
| I0969103                                   | C0609A | C0709A      |               | 2                           |                 |           |
| I0969104                                   | C0609A | C0509A      |               | 1                           |                 |           |
| N1200101                                   | C0609B | B0408B      |               | 2                           |                 |           |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO.      | REV. |
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| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 47             | K    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES          |      |
| I1408104                                   | C0610A | C0410A      |               | 1            |                |      |
| I1408105                                   | C0610A | C0710A      |               | 2            |                |      |
| I1372100                                   | C0610B | D0302A      |               | 2            |                |      |
| I1372101                                   | C0610B | C0611A      |               | 1            |                |      |
| I1372101                                   | C0611A | C0610B      |               | 1            |                |      |
| I1411105                                   | C0611B | C0511B      |               | 2            |                |      |
| I1411106                                   | C0611B | C0711B      |               | 1            |                |      |
| A0205301                                   | C0612A | B2301B      |               | 2            |                |      |
| I1423101                                   | C0612B | D0207B      |               | 2            |                |      |
| I11711                                     | C0613A | A2508A      |               | 2            |                |      |
| I1171100                                   | C0613A | A1410B      |               | 1            |                |      |
| I1322100                                   | C0613B | D0804B      |               | 1            |                |      |
| 2002100 GND                                | C0701A | C0709B      |               | 1            | S/C 48 & Below |      |
| I1338100                                   | C0704A | A0512B      |               | 1            |                |      |
| I1402104                                   | C0704B | C0604B      |               | 2            |                |      |
| I1402105                                   | C0704B | C0804B      |               | 1            |                |      |
| I1244104                                   | C0705A | D0906A      |               | 1            |                |      |
| I0971101                                   | C0705B | C0805B      |               | 2            |                |      |
| I0971102                                   | C0705B | C0706A      |               | 1            |                |      |
| I071102                                    | C0706A | C0705B      |               | 1            |                |      |
| I0971103                                   | C0706A | C0605B      |               | 2            |                |      |
| I1522100                                   | C0706B | A1311A      |               | 1            |                |      |
| I0970101                                   | C0707A | C0807A      |               | 1            |                |      |
| I0970102                                   | C0707A | C0607A      |               | 2            |                |      |
| I1405106                                   | C0707B | C0607B      |               | 1            |                |      |
| I1405107                                   | C0707B | C0807B      |               | 2            |                |      |
| A0250200                                   | C0708A | A2005B      |               | 1            |                |      |
| A0250201 TTR                               | C0708A | C2710A      |               | 2            |                |      |
| A0630200                                   | C0708B | C2012A      |               | 1            |                |      |
| I0969102                                   | C0709A | C0809A      |               | 1            |                |      |
| I0969103                                   | C0709A | C0609A      |               | 2            |                |      |
| I1248001                                   | C0709B | B0107B      |               | 2            | S/C 49 & Above |      |
| 20002100 GND                               | C0709B | C0701A      |               | 1            |                |      |
| I1408105                                   | C0710A | C0610A      |               | 2            |                |      |
| I1408106                                   | C0710A | C0810A      |               | 1            |                |      |
| I1367100                                   | C0710B | D0309B      |               | 2            |                |      |

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| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 48        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| I1367101                                   | C0710B | C0711A      |               | 1            |           |      |
| I1367101                                   | C0711A | C0710B      |               | 1            |           |      |
| I1411106                                   | C0711B | C0611B      |               | 1            |           |      |
| I1411107                                   | C0711B | C0811B      |               | 2            |           |      |
| A0205201                                   | C0712A | A2317B      |               | 2            |           |      |
| I1387100                                   | C0712B | D0202B      |               | 2            |           |      |
| I1387101                                   | C0712B | C0713A      |               | 1            |           |      |
| I1387101                                   | C0713A | C0712B      |               | 1            |           |      |
| I1335100                                   | C0713B | D0806A      |               | 1            |           |      |
| 20031100 GND                               | C0801A | C0806A      |               | 1            |           |      |
| N1301100                                   | C0804A | A0513A      |               | 1            |           |      |
| I1402105                                   | C0804B | C0704B      |               | 1            |           |      |
| K1176100                                   | C0805A | B0802A      |               | 2            |           |      |
| K1176101                                   | C0805A | C2108B      |               | 1            |           |      |
| I0971100                                   | C0805B | D1713A      |               | 1            |           |      |
| I0971101                                   | C0805B | C0705B      |               | 2            |           |      |
| 20031100 GND                               | C0806A | C0801A      |               | 1            |           |      |
| I1521100                                   | C0806B | A1310B      |               | 1            |           |      |
| I0970100                                   | C0807A | C1702A      |               | 2            |           |      |
| I0970101                                   | C0807A | C0707A      |               | 1            |           |      |
| I1405107                                   | C0807B | C0707B      |               | 2            |           |      |
| I1405108                                   | C0807B | D0212A      |               | 1            |           |      |
| A0250101                                   | C0808A | A2003B      |               | 2            |           |      |
| A0630100                                   | C0808B | C2012B      |               | 1            |           |      |
| I0969101                                   | C0809A | C1210B      |               | 2            |           |      |
| I0969102                                   | C0809A | C0709A      |               | 1            |           |      |
| I1238101                                   | C0809B | B0406A      |               | 2            |           |      |
| I1408106                                   | C0810A | C0710A      |               | 1            |           |      |
| I1361100                                   | C0810B | D0703B      |               | 2            |           |      |
| I1361101                                   | C0810B | C0811A      |               | 1            |           |      |
| I1361101                                   | C0811A | C0810B      |               | 1            |           |      |
| I1411107                                   | C0811B | C0711B      |               | 2            |           |      |
| I1411108                                   | C0811B | D0212B      |               | 1            |           |      |
| A0205101                                   | C0812A | A2317A      |               | 2            |           |      |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 49         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| 20038100 GND                               | C0813A | C0814A      |               | 1          |       |
| I1348100                                   | C0813B | D0804A      |               | 1          |       |
| 20038100 GND                               | C0814A | C0813A      |               | 1          |       |
| 20022100 GND                               | C0901A | C0902B      |               | 2          |       |
| 20022101 GND                               | C0902A | C0902B      |               | 1          |       |
| 20022100 GND                               | C0902B | C0901A      |               | 2          |       |
| 20022101 GND                               | C0902B | C0902A      |               | 1          |       |
| A1053100                                   | C0903A | C1308A      |               | 1          |       |
| A1053101                                   | C0903A | A1905A      |               | 2          |       |
| A1505100                                   | C0903B | D1807B      |               | 1          |       |
| K1176102                                   | C0904A | C2108B      |               | 2          |       |
| K1176103                                   | C0904A | D0904A      |               | 1          |       |
| M1200102                                   | C0904B | C1212A      |               | 1          |       |
| M1200103                                   | C0904B | D0904B      |               | 2          |       |
| A1505300                                   | C0905A | D1805A      |               | 1          |       |
| A1505200                                   | C0905B | D1806A      |               | 1          |       |
| I1244102                                   | C0906A | C1511B      |               | 1          |       |
| I1244103                                   | C0906A | D0906A      |               | 2          |       |
| N1059100                                   | C0906B | C1310A      |               | 1          |       |
| A1505400                                   | C0907B | D1808A      |               | 1          |       |
| I1064100                                   | C0908A | C1311A      |               | 1          |       |
| A1504100                                   | C0908B | D1806B      |               | 1          |       |
| A1504300                                   | C0909A | C1808A      |               | 1          |       |
| I1185100                                   | C0909B | A1212A      |               | 1          |       |
| I1185101                                   | C0909B | D0909B      |               | 2          |       |
| 20055100 GND                               | C0910A | D0910A      |               | 1          |       |
| A1504400                                   | C0911A | D1809A      |               | 1          |       |
| K0050103                                   | C0911B | D0913B      |               | 2          |       |
| K0050104                                   | C0911B | A1904B      |               | 1          |       |
| A1503200                                   | C0912A | C1810B      |               | 1          |       |
| N1154101                                   | C0912B | A1210B      |               | 2          |       |
| N1154102                                   | C0912B | D0912B      |               | 2          |       |
| A1503100                                   | C0913A | C1806B      |               | 1          |       |
| K0052103                                   | C0913B | D0911B      |               | 2          |       |
| K0052104                                   | C0913B | A1903A      |               | 1          |       |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 50        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| 20016100 GND                               | C1001A | C1004A      |               | 1            |           |      |
| A0452100                                   | C1002A | D1105B      |               | 1            |           |      |
| A0453100                                   | C1002B | D1110B      |               | 1            |           |      |
| I1176100                                   | C1003A | B0811B      |               | 1            |           |      |
| A0455100                                   | C1003B | D1004A      |               | 1            |           |      |
| 20016100 GND                               | C1004A | C1001A      |               | 1            |           |      |
| 20016101 GND                               | C1004A | C1004B      |               | 2            |           |      |
| 20016101 GND                               | C1004B | C1004A      |               | 2            |           |      |
| 20016102 GND                               | C1004B | C1006A      |               | 1            |           |      |
| A0455300                                   | C1005A | D1004B      |               | 1            |           |      |
| A0455200                                   | C1005B | D1006A      |               | 1            |           |      |
| 20016102 GND                               | C1006A | C1004B      |               | 1            |           |      |
| 20016103 GND                               | C1006A | C1006B      |               | 2            |           |      |
| 20016103 GND                               | C1006B | C1006A      |               | 2            |           |      |
| K11751                                     | C1007A | B0804B      |               | 2            |           |      |
| A0455400                                   | C1007B | D1006B      |               | 1            |           |      |
| 20025100 GND                               | C1008A | C1009B      |               | 2            |           |      |
| A0454100                                   | C1008B | D1008A      |               | 1            |           |      |
| A0454300                                   | C1009A | D1009B      |               | 1            |           |      |
| 20025100 GND                               | C1009B | C1008A      |               | 2            |           |      |
| 20025101 GND                               | C1009B | C1010A      |               | 1            |           |      |
| 20025101 GND                               | C1010A | C1009B      |               | 1            |           |      |
| 20025102 GND                               | C1010A | C1011B      |               | 2            |           |      |
| A0454200                                   | C1010B | D1010A      |               | 1            |           |      |
| 20025102 GND                               | C1011B | C1010A      |               | 2            |           |      |
| 20025103 GND                               | C1011B | C1012B      |               | 1            |           |      |
| 20025103 GND                               | C1012B | C1011B      |               | 1            |           |      |
| 20025104 GND                               | C1012B | C1013B      |               | 2            |           |      |
| 20025104 GND                               | C1013B | C1012B      |               | 2            |           |      |
| 20025105 GND                               | C1013B | C1014A      |               | 1            |           |      |
| 20025105 GND                               | C1014A | C1013B      |               | 1            |           |      |
| N1052106                                   | C1102A | C1408B      |               | 2            |           |      |
| N1052107                                   | C1102A | D0802A      |               | 1            |           |      |
| I0643100                                   | C1103A | D2006A      |               | 1            |           |      |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 51         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| A0629100                                   | C1103B | D2003B      |               | 1          |       |
| K0652101                                   | C1104A | D2012B      |               | 2          |       |
| I0462100                                   | C1104B | B1003A      |               | 1          |       |
| I0463100                                   | C1105A | B1002B      |               | 1          |       |
| A0455201                                   | C1106A | D1006A      |               | 2          |       |
| A0455101                                   | C1106B | D1004A      |               | 2          |       |
| A0455301                                   | C1107A | D1004B      |               | 2          |       |
| A0455401                                   | C1107B | D1006B      |               | 2          |       |
| A0454101                                   | C1108B | D1008A      |               | 2          |       |
| A0454201                                   | C1109A | D1010A      |               | 2          |       |
| A0454301                                   | C1109B | D1009B      |               | 2          |       |
| A0955202                                   | C1110B | D1204B      |               | 1          |       |
| K0351100                                   | C1111B | B2009B      |               | 1          |       |
|  |        |             |               |            |       |
| A0451400                                   | C1113A | B1007B      |               | 1          |       |
| A0450200                                   | C1113B | B1010B      |               | 1          |       |
| A0450300                                   | C1114A | B1009A      |               | 1          |       |
| I0194102                                   | C1114B | D1206A      |               | 1          |       |
| K1175201                                   | C1115B | B0802B      |               | 2          |       |
| K1175102                                   | C1116B | B0803B      |               | 2          |       |
| N1066102                                   | C1117A | B0806B      |               | 2          |       |
| N1066103                                   | C1117A | C1215B      |               | 1          |       |
| N1227100                                   | C1117B | B0504B      |               | 1          |       |
| N1227101                                   | C1117B | B1302A      |               | 2          |       |
| 20039100 GND                               | C1201A | C1213B      |               | 1          |       |
| I0122103                                   | C1202A | B1507B      |               | 2          |       |
| N1165100                                   | C1203A | A1910A      |               | 1          |       |
| N1167100                                   | C1203B | C2513A      |               | 1          |       |
| N1163100                                   | C1204A | C3017B      |               | 1          |       |
| K1156100                                   | C1204B | A1413A      |               | 1          |       |
| I1150100                                   | C1205A | B1113B      |               | 1          |       |
| N1161100                                   | C1205B | A0409B      |               | 1          |       |
| N1069100                                   | C1206A | B1112B      |               | 1          |       |
| N1069101                                   | C1206A | D1304B      |               | 2          |       |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 52        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| K1152100                                   | C1206B | A1405B      |               | 1            |           |      |
| N1162100                                   | C1207A | A0413A      |               | 1            |           |      |
| N1164100                                   | C1207B | D3001B      |               | 1            |           |      |
| K1157100                                   | C1208A | A1413B      |               | 1            |           |      |
| K1153100                                   | C1208B | A1406B      |               | 1            |           |      |
| N1168100                                   | C1209A | C2514A      |               | 1            |           |      |
| N1166100                                   | C1209B | A1912A      |               | 1            |           |      |
| I0123103                                   | C1210A | B1503A      |               | 2            |           |      |
| I0969100                                   | C1210B | C2112B      |               | 1            |           |      |
| I0969101                                   | C1210B | C0809A      |               | 2            |           |      |
| N0681100                                   | C1211A | A1110A      |               | 2            |           |      |
| I0968101                                   | C1211B | C1703A      |               | 2            |           |      |
| M1200101                                   | C1212A | B0506B      |               | 2            |           |      |
| M1200102                                   | C1212A | C0904B      |               | 1            |           |      |
| I0180100                                   | C1212B | B1703A      |               | 1            |           |      |
| K1178101                                   | C1213A | D1208B      |               | 2            |           |      |
| 20039100 GND                               | C1213B | C1201A      |               | 1            |           |      |
| A0953300                                   | C1214B | D1704A      |               | 1            |           |      |
| I0611101                                   | C1215A | C1203B      |               | 2            |           |      |
| I0611102                                   | C1215A | B0612A      |               | 1            |           |      |
| N1066103                                   | C1215B | C1117A      |               | 1            |           |      |
| N1066104                                   | C1215B | B0706A      |               | 2            |           |      |
| I0124103                                   | C1216A | B1502A      |               | 2            |           |      |
| N0683100                                   | C1216B | A1110B      |               | 1            |           |      |
| I0127101                                   | C1217A | A2010A      |               | 2            |           |      |
| I0127102                                   | C1217A | B2212B      |               | 1            |           |      |
| N1159100                                   | C1217B | A1512B      |               | 1            |           |      |
| 20019100 GND                               | C1302A | A1203B      |               | 1            |           |      |
| I1020100                                   | C1303A | A1404A      |               | 1            |           |      |
| I1071100                                   | C1303B | C1308B      |               | 1            |           |      |
| I1013100                                   | C1304A | D1811B      |               | 1            |           |      |
| N1070100                                   | C1304B | B2512B      |               | 1            |           |      |
| N1056101                                   | C1305A | C1409A      |               | 2            |           |      |
| N1056102                                   | C1305A | B1306A      |               | 1            |           |      |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 53         | B     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I0605100                                   | C1305B | B1303B      |               | 1          |       |
| I0605101                                   | C1305B | C1505B      |               | 2          |       |
| R1057100                                   | C1306A | C1409B      |               | 1          |       |
| R1057101                                   | C1306A | B1403B      |               | 2          |       |
| I0015100                                   | C1306B | D1301B      |               | 1          |       |
| N1215101                                   | C1307A | C1507A      |               | 2          |       |
| N1215102                                   | C1307A | B0713B      |               | 1          |       |
| I1056100                                   | C1307B | A1209B      |               | 1          |       |
| I1056101                                   | C1307B | B1405B      |               | 2          |       |
| A1053100                                   | C1308A | C0903A      |               | 1          |       |
| I1071100                                   | C1308B | C1303B      |               | 1          |       |
| A0958403                                   | C1309A | C1509A      |               | 2          |       |
| A0958301                                   | C1309B | B1208A      |               | 2          |       |
| A0958302                                   | C1309B | C1509B      |               | 1          |       |
| N1059100                                   | C1310A | C0906B      |               | 1          |       |
| I1055100                                   | C1310B | C1405A      |               | 1          |       |
| I1064100                                   | C1311A | C0908A      |               | 1          |       |
| I1244100                                   | C1311B | B0407B      |               | 1          |       |
| I1244101                                   | C1311B | C1511B      |               | 2          |       |
| I0967101                                   | C1312A | C1406B      |               | 2          |       |
| I1229101                                   | C1312B | C1512B      |               | 2          |       |
| I1229102                                   | C1312B | C0505A      |               | 1          |       |
| A0957103                                   | C1313A | C1513A      |               | 2          |       |
| R1060100                                   | C1313B | D1412B      |               | 1          |       |
| I1059100                                   | C1314A | C1406A      |               | 1          |       |
| N1050100                                   | C1314B | B1808B      |               | 1          |       |
| I0606100                                   | C1315A | B1305B      |               | 1          |       |
| I0606101                                   | C1315A | C1515A      |               | 2          |       |
| N1057100                                   | C1316A | C1516A      |               | 2          |       |
| I1186100                                   | C1316B | B0811A      |               | 1          |       |
| I1186101                                   | C1316B | C1516B      |               | 2          |       |
| I0585100                                   | C1317A | A1509B      |               | 1          |       |
| R1050100                                   | C1317B | C1411A      |               | 1          |       |
| 20003100 GND                               | C1401A | C1413A      |               | 1          |       |

| TITLE                                      |        |             | WL            | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 54        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| R1051100                                   | C1403B | D1809B      |               | 1            |           |      |
| I1054100                                   | C1404A | D0612A      |               | 1            |           |      |
| I1054101                                   | C1404A | A1209A      |               | 2            |           |      |
| N1064100                                   | C1404B | C1805A      |               | 1            |           |      |
| I1055100                                   | C1405A | C1310B      |               | 1            |           |      |
| I1060100                                   | C1405B | B0508B      |               | 1            |           |      |
| I1059100                                   | C1406A | C1314A      |               | 1            |           |      |
| I0967100                                   | C1406B | A1905B      |               | 1            |           |      |
| I0967101                                   | C1406B | C1312A      |               | 2            |           |      |
| N10511                                     | C1407A | A1207B      |               | 1            |           |      |
| I0956100                                   | C1407B | C1607B      |               | 1            |           |      |
| I1063100                                   | C1408A | D0413A      |               | 1            |           |      |
| N1052100                                   | C1408B | B1307A      |               | 1            |           |      |
| N1052106                                   | C1408B | C1102A      |               | 2            |           |      |
| N1056100                                   | C1409A | B0708B      |               | 1            |           |      |
| N1056101                                   | C1409A | C1305A      |               | 2            |           |      |
| R1057100                                   | C1409B | C1306A      |               | 1            |           |      |
| I0960100                                   | C1410A | C1610A      |               | 1            |           |      |
| R1058100                                   | C1410B | D1312B      |               | 1            |           |      |
| R1050100                                   | C1411A | C1317B      |               | 1            |           |      |
| R1050101                                   | C1411A | D1808B      |               | 2            |           |      |
| I0950100                                   | C1411B | C1611B      |               | 1            |           |      |
| I0954100                                   | C1412A | C1612A      |               | 1            |           |      |
| I0952100                                   | C1412B | C1612B      |               | 1            |           |      |
| 20003100 GND                               | C1413A | C1401A      |               | 1            |           |      |
| I0958100                                   | C1413B | C1613B      |               | 1            |           |      |
| 20018100 GND                               | C1502A | A1204B      |               | 1            |           |      |
| I1045100                                   | C1503A | A1403A      |               | 1            |           |      |
| I1096100                                   | C1503B | C1508B      |               | 1            |           |      |
| I1038100                                   | C1504A | D1911B      |               | 1            |           |      |
| N1073100                                   | C1504B | B2512A      |               | 1            |           |      |
| N1056104                                   | C1505A | C1609A      |               | 1            |           |      |
| I0605101                                   | C1505B | C1305B      |               | 2            |           |      |
| R1082100                                   | C1506A | C1609B      |               | 1            |           |      |

| TITLE           |  | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
|-----------------|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP |  |        |             |               |            |       |
|                 |  |        |             |               |            |       |
| R1082101        |  | C1506A | B1403A      |               | 2          |       |
| 10016100        |  | C1506B | D1501B      |               | 1          |       |
| N1215100        |  | C1507A | B0508A      |               | 1          |       |
| N1215101        |  | C1507A | C1307A      |               | 2          |       |
| I1081101        |  | C1507B | B1406B      |               | 2          |       |
| A1078100        |  | C1508A | D0903A      |               | 1          |       |
| I1096100        |  | C1508B | C1503B      |               | 1          |       |
| A0958402        |  | C1509A | D1706A      |               | 1          |       |
| A0958403        |  | C1509A | C1309A      |               | 2          |       |
| A0958302        |  | C1509B | C1309B      |               | 1          |       |
| N1084100        |  | C1510A | D0906B      |               | 1          |       |
| I1080100        |  | C1510B | C1605A      |               | 1          |       |
| I1089100        |  | C1511A | D0908A      |               | 1          |       |
| I1244101        |  | C1511B | C1311B      |               | 2          |       |
| I1244102        |  | C1511B | C0906A      |               | 1          |       |
| I0966101        |  | C1512A | C1606B      |               | 2          |       |
| I1229100        |  | C1512B | B0413B      |               | 1          |       |
| I1229101        |  | C1512B | C1312B      |               | 2          |       |
| A0957100        |  | C1513A | D1711A      |               | 1          |       |
| A0957103        |  | C1513A | C1313A      |               | 2          |       |
| R1085100        |  | C1513B | D1612B      |               | 1          |       |
| I1084100        |  | C1514A | C1606A      |               | 1          |       |
| N1050101        |  | C1514B | B1808B      |               | 2          |       |
| I0606101        |  | C1515A | C1315A      |               | 2          |       |
| N1057100        |  | C1516A | C1316A      |               | 2          |       |
| N1057101        |  | C1516A | B1711A      |               | 1          |       |
| I1186101        |  | C1516B | C1316B      |               | 2          |       |
| I0586100        |  | C1517A | A1513B      |               | 1          |       |
| R1075100        |  | C1517B | C1611A      |               | 1          |       |
| 20004100 GND    |  | C1601A | C1613A      |               | 1          |       |
| R1076100        |  | C1603B | D1909B      |               | 1          |       |
| I1079100        |  | C1604A | A1208B      |               | 1          |       |
| I1079101        |  | C1604A | D0612B      |               | 2          |       |
| N1089100        |  | C1604B | C1905A      |               | 1          |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 56         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I1080100                                   | C1605A | C1510B      |               | 1          |       |
| I1085100                                   | C1605B | B0509A      |               | 1          |       |
| I1084100                                   | C1606A | C1514A      |               | 1          |       |
| I0966100                                   | C1606B | A1908A      |               | 1          |       |
| I0966101                                   | C1606B | C1512A      |               | 2          |       |
| N10761                                     | C1607A | A1207A      |               | 1          |       |
| I0956100                                   | C1607B | C1407B      |               | 1          |       |
| I0956101                                   | C1607B | C1704B      |               | 2          |       |
| N1088100                                   | C1608A | D0413B      |               | 1          |       |
| N1052101                                   | C1608B | B1307A      |               | 2          |       |
| N1052102                                   | C1608B | C2008A      |               | 1          |       |
| N1056103                                   | C1609A | B1306A      |               | 2          |       |
| N1056104                                   | C1609A | C1505A      |               | 1          |       |
| R1082100                                   | C1609B | C1506A      |               | 1          |       |
| I0960100                                   | C1610A | C1410A      |               | 1          |       |
| I0960101                                   | C1610A | C1708A      |               | 2          |       |
| R1083100                                   | C1610B | D1512B      |               | 1          |       |
| R1075100                                   | C1611A | C1517B      |               | 1          |       |
| R1075101                                   | C1611A | D1908B      |               | 2          |       |
| I0950100                                   | C1611B | C1411B      |               | 1          |       |
| I0950101                                   | C1611B | C1705B      |               | 2          |       |
| I0954100                                   | C1612A | C1412A      |               | 1          |       |
| I0954101                                   | C1612A | C1707B      |               | 2          |       |
| I0952100                                   | C1612B | C1412B      |               | 1          |       |
| I0952101                                   | C1612B | C1707A      |               | 2          |       |
| 20004100 GND                               | C1613A | C1601A      |               | 1          |       |
| I0958100                                   | C1613B | C1413B      |               | 1          |       |
| I0958101                                   | C1613B | C1706B      |               | 2          |       |
| I0970100                                   | C1702A | C0807A      |               | 2          |       |
| I0968100                                   | C1703A | A0411B      |               | 1          |       |
| I0968101                                   | C1703A | C1211B      |               | 2          |       |
| A0951600                                   | C1704A | A1508B      |               | 1          |       |
| I0956101                                   | C1704B | C1607B      |               | 2          |       |
| N1207100                                   | C1705A | B1202A      |               | 1          |       |

| TITLE<br>LOGIC WIRE WRAP                   |        |             | WL            | DOCUMENT NO.<br>HPDE - 7992 | SHEET NO.<br>57 | REV.<br>A |
|--|--------|-------------|---------------|-----------------------------|-----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL                  | NOTES           |           |
| I0950101                                   | C1705B | C1611B      |               | 2                           |                 |           |
| A0951100                                   | C1706A | A1506A      |               | 1                           |                 |           |
| I0958101                                   | C1706B | C1613B      |               | 2                           |                 |           |
| I0952101                                   | C1707A | C1612B      |               | 2                           |                 |           |
| I0954101                                   | C1707B | C1612A      |               | 2                           |                 |           |
| I0960101                                   | C1708A | C1610A      |               | 2                           |                 |           |
| A0951200                                   | C1708B | A1505B      |               | 1                           |                 |           |
| A0951300                                   | C1709A | A1503A      |               | 1                           |                 |           |
| A0951400                                   | C1709B | A1508A      |               | 1                           |                 |           |
| A0951500                                   | C1710A | A1507B      |               | 1                           |                 |           |
| A0952200                                   | C1711A | B1313B      |               | 1                           |                 |           |
| A0955400                                   | C1712A | A1105A      |               | 2                           |                 |           |
| A0955500                                   | C1712B | D0513A      |               | 1                           |                 |           |
| A0955300                                   | C1713A | D0411A      |               | 1                           |                 |           |
| A0955200                                   | C1713B | D2006B      |               | 1                           |                 |           |
| A0955201                                   | C1713B | D1204B      |               | 2                           |                 |           |
| A0955100                                   | C1714A | C2112A      |               | 1                           |                 |           |
| A0955101                                   | C1714A | C2105A      |               | 2                           |                 |           |
| N1202100                                   | C1714B | B1206B      |               | 1                           |                 |           |
| A0958600                                   | C1715A | A1213B      |               | 1                           |                 |           |
| A0958601                                   | C1715A | C2109B      |               | 2                           |                 |           |
| A0958300                                   | C1715B | B1208A      |               | 1                           |                 |           |
| A0956600                                   | C1716A | B0511B      |               | 1                           |                 |           |
| A0956601                                   | C1716A | C2006A      |               | 2                           |                 |           |
| A0956500                                   | C1716B | B0512B      |               | 1                           |                 |           |
| A0956400                                   | C1717A | C0710A      |               | 1                           |                 |           |
| A0956300                                   | C1717B | D0512A      |               | 1                           |                 |           |
| 20008100 GND                               | C1801A | C1810A      |               | 1                           |                 |           |
| I1001100                                   | C1802A | B1612B      |               | 1                           |                 |           |
| I1001101                                   | C1802A | C1902A      |               | 2                           |                 |           |
| I1004100                                   | C1803A | B1510B      |               | 1                           |                 |           |
| I1004102                                   | C1803A | C1903A      |               | 2                           |                 |           |
| I1002100                                   | C1803B | B1611B      |               | 1                           |                 |           |
| I1002102                                   | C1803B | C1903B      |               | 2                           |                 |           |

| TITLE<br>LOGIC WIRE WRAP                   |        |             | WL            | DOCUMENT NO.<br>HPDE - 7992 | SHEET NO.<br>58 | REV.<br>B |
|--|--------|-------------|---------------|-----------------------------|-----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL                  | NOTES           |           |
| I1003100                                   | C1804A | B1613B      |               | 1                           |                 |           |
| I1003101                                   | C1804A | C1904A      |               | 2                           |                 |           |
| I1006100                                   | C1804B | B1511B      |               | 1                           |                 |           |
| I1006102                                   | C1804B | C1904B      |               | 2                           |                 |           |
| N1064100                                   | C1805A | C1404B      |               | 1                           |                 |           |
| I1005100                                   | C1805B | C1512B      |               | 1                           |                 |           |
| I1005101                                   | C1805B | B1905B      |               | 2                           |                 |           |
| A1501400                                   | C1806A | D0811A      |               | 2                           |                 |           |
| A1501401                                   | C1806A | C1906A      |               | 1                           |                 |           |
| A1503100                                   | C1806B | C0913A      |               | 1                           |                 |           |
| A1501300                                   | C1807A | D0809A      |               | 2                           |                 |           |
| A1501301                                   | C1807A | C1907A      |               | 1                           |                 |           |
| I1000100                                   | C1807B | B1610B      |               | 1                           |                 |           |
| I1000102                                   | C1807B | C1907B      |               | 2                           |                 |           |
| A1504300                                   | C1808A | C0909A      |               | 1                           |                 |           |
| I1007100                                   | C1808B | C1908B      |               | 1                           |                 |           |
| I1007102                                   | C1808B | B1513B      |               | 2                           |                 |           |
| A1501100                                   | C1809A | D0808B      |               | 2                           |                 |           |
| A1501101                                   | C1809A | C1909A      |               | 1                           |                 |           |
| A1501200                                   | C1809B | D0810B      |               | 2                           |                 |           |
| A1501201                                   | C1809B | C1909B      |               | 1                           |                 |           |
| 20008100 GND                               | C1810A | C1801A      |               | 1                           |                 |           |
| A1503200                                   | C1810B | C0912A      |               | 1                           |                 |           |
| 20009100 GND                               | C1901A | C1910A      |               | 1                           |                 |           |
| I1001101                                   | C1902A | C1802A      |               | 2                           |                 |           |
| I1001102                                   | C1902A | C2013B      |               | 1                           |                 |           |
| I1004102                                   | C1903A | C1803A      |               | 2                           |                 |           |
| I1004103                                   | C1903A | C2004A      |               | 1                           |                 |           |
| I1002102                                   | C1903B | C1803B      |               | 2                           |                 |           |
| I1002103                                   | C1903B | C2014A      |               | 1                           |                 |           |
| I1003101                                   | C1904A | C1804A      |               | 2                           |                 |           |
| I1003102                                   | C1904A | C2014B      |               | 1                           |                 |           |
| I1006102                                   | C1904B | C1804B      |               | 2                           |                 |           |
| I1006103                                   | C1904B | C2005A      |               | 1                           |                 |           |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.           |
|--|--------|-------------|---------------|------------|----------------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 59         | K              |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES          |
| N1089100                                   | C1905A | C1604B      |               | 1          |                |
| I1005101                                   | C1905B | C1805B      |               | 2          |                |
| I1005102                                   | C1905B | C2004B      |               | 1          |                |
| A1501401                                   | C1906A | C1806A      |               | 1          |                |
| A1506100                                   | C1906B | D0913A      |               | 1          |                |
| A1501301                                   | C1907A | C1807A      |               | 1          |                |
| I1000102                                   | C1907B | C1807B      |               | 2          |                |
| I1000103                                   | C1907B | C2013A      |               | 1          |                |
| A1507300                                   | C1908A | D0909A      |               | 1          |                |
| I1007100                                   | C1908B | C1808B      |               | 1          |                |
| I1007101                                   | C1908B | C2005B      |               | 2          |                |
| A1501101                                   | C1909A | C1809A      |               | 1          |                |
| A1501201                                   | C1909B | C1809B      |               | 1          |                |
| 20009100 GND                               | C1910A | C1901A      |               | 1          |                |
| A1506200                                   | C1910B | D0912A      |               | 1          |                |
| I0656100                                   | C2002A | C2814B      |               | 1          |                |
| K0808200                                   | C2003B | D2508B      |               | 2          |                |
| K0808201 TTR                               | C2003B | D2708B      |               | 1          |                |
| I1004103                                   | C2004A | C1903A      |               | 1          |                |
| I1005102                                   | C2004B | C1905B      |               | 1          |                |
| I1006103                                   | C2005A | C1904B      |               | 1          |                |
| I1007101                                   | C2005B | C1908B      |               | 2          |                |
| A0956601                                   | C2006A | C1716A      |               | 2          |                |
| I0974100                                   | C2006B | C0312B      |               | 1          |                |
| I0555100                                   | C2007A | A1111A      |               | 1          |                |
| I0555101                                   | C2007A | C2210B      |               | 2          | S/C 49 & Above |
| N1052104                                   | C2007B | C2109A      |               | 1          |                |
| N1052105                                   | C2007B | B1209B      |               | 2          |                |
| N1052102                                   | C2008A | C1608B      |               | 1          |                |
| N1052103                                   | C2008A | C2109A      |               | 2          |                |
| A0631100                                   | C2008B | C0408B      |               | 1          |                |
| A0630400                                   | C2009A | C0508B      |               | 1          |                |
| A0630300                                   | C2009B | C0608B      |               | 1          |                |
| A0632100                                   | C2010A | D1811A      |               | 1          |                |
| A0631200                                   | C2010B | C0310B      |               | 1          |                |

| TITLE                                      |        |             | WL            | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 60        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| A0631300                                   | C2011A | C0205A      |               | 1            |           |      |
| A0631400                                   | C2011B | C0105A      |               | 1            |           |      |
| A0630200                                   | C2012A | C0708B      |               | 1            |           |      |
| A0630100                                   | C2012B | C0808B      |               | 1            |           |      |
| I1000103                                   | C2013A | C1907B      |               | 1            |           |      |
| I1001102                                   | C2013B | C1902A      |               | 1            |           |      |
| I1002103                                   | C2014A | C1903B      |               | 1            |           |      |
| I1003102                                   | C2014B | C1904A      |               | 1            |           |      |
| I0636100                                   | C2015A | B1310B      |               | 1            |           |      |
| A0627101                                   | C2015B | C2114A      |               | 2            |           |      |
| I0559101                                   | C2103A | C2113A      |               | 2            |           |      |
| K0850200                                   | C2103B | C0509B      |               | 1            |           |      |
| K1179203                                   | C2104A | B1112A      |               | 2            |           |      |
| I0613100                                   | C2104B | D2405B      |               | 1            |           |      |
| A0955101                                   | C2105A | C1714A      |               | 2            |           |      |
| I0556101                                   | C2105B | B1311A      |               | 2            |           |      |
| A0958504                                   | C2106A | D1910A      |               | 2            |           |      |
| A0958200                                   | C2106B | D1702A      |               | 1            |           |      |
| K0685100                                   | C2107A | D0705A      |               | 1            |           |      |
| K0679101                                   | C2107B | B1802A      |               | 2            |           |      |
| K0625102                                   | C2108A | B1803B      |               | 2            |           |      |
| K1176101                                   | C2108B | C0805A      |               | 1            |           |      |
| K1176102                                   | C2108B | C0904A      |               | 2            |           |      |
| N1052103                                   | C2109A | C2008A      |               | 2            |           |      |
| N1052104                                   | C2109A | C2007B      |               | 1            |           |      |
| A0958601                                   | C2109B | C1715A      |               | 2            |           |      |
| I0561100                                   | C2110A | JA8105A     |               | 1            |           |      |
| I0558100                                   | C2110B | A1108B      |               | 1            |           |      |
| I0977100                                   | C2111A | B1208B      |               | 1            |           |      |
|  |        |             |               | 2            |           |      |
| A0955100                                   | C2112A | C1714A      |               | 1            |           |      |
| I0969100                                   | C2112B | C1210B      |               | 1            |           |      |
| I0559100                                   | C2113A | C2305B      |               | 1            |           |      |
|  |        |             |               | 2            |           |      |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO.      | REV. |
|--|--------|-------------|---------------|--------------|----------------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 61             | K    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES          |      |
| A0627100                                   | C2114A | B2608B      |               | 1            |                |      |
| A0627101                                   | C2114A | C2015B      |               | 2            |                |      |
| I0540100                                   | C2114B | A1702A      |               | 1            |                |      |
| I0611104                                   | C2115A | B1304B      |               | 2            |                |      |
| N0216102                                   | C2116B | A2217B      |               | 2            |                |      |
| A0707100                                   | C2117B | D1108B      |               | 1            |                |      |
| 20060000                                   | C2201A | C2213A      |               | 1            | S/C 49 & Above |      |
| K0351101                                   | C2204B | B2008B      |               | 2            | S/C 48 & Below |      |
| I0348102                                   | C2204B | A30108      |               | 2            | S/C 49 & Above |      |
| I0555101                                   | C2210B | C2007A      |               | 2            | S/C 49 & Above |      |
| I0555102                                   | C2210B | C2211A      |               | 1            | S/C 49 & Above |      |
| I0555102                                   | C2211A | C2210B      |               | 1            | S/C 49 & Above |      |
| A0337001                                   | C2212B | B3011A      |               | 1            | S/C 49 & Above |      |
| 20060000                                   | C2213A | C2201A      |               | 1            | S/C 49 & Above |      |
| 20060001                                   | C2213A | C2214B      |               | 2            | S/C 49 & Above |      |
| 20060001                                   | C2214B | C2213A      |               | 2            | S/C 49 & Above |      |
| I0734000                                   | C2215A | A1112B      |               | 1            | S/C 49 & Above |      |
| I0559100                                   | C2305B | C2113A      |               | 1            |                |      |
| A0886100                                   | C2313B | C2813B      |               | 1            |                |      |
| N0898100                                   | C2314B | JA8108A     |               | 1            |                |      |
| I0875100                                   | C2409B | C2509B      |               | 1            |                |      |
| K0802200                                   | C2411B | C2511B      |               | 1            |                |      |
| N0873100                                   | C2412B | C2512B      |               | 1            |                |      |
| K0810200                                   | C2415B | D2712B      |               | 1            |                |      |
| K0810201                                   | C2415B | C2009A      |               | 2            |                |      |
| 20036100 GND                               | C2501A | C2508A      |               | 1            |                |      |
| N0893100                                   | C2504B | C2809B      |               | 1            |                |      |
| 20036100 GND                               | C2508A | C2501A      |               | 1            |                |      |
| I0875100                                   | C2409B | C2409B      |               | 1            |                |      |
| K0802200                                   | C2511B | C2411B      |               | 1            |                |      |
| N0873100                                   | C2512B | C2412B      |               | 1            |                |      |
| N1167100                                   | C2513A | C1203B      |               | 1            |                |      |
| N1168100                                   | C2514A | C1209A      |               | 1            |                |      |
| 80107100 TTR                               | C2703A | B1509A      |               | 1            |                |      |
| 80104100 TTR                               | C2703B | B1506A      |               | 1            |                |      |
| 80106100 TTR                               | C2704A | B1508A      |               | 1            |                |      |
| 80105100 TTR                               | C2705A | B1505A      |               | 1            |                |      |
| 81445100 TTR                               | C2705B | A0513B      |               | 1            |                |      |
| 80110100 TTR                               | C2706A | B1608A      |               | 1            |                |      |
| 80111100 TTR                               | C2706B | B1609A      |               | 1            |                |      |
| 80108100 TTR                               | C2707A | B1606A      |               | 1            |                |      |

| TITLE                                      |        |             | WL            | DOCUMENT NO. | SHEET NO.               | REV. |
|--|--------|-------------|---------------|--------------|-------------------------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 62                      | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES                   |      |
| 80109100 TTR                               | C2707B | B1605A      |               | 1            |                         |      |
| 80507100 TTR                               | C2708A | D0609A      |               | 1            |                         |      |
| 80113100 TTR                               | C2709A | A1810A      |               | 1            |                         |      |
| I0331100                                   | C2709B | A2808B      |               | 1            |                         |      |
| I0331101                                   | C2709B | C2715A      |               | 2            |                         |      |
| A0250201 TTR                               | C2710A | C0708A      |               | 2            |                         |      |
| A0250102                                   | C2711A | B2313B      |               | 2            |                         |      |
| 80112100 TTR                               | C2711B | B1706A      |               | 1            |                         |      |
| A0250301 TTR                               | C2712A | A2005A      |               | 2            |                         |      |
| I0175102 TTR                               | C2712B | A2408B      |               | 1            |                         |      |
| A0251101 TTR                               | C2713A | A2008B      |               | 2            |                         |      |
| A0250401 TTR                               | C2713B | A2007B      |               | 2            |                         |      |
| A0252202                                   | C2714A | A2012A      |               | 2            |                         |      |
| A0251201 TTR                               | C2714B | A2010B      |               | 2            |                         |      |
| I0331101                                   | C2715A | C2709B      |               | 2            |                         |      |
| I0331102                                   | C2715A | A2213A      |               | 1            |                         |      |
| A0252103 TTR                               | C2715B | D0213B      |               | 1            |                         |      |
| A0251402 TTR                               | C2716A | A2011A      |               | 1            |                         |      |
| A0251300                                   | C2716B | A2009A      |               | 1            |                         |      |
| A0251302                                   | C2716B | A1907B      |               | 2            |                         |      |
| 81446100 TTR                               | C2717A | A0602B      |               | 1            |                         |      |
| 20049100                                   | C2717B | D2714A      |               | 1            | DELETE FOR BR3E4/5 ONLY |      |
| N0893100                                   | C2809B | C2504B      |               | 1            |                         |      |
| A0886100                                   | C2813B | C2313B      |               | 1            |                         |      |
| I0656100                                   | C2814B | C2002A      |               | 1            |                         |      |
| 40006100                                   | C2815B | A2115A      |               | 1            |                         |      |
| A0320100                                   | C3007B | A3009B      |               | 1            |                         |      |
| A0384100                                   | C3008B | A2710B      |               | 1            |                         |      |
| K0250100                                   | C3013B | B2312A      |               | 1            |                         |      |
| N1163100                                   | C3017B | C1204A      |               | 1            |                         |      |
| N1163101                                   | C3017B | A2809A      |               | 2            |                         |      |
| I1377100                                   | D0202A | C0510B      |               | 2            |                         |      |
| I1387100                                   | D0202B | C0712B      |               | 2            |                         |      |
| I0974102                                   | D0203A | C0112B      |               | 1            |                         |      |
| I0974103                                   | D0203A | D0303A      |               | 2            |                         |      |
| I1217101                                   | D0203B | B0411A      |               | 2            |                         |      |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 63         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| A0500201                                   | D0204A | A1711B      |               | 2          |       |
| I1221101                                   | D0204B | B0412A      |               | 2          |       |
| A0500401                                   | D0205A | A1607B      |               | 2          |       |
| I1414102                                   | D0205B | D0305B      |               | 2          |       |
| A0460200                                   | D0206A | D1005B      |               | 1          |       |
| I0973102                                   | D0206B | C0309A      |               | 2          |       |
| I0973103                                   | D0206B | D0306B      |               | 1          |       |
| N1152100                                   | D0207A | A1408B      |               | 1          |       |
| I1423100                                   | D0207B | D0504B      |               | 1          |       |
| I1423101                                   | D0207B | C0612B      |               | 2          |       |
| A0460400                                   | D0208A | D007B       |               | 1          |       |
| M0151108                                   | D0208B | A0210B      |               | 2          |       |
| 20037101 GND                               | D0209A | D0210A      |               | 1          |       |
| I1389100                                   | D0209B | A0412B      |               | 2          |       |
| 20037100 GND                               | D0210A | D0214A      |               | 2          |       |
| 20037101 GND                               | D0210A | D0209A      |               | 1          |       |
| A0203101                                   | D0211A | B2307B      |               | 2          |       |
| A0203102                                   | D0211A | D0708A      |               | 1          |       |
| I1405108                                   | D0212A | C0807B      |               | 1          |       |
| I1411108                                   | D0212B | C0811B      |               | 1          |       |
| A0252102                                   | D0213B | A2013A      |               | 2          |       |
| A0252103 TTR                               | D0213B | C2715B      |               | 1          |       |
| 20037100 GND                               | D0214A | D0210A      |               | 2          |       |
| 20002100 GND                               | D0301A | D0308B      |               | 1          |       |
| I1372100                                   | D0302A | C0610B      |               | 2          |       |
| I1382100                                   | D0302B | C0410B      |               | 2          |       |
| I0974103                                   | D0303A | D0203A      |               | 2          |       |
| I0974104                                   | D0303A | D0706B      |               | 1          |       |
| I1219101                                   | D0303B | B0411B      |               | 2          |       |
| A0501101                                   | D0304A | A1608B      |               | 2          |       |
| I1215101                                   | D0304B | B0410B      |               | 2          |       |
| A0500301                                   | D0305A | A1709A      |               | 2          |       |
| I1414101                                   | D0305B | D0507B      |               | 1          |       |
| I1414102                                   | D0305B | D0205B      |               | 2          |       |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.              |
|--|--------|-------------|---------------|------------|-------------------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 64         | B                 |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES             |
| A0459100                                   | D0306A | D1008B      |               | 1          |                   |
| I0973103                                   | D0306B | D0205B      |               | 1          |                   |
| I0973104                                   | D0306B | D0712B      |               | 2          |                   |
| N0155100                                   | D0307A | A0211B      |               | 1          | S/C 32 & BLW ONLY |
| X0650101                                   | D0307A | A0106A      |               | 2          | S/C 33 & ABV ONLY |
| I1420101                                   | D0307B | D0502A      |               | 1          |                   |
| I1420102                                   | D0307B | D0312A      |               | 2          |                   |
| A0460300                                   | D0308A | D1005A      |               | 1          |                   |
| M0003100                                   | D0308B | A0110B      |               | 1          |                   |
| I1429101                                   | D0309A | D0603A      |               | 2          |                   |
| I1367100                                   | D0309B | C0710B      |               | 2          |                   |
| I0979101                                   | D0310A | D0706A      |               | 2          |                   |
| A0203201                                   | D0310B | B2306A      |               | 2          |                   |
| K0682100                                   | D0311A | B1810B      |               | 1          |                   |
| A0252203                                   | D0311B | A1805A      |               | 1          |                   |
| I1420102                                   | D0312A | D0307B      |               | 2          |                   |
| I1420103                                   | D0312A | C0111A      |               | 1          |                   |
| I1388101                                   | D0312B | D0704B      |               | 1          |                   |
| I0156100                                   | D0313B | A2206B      |               | 1          |                   |
| I1408100                                   | D0402A | C0110A      |               | 1          |                   |
| I1405100                                   | D0403A | C0107B      |               | 1          |                   |
| I1405109                                   | D0403A | A1804B      |               | 2          |                   |
| I1411100                                   | D0404B | C0111B      |               | 1          |                   |
| I1411109                                   | D0404B | A1805B      |               | 2          |                   |
| 70006100                                   | D0405A | JAB508B     |               | 1          |                   |
| I0100122                                   | D0405B | D0509B      |               | 1          |                   |
| I0100123                                   | D0405B | D0406B      |               | 2          |                   |
| 70009100                                   | D0406A | JAB503B     |               | 1          |                   |
| I0100123                                   | D0406B | D0405B      |               | 2          |                   |
| I0100124                                   | D0406B | D0408B      |               | 1          |                   |
| I1433100                                   | D0407A | D0608A      |               | 1          |                   |
| I1402100                                   | D0407B | C0304B      |               | 2          |                   |
| 70010100                                   | D0408A | JAB502B     |               | 1          |                   |
| I0100124                                   | D0408B | D0406B      |               | 1          |                   |
| I0100125                                   | D0408B | D0409B      |               | 2          |                   |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 65        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| 70007100                                   | D0409A | JA8506B     |               | 1            |           |      |
| I0100125                                   | D0409B | D0408B      |               | 2            |           |      |
| A0957200                                   | D0410A | B0804A      |               | 1            |           |      |
| A0955300                                   | D0411A | C1713A      |               | 1            |           |      |
| A0956501                                   | D0412A | B0512B      |               | 2            |           |      |
| I1063100                                   | D0413A | C1408A      |               | 1            |           |      |
| N1088100                                   | D0413B | C1608A      |               | 1            |           |      |
| I1420100                                   | D0502A | D0711B      |               | 2            |           |      |
| I1420101                                   | D0502A | D0307B      |               | 1            |           |      |
| I1417100                                   | D0503A | C0512B      |               | 1            |           |      |
| I1417101                                   | D0503A | C0211A      |               | 2            |           |      |
| I1423100                                   | D0504B | D0207B      |               | 1            |           |      |
| I1423102                                   | D0504B | D0710A      |               | 2            |           |      |
| 70011100                                   | D0505A | JA8501B     |               | 1            |           |      |
| I0100118                                   | D0505B | D0609B      |               | 1            |           |      |
| I0100119                                   | D0505B | D0506B      |               | 2            |           |      |
| 70008100                                   | D0506A | JA8504B     |               | 1            |           |      |
| I0100120                                   | D0506B | D0508B      |               | 1            |           |      |
| I0100119                                   | D0506B | D0505B      |               | 2            |           |      |
| I1414100                                   | D0507B | D0709A      |               | 2            |           |      |
| I1414101                                   | D0507B | D0305B      |               | 1            |           |      |
| 70012100                                   | D0508A | JA8505B     |               | 1            |           |      |
| I0100120                                   | D0508B | D0506B      |               | 1            |           |      |
| I0100121                                   | D0508B | D0509B      |               | 2            |           |      |
| 70013100                                   | D0509A | JA8507B     |               | 1            |           |      |
| I0100121                                   | D0509B | D0508B      |               | 2            |           |      |
| I0100122                                   | D0509B | D0405B      |               | 1            |           |      |
| A0956201                                   | D0510A | B0710B      |               | 1            |           |      |
| A0956401                                   | D0511A | B0710A      |               | 2            |           |      |
| A0956300                                   | D0512A | C1717B      |               | 1            |           |      |
| A0955500                                   | D0513A | C1712B      |               | 1            |           |      |
| I1194100                                   | D0602B | B0606A      |               | 1            |           |      |
| I1429100                                   | D0603A | D0707B      |               | 1            |           |      |
| I1429101                                   | D0603A | D0309A      |               | 2            |           |      |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 66        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| I0518100                                   | D0604A | A1709B      |               | 1            |           |      |
| I0510100                                   | D0604B | A1603A      |               | 1            |           |      |
| I0100115                                   | D0605B | D1613A      |               | 2            |           |      |
| I0100116                                   | D0605B | D0606B      |               | 1            |           |      |
| 70014100                                   | D0606A | JA8509B     |               | 1            |           |      |
| I0100116                                   | D0606B | D0605B      |               | 1            |           |      |
| I0100117                                   | D0606B | D0609B      |               | 2            |           |      |
| I1426100                                   | D0607B | D0711A      |               | 1            |           |      |
| I1426101                                   | D0607B | C0412B      |               | 2            |           |      |
|  |        |             |               |              |           |      |
| I1433100                                   | D0608A | D0407A      |               | 1            |           |      |
| I0046104                                   | D0608B | A2804B      |               | 2            |           |      |
| 80507100 TTR                               | D0609A | C2708A      |               | 1            |           |      |
| I0100117                                   | D0609B | D0606B      |               | 2            |           |      |
| I0100118                                   | D0609B | D0505B      |               | 1            |           |      |
| N0507100                                   | D0610A | B1312B      |               | 1            |           |      |
| A0957301                                   | D0611A | B0505A      |               | 1            |           |      |
| I1054100                                   | D0612A | C1404A      |               | 1            |           |      |
| I1079101                                   | D0612B | C1604A      |               | 2            |           |      |
| A0956100                                   | D0613A | D1701B      |               | 1            |           |      |
| I1361100                                   | D0703B | C0810B      |               | 2            |           |      |
| I1388100                                   | D0704B | A1213A      |               | 2            |           |      |
| I1388101                                   | D0704B | D0312B      |               | 1            |           |      |
| K0685100                                   | D0705A | C2107A      |               | 1            |           |      |
| A0252101                                   | D0705B | A1913B      |               | 2            |           |      |
| I0979100                                   | D0706A | A1102B      |               | 1            |           |      |
| I0979101                                   | D0706A | D0310A      |               | 2            |           |      |
| I0974104                                   | D0706B | D0303A      |               | 1            |           |      |
| I1223101                                   | D0707A | B0412B      |               | 2            |           |      |
| I1429100                                   | D0707B | D0603A      |               | 1            |           |      |
| A0203102                                   | D0708A | D0211A      |               | 1            |           |      |
| A0500101                                   | D0708B | A1713A      |               | 2            |           |      |
| I1414100                                   | D0709A | D0507B      |               | 2            |           |      |
| N1181101                                   | D0709B | B0405B      |               | 2            |           |      |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 67         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I1423102                                   | D0710A | D0504B      |               | 2          |       |
| 20034100 GND                               | D0710B | D0714A      |               | 1          |       |
| I1426100                                   | D0711A | D0607B      |               | 1          |       |
| I1420100                                   | D0711B | D0502A      |               | 2          |       |
| I0160100                                   | D0712A | A2207A      |               | 1          |       |
| I0973104                                   | D0712B | D0306B      |               | 2          |       |
| A0460100                                   | D0713A | D1003B      |               | 1          |       |
| 20034100 GND                               | D0714A | D0710B      |               | 1          |       |
| 20020100 GND                               | D0801A | D0802B      |               | 1          |       |
| 20020101 GND                               | D0801A | D0807A      |               | 2          |       |
| N1052107                                   | D0802A | C1102A      |               | 1          |       |
| N1052108                                   | D0802A | D1101A      |               | 2          |       |
| 20020100 GND                               | D0802B | D0801A      |               | 1          |       |
| I1505100                                   | D0803A | D2009B      |               | 1          |       |
| A1502100                                   | D0803B | D1807A      |               | 1          |       |
| I1348100                                   | D0804A | C0813B      |               | 1          |       |
| I1322100                                   | D0804B | C0613B      |               | 1          |       |
| A1502300                                   | D0805A | D1804B      |               | 1          |       |
| A1502200                                   | D0805B | D1805B      |               | 1          |       |
| I1335100                                   | D0806A | C0713B      |               | 1          |       |
| I1309100                                   | D0806B | C0513B      |               | 1          |       |
| 20020101 GND                               | D0807A | D0801A      |               | 2          |       |
| A1502400                                   | D0807B | D1804A      |               | 1          |       |
| I1298100                                   | D0808A | C0413B      |               | 1          |       |
| A1501100                                   | D0808B | C1809A      |               | 2          |       |
| A1501300                                   | D0809A | C1807A      |               | 2          |       |
| I1274100                                   | D0809B | C0203B      |               | 1          |       |
| I1285100                                   | D0810A | C0313B      |               | 1          |       |
|  |        |             |               |            |       |
| A1501200                                   | D0810B | C1809B      |               | 2          |       |
| A1501400                                   | D0811A | C1806A      |               | 2          |       |
| I1261100                                   | D0811B | C0103B      |               | 1          |       |
| 20024101 GND                               | D0901A | D0902B      |               | 1          |       |
| 20024100 GND                               | D0902A | D0902B      |               | 2          |       |

| TITLE<br>LOGIC WIRE WRAP                   |        |             | WL            | DOCUMENT NO.<br>HPDE - 7992 | SHEET NO.<br>68 | REV.<br>A |
|--|--------|-------------|---------------|-----------------------------|-----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL                  | NOTES           |           |
| 20024100 GND                               | D0902B | D0902A      |               | 2                           |                 |           |
| 20024101 GND                               | D0902B | D0901A      |               | 1                           |                 |           |
| A1078100                                   | D0903A | C1508A      |               | 1                           |                 |           |
| A1078101                                   | D0903A | A1903B      |               | 2                           |                 |           |
| A1508100                                   | D0903B | D1907B      |               | 1                           |                 |           |
| K1176103                                   | D0904A | C0904A      |               | 1                           |                 |           |
| M1200103                                   | D0904B | C0904B      |               | 2                           |                 |           |
| A1508300                                   | D0905A | D1905A      |               | 1                           |                 |           |
| A1508200                                   | D0905B | D1906A      |               | 1                           |                 |           |
| I1244103                                   | D0906A | C0906A      |               | 2                           |                 |           |
| I1244104                                   | D0906A | C0705A      |               | 1                           |                 |           |
| N1084100                                   | D0906B | C1510A      |               | 1                           |                 |           |
| A1508400                                   | D0907B | D1908A      |               | 1                           |                 |           |
| I1089100                                   | D0908A | C1511A      |               | 1                           |                 |           |
| A1507100                                   | D0908B | D1906B      |               | 1                           |                 |           |
| A1507300                                   | D0909A | C1908A      |               | 1                           |                 |           |
| I1185101                                   | D0909B | C0909B      |               | 2                           |                 |           |
| 20055100 GND                               | D0910A | C0910A      |               | 1                           |                 |           |
| 20055101 GND                               | D0910A | D0914A      |               | 2                           |                 |           |
| A1507400                                   | D0911A | D1909A      |               | 1                           |                 |           |
| K0052102                                   | D0911B | A1403B      |               | 1                           |                 |           |
| K0052103                                   | D0911B | C0913B      |               | 2                           |                 |           |
| A1506200                                   | D0912A | C1910B      |               | 1                           |                 |           |
| N1154102                                   | D0912B | C0912B      |               | 1                           |                 |           |
| A1506100                                   | D0913A | C1906B      |               | 1                           |                 |           |
| K0050102                                   | D0913B | A1404B      |               | 1                           |                 |           |
| K0050103                                   | D0913B | C0911B      |               | 2                           |                 |           |
| 20055101 GND                               | D0914A | D0910A      |               | 2                           |                 |           |
| 20017100 GND                               | D1001A | D1002B      |               | 1                           |                 |           |
| I1176101                                   | D1002A | B0811B      |               | 2                           |                 |           |
| 20017100 GND                               | D1002B | D1001A      |               | 1                           |                 |           |
| 20017101 GND                               | D1002B | D1007A      |               | 2                           |                 |           |
| A0458100                                   | D1003A | D1108A      |               | 1                           |                 |           |
| A0460100                                   | D1003B | D0713A      |               | 1                           |                 |           |
| A0455100                                   | D1004A | C1003B      |               | 1                           |                 |           |
| A0455101                                   | D1004A | C1106B      |               | 2                           |                 |           |
| A0455300                                   | D1004B | C1005A      |               | 1                           |                 |           |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 69        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| A0455301                                   | D1004B | C1107A      |               | 2            |           |      |
| A0460300                                   | D1005A | D0308A      |               | 1            |           |      |
| A0460200                                   | D1005B | D0206A      |               | 1            |           |      |
| A0455200                                   | D1006A | C1005B      |               | 1            |           |      |
| A0455201                                   | D1006A | C1106A      |               | 2            |           |      |
| A0455400                                   | D1006B | C1007B      |               | 1            |           |      |
| A0455401                                   | D1006B | C1107B      |               | 2            |           |      |
| 20017101 GND                               | D1007A | D1002B      |               | 2            |           |      |
| 20017102 GND                               | D1007A | D1011B      |               | 1            |           |      |
| A0460400                                   | D1007B | D0208A      |               | 1            |           |      |
| A0454100                                   | D1008A | C1008B      |               | 1            |           |      |
| A0454101                                   | D1008A | C1108B      |               | 2            |           |      |
| A0459100                                   | D1008B | D0306A      |               | 1            |           |      |
| A0459300                                   | D1009A | C0208B      |               | 1            |           |      |
| A0454300                                   | D1009B | C1009A      |               | 1            |           |      |
| A0454301                                   | D1009B | C1109B      |               | 2            |           |      |
| A0454200                                   | E1010A | C1010B      |               | 1            |           |      |
| A0454201                                   | D1010A | C1109A      |               | 2            |           |      |
| A0459200                                   | D1010B | C0308B      |               | 1            |           |      |
| 20017102 GND                               | D1011B | D1007A      |               | 1            |           |      |
| 20017103 GND                               | D1011B | D1012B      |               | 2            |           |      |
| 20017103 GND                               | D1012B | D1011B      |               | 2            |           |      |
| 20017104 GND                               | D1012B | D1013B      |               | 1            |           |      |
| 20017104 GND                               | D1013B | D1012B      |               | 1            |           |      |
| N1052108                                   | D1101A | D0802A      |               | 2            |           |      |
| I0978100                                   | D1101B | A0411A      |               | 1            |           |      |
| A0957101                                   | D1102A | D1711A      |               | 2            |           |      |
| A0957102                                   | D1102A | B0808B      |               | 1            |           |      |
| A1176100                                   | D1103B | B0712B      |               | 1            |           |      |
| A0452100                                   | D1105B | C1002A      |               | 1            |           |      |
| A0458100                                   | D1108A | D1003A      |               | 1            |           |      |
| A0707100                                   | D1108B | C2117B      |               | 1            |           |      |
| A0707101                                   | D1108B | D1302A      |               | 2            |           |      |
| A0453100                                   | D1110B | C1002B      |               | 1            |           |      |
| K0454200                                   | D1112B | B0711B      |               | 1            |           |      |

| TITLE<br>LOGIC WIRE WRAP                   |        | WL          | DOCUMENT NO.<br>HPDE - 7992 | SHEET NO.<br>70 | REV.<br>A |
|--|--------|-------------|-----------------------------|-----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR               | Z<br>LEVEL      | NOTES     |
| N1196100                                   | D1201A | B0705B      |                             | 1               |           |
| N1160100                                   | D1201B | A1504B      |                             | 1               |           |
| A0954200                                   | D1202A | D1709A      |                             | 2               |           |
| A0954201                                   | D1202A | B0803A      |                             | 1               |           |
| N0679100                                   | D1202B | A1106A      |                             | 1               |           |
| A0954102                                   | D1203A | B0806A      |                             | 1               |           |
| A0953200                                   | D1203B | D1703B      |                             | 2               |           |
| A0953201                                   | D1203B | B1204A      |                             | 1               |           |
| I1182100                                   | D1204A | B0606B      |                             | 1               |           |
| A0955201                                   | D1204B | C1713B      |                             | 2               |           |
| A0955202                                   | D1204B | C1108B      |                             | 1               |           |
| I0330102                                   | D1205A | A2305B      |                             | 2               |           |
| I0330103                                   | D1205A | B0503A      |                             | 1               |           |
| N1153100                                   | B1205B | A1409A      |                             | 1               |           |
| I0194101                                   | D1206A | A2412B      |                             | 2               |           |
| I0194102                                   | D1206A | C1114B      |                             | 1               |           |
| A1190100                                   | D1206B | B2508B      |                             | 1               |           |
| N0156100                                   | D1207A | A0210A      |                             | 1               |           |
| N0156101                                   | D1207A | A2202A      |                             | 2               |           |
| I1199100                                   | D1207B | B0707B      |                             | 1               |           |
| A1154100                                   | D1208A | A1402A      |                             | 1               |           |
| K1178100                                   | D1208B | B0613A      |                             | 1               |           |
| K1178101                                   | D1208B | C1213A      |                             | 2               |           |
| N1154100                                   | D1209A | A1210B      |                             | 1               |           |
| N1154103                                   | D1209A | C0405A      |                             | 2               |           |
| I0331104                                   | D1209B | A1703B      |                             | 1               |           |
| I0331105                                   | D1209B | A1113B      |                             | 2               |           |
| N1299100                                   | D1210A | B1007B      |                             | 1               |           |
| 20047100 GND                               | D1210B | D1214A      |                             | 1               |           |
| I1164100                                   | D1211A | A1507A      |                             | 1               |           |
| K1203200                                   | D1211B | B0313B      |                             | 1               |           |
| K1203201                                   | D1211B | B1105B      |                             | 2               |           |
| I1203100                                   | D1212A | B0209A      |                             | 2               |           |
| N1155100                                   | D1212B | A1513A      |                             | 1               |           |

| TITLE                                      |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 71        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| M0002100                                   | D1213A | A0209B      |               | 1            |           |      |
| I1166101                                   | D1213B | A1502A      |               | 2            |           |      |
| 20047100 GND                               | D1214A | D1210B      |               | 1            |           |      |
| N1065100                                   | D1301A | D1501A      |               | 1            |           |      |
| 10015100                                   | D1301B | C1306B      |               | 1            |           |      |
| A0707101                                   | D1302A | D1108B      |               | 2            |           |      |
| A0707102                                   | D1302A | D1502A      |               | 1            |           |      |
| N1066100                                   | D1302B | D1502B      |               | 2            |           |      |
| N1066101                                   | D1302B | B0806B      |               | 1            |           |      |
| I0046100                                   | D1303A | B1110A      |               | 1            |           |      |
| I0046101                                   | D1303A | D1503A      |               | 2            |           |      |
| 20005101 GND                               | D1303B | D1304A      |               | 1            |           |      |
| 20005100 GND                               | D1304A | D1314A      |               | 2            |           |      |
| 20005101 GND                               | D1304A | D1303B      |               | 1            |           |      |
| N1069101                                   | D1304B | C1206A      |               | 2            |           |      |
| N1069102                                   | D1304B | D1504B      |               | 1            |           |      |
| R1058100                                   | D1312B | C1410B      |               | 1            |           |      |
| 20005100 GND                               | D1314A | D1304A      |               | 2            |           |      |
| I1074100                                   | D1411A | D1812A      |               | 1            |           |      |
| I1074101                                   | D1411A | B0908B      |               | 2            |           |      |
| R1060100                                   | D1412B | C1313B      |               | 1            |           |      |
| I0100113                                   | D1413A | A2817B      |               | 2            |           |      |
| I0100114                                   | D1413A | D1613A      |               | 1            |           |      |
| N1065100                                   | D1501A | D1301A      |               | 1            |           |      |
| N1065101                                   | D1501A | A1505A      |               | 2            |           |      |
| 10016100                                   | D1501B | C1506B      |               | 1            |           |      |
| A0707102                                   | D1502A | D1302A      |               | 1            |           |      |
| A0707103 TTR                               | D1502A | D2706A      |               | 2            |           |      |
| N1066100                                   | D1502B | D1302B      |               | 2            |           |      |
| I0046105                                   | D1503A | B2407B      |               | 1            |           |      |
| I0046101                                   | D1503A | D1303A      |               | 2            |           |      |
| 20006101 GND                               | D1503B | D1504A      |               | 1            |           |      |
| 20006100 GND                               | D1504A | D1514A      |               | 2            |           |      |
| 20006101 GND                               | D1504A | D1503B      |               | 1            |           |      |
| N1069102                                   | D1504B | D1304B      |               | 1            |           |      |
| R1083100                                   | D1512B | C1610B      |               | 1            |           |      |

| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 72         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| 20006100 GND                               | D1514A | D1504A      |               | 2          |       |
| I1099100                                   | D1611A | D1912A      |               | 1          |       |
| I1099101                                   | D1611A | B0909A      |               | 2          |       |
| R1085100                                   | D1612B | C1513B      |               | 1          |       |
| I0100114                                   | D1613A | D1413A      |               | 1          |       |
| I0100115                                   | D1613A | D0605B      |               | 2          |       |
| A0956200                                   | D1701A | B0710B      |               | 2          |       |
| A0956100                                   | D1701B | D0613A      |               | 1          |       |
| A0956101                                   | D1701B | C2111B      |               | 2          |       |
| A0958200                                   | D1702A | C2106B      |               | 1          |       |
| A0953600                                   | D1702B | B0703A      |               | 1          |       |
| A0953500                                   | D1703A | B0604A      |               | 1          |       |
| A0953200                                   | D1703B | D1203B      |               | 2          |       |
| A0953300                                   | D1704A | C1214B      |               | 1          |       |
| A0953401                                   | D1704B | B1205B      |               | 2          |       |
| A0958500                                   | D1705A | B0807A      |               | 1          |       |
| A0958502                                   | D1705A | D1810A      |               | 2          |       |
| A09584                                     | D1706A | D0807B      |               | 2          |       |
| A0958402                                   | D1706A | C1509A      |               | 1          |       |
| A0954600                                   | D1707A | A1412A      |               | 1          |       |
| A0954500                                   | D1707B | A1412B      |               | 1          |       |
| A0954400                                   | D1708A | A1411B      |               | 1          |       |
| A0954300                                   | D1708B | A1407B      |               | 1          |       |
| A0954200                                   | D1709A | D1202A      |               | 2          |       |
| A0954100                                   | D1709B | B1205A      |               | 1          |       |
| A0957201                                   | D1710A | B0804A      |               | 2          |       |
| A0957300                                   | D1710B | B0505A      |               | 2          |       |
| A0957100                                   | D1711A | C1513A      |               | 1          |       |
| A0957101                                   | D1711A | D1102A      |               | 2          |       |
| I09651                                     | D1711B | B0602A      |               | 1          |       |
| I0963100                                   | D1712A | B0602B      |               | 1          |       |
| I0971100                                   | D1713A | C0805B      |               | 1          |       |
| A1502400                                   | D1804A | D0807B      |               | 1          |       |
| A1502401                                   | D1804A | D1904A      |               | 2          |       |
| A1502300                                   | D1804B | D0805A      |               | 1          |       |

| FILE                                       |        | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|--------|-------------|---------------|--------------|-----------|------|
| LOGIC WIRE WRAP                            |        |             |               | HPDE - 7992  | 73        | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| A1502301                                   | D1804B | D1904B      |               | 2            |           |      |
| A1505300                                   | D1805A | C0905A      |               | 1            |           |      |
| A1502200                                   | D1805B | D0805B      |               | 1            |           |      |
| A1502201                                   | D1805B | D1905B      |               | 2            |           |      |
| A1505200                                   | D1806A | C0905B      |               | 1            |           |      |
| A1504100                                   | D1806B | C0908B      |               | 1            |           |      |
| A1502100                                   | D1807A | D0803B      |               | 1            |           |      |
| A1502101                                   | D1807A | D1907A      |               | 2            |           |      |
| A1505100                                   | D1807B | C0903B      |               | 1            |           |      |
| A1505400                                   | D1808A | C0907B      |               | 1            |           |      |
| R1050101                                   | D1808B | C1411A      |               | 2            |           |      |
| A1504400                                   | D1809A | C0911A      |               | 1            |           |      |
| R1051100                                   | D1809B | C1403B      |               | 1            |           |      |
| A0958502                                   | D1810A | D1705A      |               | 2            |           |      |
| A0958503                                   | D1810A | D1910A      |               | 1            |           |      |
| 20007100 GND                               | D1810B | D1814A      |               | 1            |           |      |
| A0632100                                   | D1811A | C2010A      |               | 1            |           |      |
| A0632101                                   | D1811A | D1911A      |               | 2            |           |      |
| I1013100                                   | D1811B | C1304A      |               | 1            |           |      |
| I1074100                                   | D1812A | D1411A      |               | 1            |           |      |
| I0557102                                   | D1812B | D1912B      |               | 1            |           |      |
| K0050201                                   | D1813A | A1511A      |               | 2            |           |      |
| K0050202                                   | D1813A | A1906A      |               | 1            |           |      |
| 20007100 GND                               | D1814A | D1800B      |               | 1            |           |      |
| A1502401                                   | D1904A | D1804A      |               | 2            |           |      |
| A1502301                                   | D1904B | D1804B      |               | 2            |           |      |
| A1508300                                   | D1905A | D0905A      |               | 1            |           |      |
| A1502201                                   | D1905B | D1805B      |               | 2            |           |      |
| A1508200                                   | D1906A | D0905B      |               | 1            |           |      |
| A1507100                                   | D1906B | D0908B      |               | 1            |           |      |
| A1502101                                   | D1907A | D1807A      |               | 2            |           |      |
| A1508100                                   | D1907B | D0903B      |               | 1            |           |      |
| A1508400                                   | D1908A | D0907B      |               | 1            |           |      |
| R1075101                                   | D1908B | C1611A      |               | 2            |           |      |

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| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |        |             | HPDE - 7992   | 74         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| A1507400                                   | D1909A | D0911A      |               | 1          |       |
| R1076100                                   | D1909B | C1603B      |               | 1          |       |
| A0958503                                   | D1910A | D1810A      |               | 1          |       |
| A0958504                                   | D1910A | C2106A      |               | 2          |       |
| 20010100 GND                               | D1910B | D1914A      |               | 1          |       |
| A0632101                                   | D1911A | D1811A      |               | 2          |       |
| I1038100                                   | D1911B | C1504A      |               | 1          |       |
| I1099100                                   | D1912A | D1611A      |               | 1          |       |
| I0557101                                   | D1912B | D2010B      |               | 2          |       |
| I0557102                                   | D1912B | D1812B      |               | 1          |       |
| K0052201                                   | D1913A | A1509A      |               | 1          |       |
| K0052202                                   | D1913A | A1907A      |               | 2          |       |
| 20010100 GND                               | D1914A | D1910B      |               | 1          |       |
| A0629100                                   | D2003B | C1103B      |               | 1          |       |
| I0643101                                   | D2005B | D2006A      |               | 2          |       |
| I0643100                                   | D2006A | C1103A      |               | 1          |       |
| I0643101                                   | D2005A | D2005B      |               | 2          |       |
| A0955200                                   | D2006B | C1713B      |               | 1          |       |
| I0973100                                   | D2007A | C0209A      |               | 2          |       |
| I1504100                                   | D2007B | A1902B      |               | 1          |       |
| I0553100                                   | D2008A | A1105B      |               | 1          |       |
| I1503100                                   | D2008B | A1904A      |               | 1          |       |
| K0810201                                   | D2009A | C2415B      |               | 2          |       |
| I1505100                                   | D2009B | D0803A      |               | 1          |       |
| K0728100                                   | D2010A | D2211B      |               | 1          |       |
| K0728101                                   | D2010A | A2604B      |               | 2          |       |
| I0557100                                   | D2010B | A0410A      |               | 1          |       |
| I0557101                                   | D2010B | D1912B      |               | 2          |       |
| K06251                                     | D2011B | D1203A      |               | 2          |       |
| I06391                                     | D2012A | B1204B      |               | 2          |       |
| I0639100                                   | D2012A | B1311B      |               | 1          |       |
| K0652100                                   | D2012B | B1303A      |               | 1          |       |
| K0652101                                   | D2012B | C1104A      |               | 2          |       |
| Y0806201                                   | D2013A | D2404B      |               | 2          |       |



| LOGIC WIRE WRAP                            |        |             | WL            | DOCUMENT NO.<br>HPDE - 7992 | SHEET NO.<br>75 | REV.<br>K |
|--|--------|-------------|---------------|-----------------------------|-----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL                  | NOTES           |           |
| 310200                                     | D2105B | A3012B      |               | 1                           |                 |           |
| 351200                                     | D2107B | B2009B      |               | 1                           |                 |           |
| 351200                                     | D2107B | B2008B      |               | 1                           |                 |           |
| 348101                                     | D2108A | B2011B      |               | 2                           |                 |           |
| 205202                                     | D2202A | A2211B      |               | 1                           | S/C 49 & Above  |           |
| 730000                                     | D2203B | B0107A      |               | 1                           | S/C 49 & Above  |           |
| 731000                                     | D2208A | B2008B      |               | 2                           | S/C 49 & Above  |           |
| 732000                                     | D2209B | B2009B      |               | 2                           | S/C 49 & Above  |           |
| 728200                                     | D2210B | B1802B      |               | 1                           |                 |           |
| 0728100                                    | D2211B | D2010A      |               | 1                           |                 |           |
| 0878100                                    | D2307B | D2807B      |               | 2                           |                 |           |
| 0878200                                    | D2308B | D2808B      |               | 2                           |                 |           |
| 0806200                                    | D2404B | D2504B      |               | 1                           |                 |           |
| 0806201                                    | D2404B | D2013A      |               | 2                           |                 |           |
| I0613100                                   | D2405B | C2104B      |               | 1                           |                 |           |
| I0882100                                   | D2409B | D2509B      |               | 1                           |                 |           |
| I0881100                                   | D2410B | D2510B      |               | 1                           |                 |           |
| Y0806200                                   | D2504B | D2404B      |               | 1                           |                 |           |
| K0808200                                   | D2508B | C2003B      |               | 2                           |                 |           |
| I0882100                                   | D2509B | D2409B      |               | 1                           |                 |           |
| I0881100                                   | D2510B | D2410B      |               | 1                           |                 |           |
| 80103100                                   | D2701A | A0311A      |               | 1                           |                 |           |
| 70005100                                   | D2701B | JAS510B     |               | 1                           |                 |           |
| 81438100 TTR                               | D2702A | A0502B      |               | 1                           |                 |           |
| M0001100 TTR                               | D2702B | A0112A      |               | 1                           |                 |           |
| 81439100 TTR                               | D2703A | A0503A      |               | 1                           |                 |           |
| 81211100 TTR                               | D2703B | B0203B      |               | 1                           |                 |           |
| 81440100 TTR                               | D2704A | A0505A      |               | 1                           |                 |           |
| 80254100 TTR                               | D2705A | B1709A      |               | 1                           |                 |           |
| I0173100 TTR                               | D2705B | B2404B      |               | 1                           |                 |           |
| A0707103 TTR                               | D2706A | D1502A      |               | 2                           |                 |           |
| A0707104 TTR                               | D2706A | D2707A      |               | 1                           |                 |           |
| 80204100 TTR                               | D2706B | B1708A      |               | 1                           |                 |           |
| A0707104 TTR                               | D2707A | D2706A      |               | 1                           |                 |           |
| 80178100 TTR                               | D2708A | B1705A      |               | 1                           |                 |           |
| K0808201 TTR                               | D2708B | C2003B      |               | 1                           |                 |           |
| 81441100 TTR                               | D2709A | A0504B      |               | 1                           |                 |           |
| 81442100 TTR                               | D2710A | A0511B      |               | 1                           |                 |           |

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| TITLE                                      |         | WL          |               | DOCUMENT NO. | SHEET NO.                | REV. |
|--|---------|-------------|---------------|--------------|--------------------------|------|
| LOGIC WIRE WRAP                            |         |             |               | HPDE - 7992  | 76                       | B    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN  | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES                    |      |
| 80676100 TTR                               | D2710B  | B1805B      |               | 1            |                          |      |
| 81443100 TTR                               | D2711A  | A0510A      |               | 1            |                          |      |
| 81444100 TTR                               | D2712A  | A0512A      |               | 1            |                          |      |
| K0810200                                   | D2712B  | C2415B      |               | 1            |                          |      |
| 20049100                                   | D2714A  | C2717B      |               | 1            |                          |      |
| A0878100                                   | D2807B  | D2307B      |               | 2            |                          |      |
| A0878200                                   | D2808B  | D2308B      |               | 2            |                          |      |
| N1164100                                   | D3001B  | C1207B      |               | 1            |                          |      |
| N1164101                                   | D3001B  | A2812B      |               | 2            |                          |      |
| A0302100                                   | D3002B  | A2703A      |               | 1            |                          |      |
| 10018100                                   | JA8001A | A0104B      |               | 1            | BR3C9J/K & BR3E4/5E ONLY |      |
| 30002100                                   | JA8002B | A0204A      |               | 1            |                          |      |
| L0005100 SPD                               | JA8003A | A0803A      |               | 1            |                          |      |
| L0006100 MTR                               | JA8003B | A0309A      |               | 1            |                          |      |
| 10017100                                   | JA8004B | A0103A      |               | 1            |                          |      |
| 30003100                                   | JA8005A | A2715A      |               | 1            |                          |      |
| 30004100                                   | JA8005B | A2711B      |               | 1            |                          |      |
| A0317100                                   | JA8006A | B2712B      |               | 1            |                          |      |
| A0317200                                   | JA8006B | B2711B      |               | 1            |                          |      |
| 30007100                                   | JA8007B | A0202A      |               | 1            |                          |      |
| 30005100                                   | JA8008A | B2412A      |               | 1            |                          |      |
| I0823100                                   | JA8013A | A1003B      |               | 1            |                          |      |
| I0821100                                   | JA8013B | A1006A      |               | 1            |                          |      |
|  |         |             |               |              |                          |      |
|  |         |             |               |              |                          |      |
| I0536100                                   | JA8101A | A1710A      |               | 1            |                          |      |
| I0537100                                   | JA8101B | A1710B      |               | 1            |                          |      |
| I0538100                                   | JA8102A | A1712B      |               | 1            |                          |      |
| I0539100                                   | JA8102B | A1712A      |               | 1            |                          |      |
| I0542100                                   | JA8103A | A1706B      |               | 1            |                          |      |
| I0543100                                   | JA8103B | A1706A      |               | 1            |                          |      |
| I0544100                                   | JA8104A | A1707B      |               | 1            |                          |      |
| I0545100                                   | JA8104B | A1707A      |               | 1            |                          |      |
| I0561100                                   | JA8105A | C2110A      |               | 1            |                          |      |
| I0279100                                   | JA8105B | A1909B      |               | 1            |                          |      |
| K0550205                                   | JA8106A | B0404A      |               | 2            |                          |      |

| TITLE                                      |         | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|---------|-------------|---------------|------------|-------|
| LOGIC WIRE WRAP                            |         |             | HPDE - 7992   | 77         | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN  | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| I0280100                                   | JAB106B | A1913A      |               | 1          |       |
| K0552100                                   | JAB107A | A1107B      |               | 1          |       |
| I0834100                                   | JAB107B | A1106B      |               | 1          |       |
| N0898100                                   | JAB108A | C2314B      |               | 1          |       |
| I0278100                                   | JAB108B | A1902A      |               | 1          |       |
| 40005100                                   | JAB109A | A0807B      |               | 1          |       |
| 20040100 GND                               | JAB109B | A0801A      |               | 2          |       |
| 40000100                                   | JAB110A | A0203B      |               | 1          |       |
| 40003100                                   | JAB110B | A0202B      |               | 1          |       |
| I0531100                                   | JAB111A | A1705A      |               | 1          |       |
| 40002100                                   | JAB111B | B2706A      |               | 1          |       |
| 40001100                                   | JAB112A | A0203A      |               | 1          |       |
| 40004100                                   | JAB112B | B2705B      |               | 1          |       |
| 20042100 GND                               | JAB113B | A1001A      |               | 1          |       |
| I0822100                                   | JAB114A | A1005A      |               | 1          |       |
| I0824100                                   | JAB114B | A1007B      |               | 1          |       |
| L1101100 MAT                               | JAB201A | A0307A      |               | 1          |       |
| L1100100 MAT                               | JAB201B | A0305B      |               | 1          |       |
|  |         |             |               |            |       |
|  |         |             |               |            |       |
| 60006101                                   | JAB203A | A1103A      |               | 2          |       |
| L1415100                                   | JAB203B | A0608A      |               | 1          |       |
| L1410100                                   | JAB204A | A0606B      |               | 1          |       |
| L1411100                                   | JAB204B | A0606A      |               | 1          |       |
| L1412100                                   | JAB205A | A0609B      |               | 1          |       |
| L1413100                                   | JAB205B | A0609A      |               | 1          |       |
| L1417100                                   | JAB206A | A0608B      |               | 1          |       |
| L1414100                                   | JAB206B | A0308A      |               | 1          |       |
| L1415100                                   | JAB207A | A0308B      |               | 1          |       |
| 50001100                                   | JAB207B | A0103B      |               | 1          |       |
| 50000100                                   | JAB208B | A0102B      |               | 1          |       |
| 20043106                                   | JAB301A | JA8303A     |               | 1          |       |
| 10006100                                   | JAB301B | A0104A      |               | 1          |       |
|  |         |             |               |            |       |

| TITLE<br>LOGIC WIRE WRAP                   |         | WL          | DOCUMENT NO.<br>HPDE-7992 | SHEET NO.<br>78 | REV.<br>A |
|--|---------|-------------|---------------------------|-----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN  | DESTINATION | WIRE<br>COLOR             | Z<br>LEVEL      | NOTES     |
| 20043106                                   | JA8303A | JA8301A     |                           | 1               |           |
| 20043105                                   | JA8303A | JA8304A     |                           | 2               |           |
| 10007100B2                                 | JA8303B | A1307A      |                           | 1               |           |
| 20043104                                   | JA8304A | JA8305A     |                           | 1               |           |
| 20043105                                   | JA8304A | JA8303A     |                           | 2               |           |
| 10008100B3                                 | JA8304B | A1306B      |                           | 1               |           |
| 20043103                                   | JA8305A | JA8306A     |                           | 2               |           |
| 20043104                                   | JA8305A | JA8304A     |                           | 1               |           |
| 10009100B4                                 | JA8305B | A1312B      |                           | 1               |           |
| 20043103                                   | JA8306A | JA8305A     |                           | 2               |           |
| 20043102                                   | JA8306A | JA8307A     |                           | 1               |           |
| 10010100B5                                 | JA8306B | A1313A      |                           | 1               |           |
| 20043102                                   | JA8307A | JA8306A     |                           | 1               |           |
| 10011100B6                                 | JA8307B | A1308B      |                           | 1               |           |
| 20043101                                   | JA8307A | JA8308A     |                           | 2               |           |
| 20043101                                   | JA8308A | JA8307A     |                           | 2               |           |
| 20043100                                   | JA8308A | A1901A      |                           | 1               |           |
| 20043100B7                                 | JA8308B | A1309A      |                           | 1               |           |
| 60002100                                   | JA8401A | A0413B      |                           | 1               |           |
| 60007100                                   | JA8402B | A0204B      |                           | 1               |           |
| 6000100                                    | JA8404A | A1910B      |                           | 1               |           |
| 60003100                                   | JA8408A | A0409A      |                           | 1               |           |
| 60001100                                   | JA8409A | A1912B      |                           | 1               |           |
| 20044100                                   | JA8410A | A2301A      |                           | 1               |           |
| 60005100                                   | JA8411B | A0103B      |                           | 2               |           |
| 60004100                                   | JA8412B | A0102A      |                           | 1               |           |
| 60006100                                   | JA8414B | A1103A      |                           | 1               |           |
| 70004100 TP4                               | JA8501A | B3014B      |                           | 1               |           |
| 70011100                                   | JA8501B | D0505A      |                           | 1               |           |
|  |         |             |                           |                 |           |
|  |         |             |                           |                 |           |
|  |         |             |                           |                 |           |
|  |         |             |                           |                 |           |
|  |         |             |                           |                 |           |



| TITLE                                      |        | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|--------|-------------|---------------|------------|-------|
| READ/WRITE WIRE WRAP (REF 76505901)        |        |             | HPDE 7059     | 1          | B     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| A0819100                                   | F0012B | F0409B      |               | 1          |       |
| A0852100                                   | F0308B | F0408B      |               | 1          |       |
| A0852200                                   | F0307B | F0407B      |               | 1          |       |
| G0801100                                   | E0005B | E0107B      |               | 1          |       |
| G0801200                                   | E0003B | E0104B      |               | 1          |       |
| I0278100                                   | F0109B | JE8005B     |               | 1          |       |
| I0279100                                   | F0108B | JE8006B     |               | 1          |       |
| I0280100                                   | F0107B | JE8008B     |               | 1          |       |
| I0531100                                   | E0117B | JE8009A     |               | 1          |       |
| I0536100                                   | E0204A | JE8001A     |               | 1          |       |
| I0537100                                   | E0204B | JE8001B     |               | 1          |       |
| I0538100                                   | E0203A | JE8002A     |               | 1          |       |
| I0539100                                   | E0203B | JE8002B     |               | 1          |       |
| I0542100                                   | F0212B | JE8003A     |               | 1          |       |
| I0543100                                   | F0212A | JE8003B     |               | 1          |       |
| I0544100                                   | F0211B | JE8004A     |               | 1          |       |
| I0545100                                   | F0211A | JE8004B     |               | 1          |       |
| I0561100                                   | E0116B | JE8005A     |               | 1          |       |
| I0561101                                   | F0411B | JE8005A     |               | 2          |       |
| I0800100                                   | E0006B | E0205B      |               | 1          |       |
| I0801100                                   | E0007B | F0201B      |               | 1          |       |
| I0802100                                   | E0008A | E0206B      |               | 1          |       |
| I0803100                                   | E0008B | F0202B      |               | 1          |       |
| I0804100                                   | E0010A | E0207B      |               | 1          |       |
| I0805100                                   | E0011B | F0203B      |               | 1          |       |
| I0806100                                   | E0011A | E0208B      |               | 1          |       |
| I0807100                                   | E0012B | F0204B      |               | 1          |       |
| I0808100                                   | E0012A | E0209B      |               | 1          |       |
| I0809100                                   | E0013A | F0205B      |               | 1          |       |
| I0810100                                   | E0210B | F0002A      |               | 1          |       |
| I0811100                                   | F0003A | F0206B      |               | 1          |       |
| I0812100                                   | E0211B | F0003B      |               | 1          |       |
| I0813100                                   | F0004B | F0207B      |               | 1          |       |
| I0814100                                   | E0212B | F0006B      |               | 1          |       |



| TITLE                                |           | LOGIC HARNESS (REF 77472908) |            | WL      | DOCUMENT NO. | SHEET NO. | REV. |
|--------------------------------------|-----------|------------------------------|------------|---------|--------------|-----------|------|
|                                      |           |                              |            |         | HPDE 7056    | 1         | A    |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN    | DESTINATION                  | WIRE COLOR | Z LEVEL | NOTES        |           |      |
| 1                                    | A2TB2 14  | A2C11 +                      | 2          |         |              |           |      |
| 2                                    | A2TB2 1   | A2C11 -                      | 0          |         |              |           |      |
| 3                                    | A2CB2 2   | A2TB1 6                      | 2          |         |              |           |      |
| 4                                    | A2A2P1 17 | A2A2P2 8                     | 4          |         |              |           |      |
| 5                                    | A2A2P2 9  | A2TB4 7                      | 4          |         |              |           |      |
| 6                                    |           |                              |            |         |              |           |      |
| 7                                    | A2TB2 13  | A2TB4 8                      | 4          |         |              |           |      |
| 8                                    | A2TB2 6   | A2C6 +                       | 2          |         |              |           |      |
| 9                                    | A2TB2 3   | Dead End                     | 0          |         |              |           |      |
| 10                                   | A2TB2 2   | A2C6 -                       | 0          |         |              |           |      |
| 11                                   | A2TB2 2   | A2TB3 2                      | 0          |         |              |           |      |
| 12                                   | A2TB2 1   | A2TB3 1                      | 0          |         |              |           |      |
| 13                                   | A2TB2 7   | A2C8 -                       | 6          |         |              |           |      |
| 14                                   | A2PA80 1B | DEAD END                     | 0          |         |              |           |      |
| 15                                   | A2TB2 8   | A2C5 +                       | 2          |         |              |           |      |
| 16                                   | A2C5 +    | A2R1 T                       | 2          |         |              |           |      |
| 17                                   | A2C5 +    | A2CB2 1                      | 2          |         |              |           |      |
| 18                                   | A2TB2 9   | A2C10 -                      | 6          |         |              |           |      |
| 19                                   | A2C10 -   | A2R1 B                       | 6          |         |              |           |      |
| 20                                   | A2C10 -   | A2CB3 1                      | 6          |         |              |           |      |
| 21                                   | A2TB2 10  | A2C3 +                       | 2          |         |              |           |      |
| 22                                   | A2C3 +    | A2R5 T                       | 2          |         |              |           |      |
| 23                                   | A2C3 +    | A2CB4 1                      | 2          |         |              |           |      |
| 24                                   | A2TB3 2   | A2C3 -                       | 0          |         |              |           |      |
| 25                                   |           |                              |            |         |              |           |      |
| 26                                   | A2C3 -    | A2R5 B                       | 0          |         |              |           |      |
| 27                                   | A2C1 +    | A2R4 T                       | 0          |         |              |           |      |
| 28                                   |           |                              |            |         |              |           |      |
| 29                                   | A2C2 +    | A2A1TB1 6                    | 0          |         |              |           |      |
| 30                                   | A2TB2 11  | A2C1 -                       | 6          |         |              |           |      |
| 31                                   | A2C1 -    | A2R4 B                       | 6          |         |              |           |      |
| 32                                   | A2C1 -    | A2CB5 1                      | 6          |         |              |           |      |
| 33                                   | A2TB2 12  | A2K5B NO                     | 6          |         |              |           |      |
| 34                                   | A2TB2 12  | A2K6 NO                      | 6          |         |              |           |      |



| TITLE                                |          | WL                |            | DOCUMENT NO. | SHEET NO. | REV. |
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| LOGIC HARNESS                        |          |                   |            | HPDE 7056    | 2         | A    |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN   | DESTINATION       | WIRE COLOR | Z LEVEL      | NOTES     |      |
| 35                                   | A2TB1 8  | A2A2P2 16         | 0          |              |           |      |
| 36                                   |          |                   |            |              |           |      |
| 37                                   | A2TB2 5  | A2A2P1 10         | 2          |              |           |      |
| 38                                   | A2TB2 16 | A2A2P1 6          | 2          |              |           |      |
| 39                                   | A2L1 2   | A2C7 +            | 2          |              |           |      |
| 40                                   | A2R2 T   | A2L1 2            | 2          |              |           |      |
| 41                                   | A2CB1A 1 | A2C7 +            | 2          |              |           |      |
| 42                                   | A2TB2 3  | A2TB3 1           | 0          |              |           |      |
| 43                                   | A2CB1A 2 | A2A2P1 13         | 2          |              |           |      |
| 44                                   | A2CB1A 2 | A2TB1 1           | 2          |              |           |      |
| 45                                   | A2TB1 1  | A2PB30 13B        | 2          |              |           |      |
| 46                                   | A2TB1 1  | A2PD30 13B        | 2          |              |           |      |
| 47                                   | A2L2 2   | A2C9 -            | 6          |              |           |      |
| 48                                   | A2R2 B   | A2L2 2            | 6          |              |           |      |
| 49                                   | A2CB1B 1 | A2C9 -            | 6          |              |           |      |
| 50                                   | A2CB1B 2 | A2TB1 2           | 6          |              |           |      |
| 51                                   | A2TB1 2  | A2PA30 2B         | 6          |              |           |      |
| 52                                   | A2TB1 2  | A2PC30 2B         | 6          |              |           |      |
| 53                                   | A2CB2 2  | UN-<br>A2A5 REG   | 2          |              |           |      |
| 54                                   | A2CB2 2  | A2A3P1 8          | 2          |              |           |      |
| 55                                   | A2CB3 2  | UN-<br>A2A7 REG   | 6          |              |           |      |
| 56                                   | A2CB3 2  | A2TB1 7           | 6          |              |           |      |
| 57                                   | A2TB2 2  | A2TB3 3           | 0          |              |           |      |
| 58                                   | A2TB2 4  | A2A3P1 13         | 4          |              |           |      |
| 59                                   | A2CB4 2  | A2A1TB1 2         | 2          |              |           |      |
| 60                                   | A2CB4 2  | A2A6 +            | 2          |              |           |      |
| 61                                   | A2CB5 2  | A2A1TB1 10        | 6          |              |           |      |
| 62                                   | A2CB5 2  | A2A6 -            | 6          |              |           |      |
| 63                                   | A2K6 C   | A2C2 -            | 6          |              |           |      |
| 64                                   | A2K5B C  | A2C2 -            | 6          |              |           |      |
| 65                                   | A2C2 -   | A2K5A NC          | 6          |              |           |      |
| 66                                   | A2C2 -   | A2A3P1 14         | 6          |              |           |      |
| 67                                   | A2A5 REG | A2TB1 3           | 2          |              |           |      |
| 68                                   | A2TB1 3  | LOGIC<br>VCC+ TOP | 2          |              |           |      |

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| TITLE                                      |          | WL                  |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|----------|---------------------|---------------|--------------|-----------|------|
| LOGIC HARNESS                              |          |                     |               | HPDE 7056    | 3         | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN   | DESTINATION         | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| 69   | A2A7 REG | A2TB1 4             | 6             |              |           |      |
| 70   | A2TB1 4  | LOGIC<br>VCC- TOP   | 6             |              |           |      |
| 71   | A2TB1 4  | LOGIC<br>VCC- BOT   | 6             |              |           |      |
| 72   | A2TB1 3  | LOGIC<br>VCC+ BOT   | 2             |              |           |      |
| 73   |          |                     |               |              |           |      |
| 74   | A2A2P2 4 | A2C11 +             | 2             |              |           |      |
| 75   | A2A2P1 1 | A2C11 +             | 2             |              |           |      |
| 76   | A2A2P1 8 | A2C11 +             | 2             |              |           |      |
| 77   | A2A3P1 6 | A2C11 +             | 2             |              |           |      |
| 78   | A2DS1 B  | A2C11 +             | 2             |              |           |      |
| 79   | A2C11 +  | A2TB1-16            | 2             |              |           |      |
| 80   | A2DS1 B  | DEAD END            | 2             |              |           |      |
| 81   | A2C11 -  | A2C8 +              | 0             |              |           |      |
| 82   |          |                     |               |              |           |      |
| 83   | A2TB1 8  | A2A2P2 6            | 0             |              |           |      |
| 84   | A2TB1 8  | A2S2-<br>DEAD END - | 0             |              |           |      |
| 85   | A2TB1 8  | A2A3P1 10           | 0             |              |           |      |
| 86   | A2TB1 8  | A2A2P2 1            | 0             |              |           |      |
| 87   | A2TB1 9  | A2CB3 3             | 0             |              |           |      |
| 88   | A2TB1 9  | DEAD END            | 0             |              |           |      |
| 89   | A2TB1 9  | A2DS1 T             | 0             |              |           |      |
| 90   | A2TB1 9  | DEAD END            | 0             |              |           |      |
| 91   | A2C6 +   | A2L1 1              | 2             |              |           |      |
| 92   | DEAD END | A2TB4 9             | 2             |              |           |      |
| 93   | DEAD END | A2TB4 1             | 2             |              |           |      |
| 94   | A2C7 -   | A2C9 +              | 0             |              |           |      |
| 95   | A2C9 +   | A2C5 -              | 0             |              |           |      |
| 96   |          |                     |               |              |           |      |
| 97   | A2TB2 1  | A2A5 GND            | 0             |              |           |      |
| 98   | A2TB2 1  | A2A7 GND            | 0             |              |           |      |
| 99   | A2C8 -   | A2L2 1              | 6             |              |           |      |
| 100  |          |                     |               |              |           |      |
| 101  |          |                     |               |              |           |      |
| 102  | A2C8 +   | A2TB1 9             | 0             |              |           |      |

| TITLE                                      |           | LOGIC HARNESS |               | WL         | DOCUMENT NO. | SHEET NO. | REV. |
|--|-----------|---------------|---------------|------------|--------------|-----------|------|
|  |           |               |               |            | HPDE 7056    | 4         | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN    | DESTINATION   | WIRE<br>COLOR | Z<br>LEVEL | NOTES        |           |      |
| 103  | A2A3P1 7  | A2TB1 12      | 0             |            |              |           |      |
| 104  | A2K6 2    | A2TB1 12      | 0             |            |              |           |      |
| 105  | DEAD END  | A2TB1 8       | 0             |            |              |           |      |
| 106  | A2A3P1 5  | A2K5 AL       | 2             |            |              |           |      |
| 107  | A2K5 BL   | A2A3P1 4      | 0             |            |              |           |      |
| 108  | A2K5 BL   | A2A2P2 2      | 0             |            |              |           |      |
| 109  | A2A3P1 2  | A2TB1 5       | 2             |            |              |           |      |
| 110  | A2A3P1 3  | A2A2P1 12     | 2             |            |              |           |      |
| 111  | A2A3P1 11 | A2K6 1        | 2             |            |              |           |      |
| 112  | A2TB1 5   | A2PA80 8B     | 2             |            |              |           |      |
| 113  | A2A3P1 1  | A2A2P1 7      | 2             |            |              |           |      |
| 114  | A2A3P1 12 | A2PA80 8A     | 6             |            |              |           |      |
| 115  |           |               |               |            |              |           |      |
| 116  |           |               |               |            |              |           |      |
| 117  | A2A2P2 5  | A2TB1 15      | 4             |            |              |           |      |
| 118  | A2A2P2 3  | A2PA80 2B     | 0             |            |              |           |      |
| 119  | A2A2P1 5  | A2TB4 3       | 0             |            |              |           |      |
| 120  | A2TB4 3   | DEAD END      | 0             |            |              |           |      |
| 121  | A2A2P1 3  | A2TB4 2       | 0             |            |              |           |      |
| 122  | A2A2P 4   | A2TB4 4       | 2             |            |              |           |      |
| 123  | A2TB4 4   | DEAD END      | 2             |            |              |           |      |
| 124  | DEAD END  | A2TB4 1       | 0             |            |              |           |      |
| 125  | A2A2P1 18 | A2TB4 5       | 2             |            |              |           |      |
| 126  | A2A2P1 16 | A2TB4 6       | 2             |            |              |           |      |
| 127  | A2A2P1 11 | A2PA80 3A     | 0             |            |              |           |      |
| 128  | A2A2P2 10 | A2PA80 3B     | 0             |            |              |           |      |
| 129  | A2A2P1 9  | A2TB1 14      | 0             |            |              |           |      |
| 130  | A2A2P1 14 | A2PA80 2A     | 4             |            |              |           |      |
| 131  | A2A2P1 15 | A2TB1 13      | 2             |            |              |           |      |
| 132  | DEAD END  | A2A5 INH      |               |            |              |           |      |
| 133  | A2CB1 3   | A2TB2 15      | 0             |            |              |           |      |
| 134  | DEAD END  | A2PA80 1A     | 4             |            |              |           |      |
| 135  | A2TB1 10  | A2PA80 7B     | 0             |            |              |           |      |
| 136  | A2CB3 4   | A2CB2 4       | 0             |            |              |           |      |



| TITLE                                      |           | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|-----------|-------------|---------------|------------|-------|
| DECK HARNESS ASSY (REF 77382800D)          |           |             | HPDE 7828     | 1          | A     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN    | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| 1  | A3P2 1    | A2TB1 15    | 4             |            |       |
| 2  | A3S8 C    | A3S6 C      | 0             |            |       |
| 3  | A3S6 C    | A3P2 2      | 0             |            |       |
| 4  | A3P2 2    | A2TB1 8     | 0             |            |       |
| 5  | A3S8 NC   | A3P5 2      | 4             |            |       |
| 6  | A3P5 2    | A2TB4 7     | 4             |            |       |
| 7  | A3P5 1    | A2TB4 8     | 4             |            |       |
| 8  | A3S6 NC   | A2TB1 12    | 4             |            |       |
| 9  | A3S8 NO   | A2PA81 10A  | 0             |            |       |
| 10   | A3S6 NO   | A2PA81 12A  | 4             |            |       |
| 11   | A3S4 C    | A2TB1 9     | 0             |            |       |
| 12   | A3S4 NO   | A2PA81 10B  | 0             |            |       |
| 13   | A3S1 C    | A2TB1 11    | 0             |            |       |
| 14   | A3S1 NO   | A2TB1 10    | 0             |            |       |
| 15   | A3PE80 9B | A2PA80 13B  | 4             |            |       |
| 16   | 9         |             |               |            |       |
| 17   |           |             |               |            |       |
| 18   |           |             |               |            |       |
| 19   | DEAD END  | A2TB4       | 4             |            |       |
| 20   | DEAD END  | A2TB4       | 4             |            |       |
| 21   | A3PE80 1A | A2PA81 1A   | 4             |            |       |
| 22   | A3PE80 1B | A2PA81 1B   | 4             |            |       |
| 23   | A3PE80 2A | A2PA81 2A   | 4             |            |       |
| 24   | A3PE80 2B | A2PA81 2B   | 4             |            |       |
| 25   | A3PE80 3A | A2PA81 3A   | 4             |            |       |
| 26   | A3PE80 3B | A2PA81 3B   | 4             |            |       |
| 27   | A3PE80 4A | A2PA81 4A   | 4             |            |       |
| 28   | A3PE80 4B | A2PA81 4B   | 4             |            |       |
| 29   | A3PE80 5A | A2PA81 5A   | 4             |            |       |
| 30   | A3PE80 5B | A2PA81 5B   | 4             |            |       |
| 31   | A3PE80 6A | A2PA81 6A   | 4             |            |       |
| 32   | A3PE80 6B | A2PA81 6B   | 4             |            |       |
| 33   | A3PE80 7A | A2PA81 7A   | 4             |            |       |
| 34   | A3PE80 7B | A2PA81 7B   | 4             |            |       |

| TITLE<br>DECK HARNESS ASSY                 |            |             | WL            | DOCUMENT NO.<br>HPDE 7828 | SHEET NO.<br>2 | REV.<br>A |
|--|------------|-------------|---------------|---------------------------|----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN     | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL                | NOTES          |           |
| 35   | A3PE80 8A  | A2PA81 8A   | 4             |                           |                |           |
| 36   | A3PE80 8B  | A2PA81 8B   | 4             |                           |                |           |
| 37   | A3PE80 9A  | A2PA81 11A  | 4             |                           |                |           |
| 38   |            |             |               |                           |                |           |
| 38A  | A3PE80 14A | A2PA81 14A  | 4             |                           |                |           |
| 38B  | A3PE80 14B | A2PA81 14B  | 0             |                           |                |           |
| 39   |            |             |               |                           |                |           |
| 39A  | A3P3-1 1   | A2PA81 9B   | 0             |                           |                |           |
| 39B  | A3P3-2 2   | A2PA81 9A   | 4             |                           |                |           |
| 40   |            |             |               |                           |                |           |
| 40A  | A3J4 1     | A2PA81 12B  | 9             |                           |                |           |
| 40B  | A3J4 2     | A2PA81 11B  | 0             |                           |                |           |
| 40C  | A3J4 3     | A2PA81 13B  | SHLD          |                           |                |           |
| 41   | A3TB1 1    | A2K5A C     | 4             |                           |                |           |
| 42   | A3TB1 2    | A2A1TB1 7   | 1             |                           |                |           |
| 43   |            |             |               |                           |                |           |
| 43A  | A3P8 4B    | A2TB1 6     | 9             |                           |                |           |
| 43B  | A3P8 3B    | A2TB1 7     | 0             |                           |                |           |
| 43C  | A3P8 3A    | A2TB1 8     | SHLD          |                           |                |           |
| 44   |            |             |               |                           |                |           |
| 44A  | A3P8 1B    | A2PB21 3B   | CNTR          |                           |                |           |
| 44B  | A3P8 1A    | A2PB30 3A   | SHLD          |                           |                |           |
| 45   |            |             |               |                           |                |           |
| 45A  | A3P8 2B    | A2PB30 5B   | CNTR          |                           |                |           |
| 45B  | A3P8 2A    | A2PB30 5A   | SHLD          |                           |                |           |
| 46   |            |             |               |                           |                |           |
| 46A  | A3PE1 9B   | A2PB18 6B   | 0             |                           |                |           |
| 46B  | A3PE1 10B  | A2PB18 6A   | 4             |                           |                |           |
| 47   | A3P6 1     | A3FL3 OUT   | 2             |                           |                |           |
| 48   |            |             |               |                           |                |           |
| 49   | A3P6 3     | A3FL4 OUT   | 6             |                           |                |           |
| 50   |            |             |               |                           |                |           |
| 51   | A3P6 4     | A2TB1 9     | 0             |                           |                |           |
| 52   |            |             |               |                           |                |           |

| TITLE                                      |            | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|------------|-------------|---------------|--------------|-----------|------|
| DECK HARNESS ASSY                          |            |             |               | HPDE 7828    | 3         | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN     | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| 52A  | A3P6 5     | A3PE3 13B   | 4             |              |           |      |
| 52B  | A3P6 6     | A3PE3 14B   | 0             |              |           |      |
| 53   |            |             |               |              |           |      |
| 54   |            |             |               |              |           |      |
| 55   |            |             |               |              |           |      |
| 56   | A3PE80 10A | A2PA50 13A  | 4             |              |           |      |
| 57   | A3FL1 IN   | A2TB1 3     | 2             |              |           |      |
| 58   | A3FL2 IN   | A2TB1 4     | 6             |              |           |      |
| 59   | A3FL3 IN   | A2TB1 1     | 2             |              |           |      |
| 60   | A3FL4 IN   | A2TB1 2     | 6             |              |           |      |
| 61   | A3FL5 IN   | A2TB1 13    | 2             |              |           |      |
| 62   |            |             |               |              |           |      |
| 62A  | A3PE4 9B   | A2PD28 1B   | COND          |              |           |      |
| 62B  | A3PE4 9A   | A2PD28 1A   | SHLD          |              |           |      |
| 63   |            |             |               |              |           |      |
| 63A  | A3PE4 8B   | A2PD28 2B   | COND          |              |           |      |
| 63B  | A3PE4 8A   | A2PD28 2A   | SHLD          |              |           |      |
| 64   |            |             |               |              |           |      |
| 64A  | A3PF3 4A   | A2PA21 9A   | SHLD          |              |           |      |
| 64B  | A3PF3 4B   | A2PA21 9B   | COND          |              |           |      |
| 65   |            |             |               |              |           |      |
| 65A  | A3PF3 3A   | A2PA21 11A  | SHLD          |              |           |      |
| 65B  | A3PF3 3B   | A2PA21 11B  | COND          |              |           |      |
| 66   |            |             |               |              |           |      |
| 67   | R/W PANEL  | DECK GND    | 38,           |              |           |      |
|  | GND        |             | 40            |              |           |      |
| 68   |            |             |               |              |           |      |
| 68A  | A2TB4 9    | DEAD END 1  | 0             |              |           |      |
| 68B  | A2TB1 5    | DEAD END 2  | 4             |              |           |      |
| 69   |            |             |               |              |           |      |
| 69A  | A2PA80 14A |             | 0             |              |           |      |
| 69B  | A2PA80 14B |             | 4             |              |           |      |
|  |            |             |               |              |           |      |
|  |            |             |               |              |           |      |

| TITLE                                      |           | WL          |               | DOCUMENT NO. | SHEET NO. | REV. |
|--|-----------|-------------|---------------|--------------|-----------|------|
| CONTROL PANEL (W8 HARNESS) (REF 77471900)  |           |             |               | HPDE 7653    | 1         | A    |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN    | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL   | NOTES     |      |
| 1  |           |             |               |              |           |      |
| 2  | A4S7 NO   | A2PA82 8B   | 0             |              |           |      |
| 3  | A2PA82 3A | A4S1 NO     | 4             |              |           |      |
| 4  | A4XDS1 A1 | A2PA82 5A   | 4             |              |           |      |
| 5  | A2PA82 5B | A4XDS1 B1   | 4             |              |           |      |
| 6  | A4XDS3 AB | A2PA82 4A   | 4             |              |           |      |
| 7  | A2PA82 4B | A4XDS3 BB   | 4             |              |           |      |
| 8  |           |             |               |              |           |      |
| 9  |           |             |               |              |           |      |
| 10   | A4XDS4 AB | A2PA82 1A   | 4             |              |           |      |
| 11   | A2PA82 1B | A4XDS4 BB   | 4             |              |           |      |
| 12   | A4S7 C    | A4S1 C      | 0             |              |           |      |
| 13   | A2TB1 5   | A4XDS5 A2   | 2             |              |           |      |
| 14   | A4XDS5 A2 | A4XDS5 B2   | 2             |              |           |      |
| 15   | A4XDS5 B2 | A4XDS4 AT   | 2             |              |           |      |
| 16   | A4XDS4 AT | A4XDS4 BT   | 2             |              |           |      |
| 17   | A4XDS4 BT | A4XDS1 A2   | 2             |              |           |      |
| 18   | A4XDS1 A2 | A4XDS1 B2   | 2             |              |           |      |
| 19   | A4XDS1 B2 | A4XDS3 AT   | 2             |              |           |      |
| 20   | A4XDS3 A2 | A4XDS3 BT   | 2             |              |           |      |
| 21   | A4XDS3 BT | A4XDS7 A2   | 2             |              |           |      |
| 22   | A4XDS7 A2 | A4XDS7 B2   | 2             |              |           |      |
| 23   | A4XDS7 B1 | A2PA82 7A   | 4             |              |           |      |
| 24   | A4XDS7 A1 | A2PA82 6B   | 4             |              |           |      |
| 25   | A4S1 C    | A4S5 C      | 0             |              |           |      |
| 26   | A2TB1 8   | A4S5 C      | 0             |              |           |      |
| 27   | A2PA82 7B | A4S5 NO     | 4             |              |           |      |
| 28   | A2PA82 6A | A4XDS5 B1   | 4             |              |           |      |
| 29   | A2PA82 3B | A4XDS5 A1   | 4             |              |           |      |
| 30   | A4S8 NO   | A4S6 NO     | 4             |              |           |      |
| 31   | A4S6 NO   | A4S4 NO     | 4             |              |           |      |
| 32   | A4S4 NO   | A4S3 NO     | 4             |              |           |      |
| 33   | A4S3 NO   | A4S2 NO     | 4             |              |           |      |
| 34   | A4S2 NO   | A2PA83 3B   | 4             |              |           |      |





| TITLE<br>I/O CABLE (REF 76507300 C)        |         | WL          | DOCUMENT NO.<br>HPDE 7073 | SHEET NO.<br>1 | REV.<br>B |
|--|---------|-------------|---------------------------|----------------|-----------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN  | DESTINATION | WIRE<br>COLOR             | Z<br>LEVEL     | NOTES     |
| 1  |         |             |                           |                |           |
| 1A   | A5IJ1 R | A2PD13 5B   | COAX                      |                |           |
| 1B   | A5IJ1 R | A2PD13 5A   | SHLD                      |                |           |
| 2  |         |             |                           |                |           |
| 2A   | A5IJ1 P | A2PD13 7B   | COAX                      |                |           |
| 2B   | A5IJ1 P | A2PD13 7A   | SHLD                      |                |           |
| 3  |         |             |                           |                |           |
| 3A   | A5IJ1 L | A2PD14 7B   | COAX                      |                |           |
| 3B   | A5IJ1 L | A2PD14 7A   | SHLD                      |                |           |
| 4  |         |             |                           |                |           |
| 4A   | A5IJ1 K | A2PD14 3B   | COAX                      |                |           |
| 4B   | A5IJ1 K | A2PD14 3A   | SHLD                      |                |           |
| 5  |         |             |                           |                |           |
| 5A   | A5IJ1 J | A2PD14 4B   | COAX                      |                |           |
| 5B   | A5IJ1 J | A2PD14 4A   | SHLD                      |                |           |
| 6  |         |             |                           |                |           |
| 6A   | A5IJ1 H | A2PC14 16B  | COAX                      |                |           |
| 6B   | A5IJ1 H | A2PC14 16A  | SHLD                      |                |           |
| 7  |         |             |                           |                |           |
| 7A   | A5IJ1 F | A2PD14 1B   | COAX                      |                |           |
| 7B   | A5IJ1 F | A2PD14 1A   | SHLD                      |                |           |
| 8  |         |             |                           |                |           |
| 8A   | A5IJ1 E | A2PD14 2B   | COAX                      |                |           |
| 8B   | A5IJ1 E | A2PD14 2A   | SHLD                      |                |           |
| 9  |         |             |                           |                |           |
| 9A   | A5IJ1 D | A2PC14 17B  | COAX                      |                |           |
| 9B   | A5IJ1 D | A2PC14 17A  | SHLD                      |                |           |
| 10   |         |             |                           |                |           |
| 10A  | A5IJ1 C | A2PD14 6B   | COAX                      |                |           |
| 10B  | A5IJ1 C | A2PD14 6A   | SHLD                      |                |           |
| 11   |         |             |                           |                |           |
| 11A  | A5IJ1 B | A2PC14 15B  | COAX                      |                |           |
| 11B  | A5IJ1 B | A2PC14 15A  | SHLD                      |                |           |
| 12   |         |             |                           |                |           |

| TLE                                  |         | WL          |            | DOCUMENT NO. | SHEET NO. | REV. |
|--------------------------------------|---------|-------------|------------|--------------|-----------|------|
| I/O CABLE                            |         |             |            | HPDE 7073    | 2         | B    |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN  | DESTINATION | WIRE COLOR | Z LEVEL      | NOTES     |      |
| 12A                                  | A5IJ1 A | A2PC14 14B  | COAX       |              |           |      |
| 12B                                  | A5IJ1 A | A2PC14 14A  | SHLD       |              |           |      |
| 13                                   |         |             |            |              |           |      |
| 13A                                  | A5IJ2 N | A2PD14 8B   | COAX       |              |           |      |
| 13B                                  | A5IJ2 N | A2PD14 8A   | SHLD       |              |           |      |
| 14                                   |         |             |            |              |           |      |
| 14A                                  | A5IJ2 M | A2PD13 10B  | COAX       |              |           |      |
| 14B                                  | A5IJ2 M | A2PD13 10A  | SHLD       |              |           |      |
| 15                                   |         |             |            |              |           |      |
| 15A                                  | A5IJ2 P | A2PD13 9B   | COAX       |              |           |      |
| 15B                                  | A5IJ2 P | A2PD13 9A   | SHLD       |              |           |      |
| 16                                   |         |             |            |              |           |      |
| 16A                                  | A5IJ2 R | A2PD13 8B   | COAX       |              |           |      |
| 16B                                  | A5IJ2 R | A2PD13 8A   | SHLD       |              |           |      |
| 17                                   |         |             |            |              |           |      |
| 17A                                  | A5IJ2 L | A2PD14 5B   | COAX       |              |           |      |
| 17B                                  | A5IJ2 L | A2PD14 5A   | SHLD       |              |           |      |
| 18                                   |         |             |            |              |           |      |
| 18A                                  | A5IJ2 B | A2PC18 11B  | COAX       |              |           |      |
| 18B                                  | A5IJ2 B | A2PC18 11A  | SHLD       |              |           |      |
| 19                                   |         |             |            |              |           |      |
| 19A                                  | A5IJ2 C | A2PC18 12B  | COAX       |              |           |      |
| 19B                                  | A5IJ2 C | A2PC18 12A  | SHLD       |              |           |      |
| 20                                   |         |             |            |              |           |      |
| 20A                                  | A5IJ2 D | A2PC18 13B  | COAX       |              |           |      |
| 20B                                  | A5IJ2 D | A2PC18 13A  | SHLD       |              |           |      |
| 21                                   |         |             |            |              |           |      |
| 21A                                  | A5IJ2 E | A2PC18 14B  | COAX       |              |           |      |
| 21B                                  | A5IJ2 E | A2PC18 14A  | SHLD       |              |           |      |
| 22                                   |         |             |            |              |           |      |
| 22A                                  | A5IJ2 F | A2PC18 15B  | COAX       |              |           |      |
| 22B                                  | A5IJ2 F | A2PC18 15A  | SHLD       |              |           |      |
| 23                                   |         |             |            |              |           |      |
| 23A                                  | A5IJ2 H | A2PC18 16B  | COAX       |              |           |      |

| TITLE                                      |          | WL          | DOCUMENT NO.  | SHEET NO.  | REV.  |
|--|----------|-------------|---------------|------------|-------|
| I/O CABLE                                  |          |             | HPDE 7073     | 3          | B     |
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN   | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
| 23B  | A5IJ2 H  | A2PC18 16A  | SHLD          |            |       |
| 24   |          |             |               |            |       |
| 24A  | A5IJ2 J  | A2PC18 17B  | COAX          |            |       |
| 24B  | A5IJ2 J  | A2PC18 17A  | SHLD          |            |       |
| 25   |          |             |               |            |       |
| 25A  | A5IJ2 K  | A2PD18 1B   | COAX          |            |       |
| 25B  | A5IJ2 K  | A2PD18 1A   | SHLD          |            |       |
| 26   |          |             |               |            |       |
| 26A  | A5IJ2 A  | A2PD18 2B   | COAX          |            |       |
| 26B  | A5IJ2 A  | A2PD18 2A   | SHLD          |            |       |
| 27   |          |             |               |            |       |
| 27A  | A5IIJ1 R | A2PD15 5B   | COAX          |            |       |
| 27B  | A5IIJ1 R | A2PD15 5A   | SHLD          |            |       |
| 28   |          |             |               |            |       |
| 28A  | A5IIJ1 P | A2PD15 7B   | COAX          |            |       |
| 28B  | A5IIJ1 P | A2PD15 7A   | SHLD          |            |       |
| 29   |          |             |               |            |       |
| 29A  | A5IIJ1 L | A2PD16 7B   | COAX          |            |       |
| 29B  | A5IIJ1 L | A2PD16 7A   | SHLD          |            |       |
| 30   |          |             |               |            |       |
| 30A  | A5IIJ1 K | A2PD16 3B   | COAX          |            |       |
| 30B  | A5IIJ1 K | A2PD16 3A   | SHLD          |            |       |
| 31   |          |             |               |            |       |
| 31A  | A5IIJ1 J | A2PD16 4B   | COAX          |            |       |
| 31B  | A5IIJ1 J | A2PD16 4A   | SHLD          |            |       |
| 32   |          |             |               |            |       |
| 32A  | A5IIJ1 H | A3PC16 16B  | COAX          |            |       |
| 32B  | A5IIJ1 H | A2PC16 16A  | SHLD          |            |       |
| 33   |          |             |               |            |       |
| 33A  | A5IIJ1 F | A2PD16 1B   | COAX          |            |       |
| 33B  | A5IIJ1 F | A2PD16 1A   | SHLD          |            |       |
| 34   |          |             |               |            |       |
| 34A  | A5IIJ1 E | A2PD16 2B   | COAX          |            |       |
| 34B  | A5IIJ1 E | A2PD16 2A   | SHLD          |            |       |

| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN   | DESTINATION | WIRE<br>COLOR | Z<br>LEVEL | NOTES |
|--|----------|-------------|---------------|------------|-------|
| 35   |          |             |               |            |       |
| 35A  | A5IIJ1 D | A2PC16 17B  | COAX          |            |       |
| 35B  | A5IIJ1 D | A2PC16 17A  | SHLD          |            |       |
| 36   |          |             |               |            |       |
| 36A  | A5IIJ1 C | A2PD16 6B   | COAX          |            |       |
| 36B  | A5IIJ1 C | A2PD16 6A   | SHLD          |            |       |
| 37   |          |             |               |            |       |
| 37A  | A5IIJ1 B | A2PC16 15B  | COAX          |            |       |
| 37B  | A5IIJ1 B | A2PC16 15A  | SHLD          |            |       |
| 38   |          |             |               |            |       |
| 38A  | A5IIJ1 A | A2PC16 14B  | COAX          |            |       |
| 38B  | A5IIJ1 A | A2PC16 14A  | SHLD          |            |       |
| 39   |          |             |               |            |       |
| 39A  | A5IIJ2 N | A2PD16 8B   | COAX          |            |       |
| 39B  | A5IIJ2 N | A2PD16 8A   | SHLD          |            |       |
| 40   |          |             |               |            |       |
| 40A  | A5IIJ2 M | A2PD15 10B  | COAX          |            |       |
| 40B  | A5IIJ2 M | A2PD15 10A  | SHLD          |            |       |
| 41   |          |             |               |            |       |
| 41A  | A5IIJ2 P | A2PD15 9B   | COAX          |            |       |
| 41B  | A5IIJ2 P | A2PD15 9A   | SHLD          |            |       |
| 42   |          |             |               |            |       |
| 42A  | A5IIJ2 R | A2PD15 8B   | COAX          |            |       |
| 42B  | A5IIJ2 R | A2PD15 8A   | SHLD          |            |       |
| 43   |          |             |               |            |       |
| 43A  | A5IIJ2 L | A2PD16 5B   | COAX          |            |       |
| 43B  | A5IIJ2 L | A2PD16 5A   | SHLD          |            |       |
| 44   |          |             |               |            |       |
| 44A  | A5IIJ2 B | A2PC19 11B  | COAX          |            |       |
| 44B  | A5IIJ2 B | A2PC19 11A  | SHLD          |            |       |
| 45   |          |             |               |            |       |
| 45A  | A5IIJ2 C | A2PC19 12B  | COAX          |            |       |
| 45B  | A5IIJ2 C | A2PC19 12A  | SHLD          |            |       |
| 46   |          |             |               |            |       |



| TITLE                                |           | WL          |            | DOCUMENT NO. | SHEET NO. | REV. |
|--------------------------------------|-----------|-------------|------------|--------------|-----------|------|
| AC HARNESS ASSY (77385300 C)         |           |             |            | HPDE 7853    | 1         |      |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN    | DESTINATION | WIRE COLOR | Z LEVEL      | NOTES     |      |
| 1                                    | NOT USED  | A1FL2 IN    | 1          |              |           |      |
| 2                                    | NOT USED  | A1FL1 IN    | 1          |              |           |      |
| 3                                    |           |             |            |              |           |      |
| 4                                    |           |             |            |              |           |      |
| 5                                    |           |             |            |              |           |      |
| 6                                    |           |             |            |              |           |      |
| 7                                    | A1Q4 4    | A1P7(1) 7   | 4          |              |           |      |
| 8                                    | A1Q3 4    | A1P7(1) 6   | 0          |              |           |      |
| 9                                    |           |             |            |              |           |      |
| 10                                   | A1FL1 OUT | A1CB2 A1    | 1          |              |           |      |
| 11                                   | A1CB2 A1  | A1M1 T      | 1          |              |           |      |
| 12                                   | A1CB2 A1  | A1XF1 IN    | 1          |              |           |      |
| 13                                   | A1CB2 A1  | A1TB2 2     | 1          |              |           |      |
| 14                                   | A1CB2 1   | A1TB3 1     | 1          |              |           |      |
| 15                                   | A1CB2 B1  | A1XF2 IN    | 1          |              |           |      |
| 16                                   | A1CB2 B1  | A1Q1 1      | 1          |              |           |      |
| 17                                   | A1FL2 OUT | A1CB2 B1    | 1          |              |           |      |
| 18                                   |           |             |            |              |           |      |
| 19                                   | A1XF1 OUT | A1TB2 5     | 1          |              |           |      |
| 20                                   | A1XF2 OUT | A1TB2 6     | 1          |              |           |      |
| 21                                   | A1CB2 A2  | A1Q2 1      | 1          |              |           |      |
| 22                                   | A1CB2 B3  | A1Q4 1      | 1          |              |           |      |
| 23                                   | A1Q1 2    | A1TB2 3     | 1          |              |           |      |
| 24                                   | A1M1 B    | A1TB2 4     | 1          |              |           |      |
| 25                                   | A1TB3 2   | A1TB2 4     | 1          |              |           |      |
| 26                                   | A1CB2 B4  | A1Q3 1      | 1          |              |           |      |
| 27                                   | A1CB2 A3  | A1Q3 2      | 1          |              |           |      |
| 28                                   |           |             |            |              |           |      |
| 29                                   |           |             |            |              |           |      |
| 30                                   |           |             |            |              |           |      |
| 31                                   | A1CB2 A4  | A1P7(1) 4   | 1          |              |           |      |
| 32                                   | A1CB2 A3  | A1P7(1) 3   | 1          |              |           |      |
| 33                                   | A1Q2 2    | A1P7(1) 2   | 1          |              |           |      |
| 34                                   | A1Q4 2    | A1P7(1) 5   | 1          |              |           |      |

| TITLE<br>AC HARNESS ASSY                   |                  | WL               | DOCUMENT NO.<br>HPDE 7853 | SHEET NO.<br>2 | REV.<br>A        |
|--|------------------|------------------|---------------------------|----------------|------------------|
| SIGNAL NAME<br>OR NUMBER<br>IDENTIFICATION | ORIGIN           | DESTINATION      | WIRE<br>COLOR             | Z<br>LEVEL     | NOTES            |
| 35   | SAFETY<br>GND    | A1P7(1) 1        | 54                        |                |                  |
| 36   | SAFETY<br>GND    | A1P7(1) 8        | 5                         |                |                  |
| 37   |                  |                  |                           |                |                  |
| 38   |                  |                  |                           |                |                  |
| 39   |                  |                  |                           |                |                  |
| 40   | A1TB2 5          | A1T3 2           | 1                         |                |                  |
| 40   | A1TB3 5          | A1T3 3           | 1                         |                | 50 HZ UNITS ONLY |
| 41   | A1TB2 6          | A1T3 1           | 1                         |                | 60 HZ UNITS ONLY |
| 42   |                  |                  |                           |                |                  |
| 43   |                  |                  |                           |                |                  |
| 44   |                  |                  |                           |                |                  |
| 44A  | A1FL2 OUT        | A1P2 2           | 1                         |                |                  |
| 44B  | A1FL2 OUT        | A1P2 3           | 1                         |                |                  |
| 44C  | A1P2 1           | A1FL1 GND        | SHLD                      |                |                  |
| 44D  | A1P2 1           | A1FL1 GND        | 5/4                       |                |                  |
| 46   |                  |                  |                           |                |                  |
| 47   |                  |                  |                           |                |                  |
| 48   |                  |                  |                           |                |                  |
| 49   |                  |                  |                           |                |                  |
| 50   | SAFETY<br>A1 GND | SAFETY<br>A2 GND | 54                        |                |                  |
| 51   | A1Q4 4           | A2TB2 4          | 4                         |                |                  |
| 52   | A1Q2 3           | A2TB2 5          | 2                         |                |                  |
| 53   | A1Q3 3           | A1Q2 3           | 2                         |                |                  |
| 54   | A1Q4 3           | A1Q3 3           | 2                         |                |                  |
| 55   | A1Q1 3           | A1TB2 16         | 2                         |                |                  |
| 56   | A1Q1 4           | A2TB2 15         | 0                         |                |                  |
| 57   | A1CR7-10 +       | A2TB2 6          | 2                         |                |                  |
| 58   | A1TB4 7          | A1TB4 4          | 0                         |                |                  |
| 59   | A1TB4 4          | A2TB2 2          | 0                         |                |                  |
| 60   | A1CR7-10 -       | A2TB2 7          | 6                         |                |                  |
| 61   | A1CR5-6 C        | A2TB2 8          | 2                         |                |                  |
| 62   | A1CR15 A         | A2TB2 9          | 6                         |                |                  |
| 63   | A1CR11-14+       | A2TB2 10         | 2                         |                |                  |
| 64   | A1TB3 6          | A2TB2 3          | 0                         |                |                  |



| TITLE                                |            | WL               | DOCUMENT NO. | SHEET NO. | REV.  |
|--------------------------------------|------------|------------------|--------------|-----------|-------|
| AC HARNESS ASSY                      |            |                  | HPDE 7853    | 3         |       |
| SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN     | DESTINATION      | WIRE COLOR   | Z LEVEL   | NOTES |
| 65                                   | A1CR11-14- | A2TB2 11         | 6            |           |       |
| 66                                   | A1CR16-17- | A2TB2 12         | 6            |           |       |
| 67                                   |            |                  |              |           |       |
| 68                                   |            |                  |              |           |       |
| 69                                   | A1TB3 5    | A1CR16-17<br>AC1 | 4            |           |       |
| 70                                   | A1TB3 7    | A1CR16-17<br>AC2 | 4            |           |       |
| 71                                   | A1T3 4     | A1CR1-2<br>AC1   | 4            |           |       |
| 72                                   | A1T3 6     | A1CR1-2<br>AC2   | 4            |           |       |
| 73                                   | A1TB3 3    | A1C12 T          | 4            |           |       |
| 74                                   | A1TB3 8    | A1C12 B          | 4            |           |       |
| 75                                   | A1C12 B    | A1CR11-14<br>AC2 | 4            |           |       |
| 76                                   | A1TB4 3    | A1CR5 A          | 4            |           |       |
| 77                                   | A1TB3 4    | A1CR11-14<br>AC1 | 4            |           |       |
| 78                                   | A1TB4 5    | A1CR6 A          | 4            |           |       |
| 79                                   | A1TB4 1    | A1C13 T          | 4            |           |       |
| 80                                   | A1TB4 2    | A1C13 B          | 4            |           |       |
| 81                                   | A1CR6 A    | A1CR3-4<br>AC2   | 4            |           |       |
| 82                                   | A1CR5 A    | A1CR3-4<br>AC1   | 4            |           |       |
| 83                                   | A1CR3-4 -  | A1CR15 C         | 6            |           |       |
| 84                                   | A1TB4 6    | A1CR7-10<br>AC1  | 4            |           |       |
| 85                                   | A1TB4 8    | A1CR7-10<br>AC2  | 4            |           |       |
| 86                                   | A1CR1-2 +  | A2TB2 14         | 2            |           |       |
| 87                                   | A1T3 5     | A2TB2 1          | 0            |           |       |
| 88                                   | A1Q2 4     | A1T3 5           | 0            |           |       |



| TITLE<br>MAINTENANCE PANEL W/L (REF 77470600) |                                      |            |             | WL         | DOCUMENT NO.<br>HPDE 7623 | SHEET NO.<br>1 OF 1 | REV.<br>A |
|---|--------------------------------------|------------|-------------|------------|---------------------------|---------------------|-----------|
| LINE NO.                                      | SIGNAL NAME OR NUMBER IDENTIFICATION | ORIGIN     | DESTINATION | WIRE COLOR | Z LEVEL                   |                     |           |
| 1   | 1W                                   | A2A1P1 7B  | A1PA85 7B   | 8          |                           |                     |           |
| 2   | 1X                                   | ↑ 8B       | ↑ 8B        | ↑          |                           |                     |           |
| 3   | 1Y                                   | ↑ 9B       | ↑ 9B        | ↑          |                           |                     |           |
| 4   | 1AA                                  | ↑ 10B      | ↑ 10B       | ↑          |                           |                     |           |
| 5   | 1BB                                  | ↑ 11B      | ↑ 11B       | ↑          |                           |                     |           |
| 6   | 1CC                                  | ↑ 12B      | ↑ 12B       | ↑          |                           |                     |           |
| 7   | 1DD                                  | ↓ 13B      | ↓ 13B       | ↓          |                           |                     |           |
| 8   | 1EE                                  | A2A1P1 14B | A2PA85 14B  |            |                           |                     |           |
| 9   | 2                                    | A2A1P2 1A  | A2PA84 1A   |            |                           |                     |           |
| 10  | 2A                                   | ↑ 4A       | ↑ 4A        |            |                           |                     |           |
| 11  | 2B                                   | ↑ 8A       | ↑ 8A        |            |                           |                     |           |
| 12  | 2C                                   | ↑ 9A       | ↑ 9A        |            |                           |                     |           |
| 13  | 2D                                   | ↑ 10A      | ↑ 10A       |            |                           |                     |           |
| 14  | 2E                                   | ↓ 2B       | ↓ 2B        |            |                           |                     |           |
| 15  | 2F                                   | ↓ 11B      | ↓ 11B       |            |                           |                     |           |
| 16  | 2G                                   | ↓ 12B      | ↓ 12B       | ↓          |                           |                     |           |
| 17  | 2H                                   | A2A1P2 14B | A2PA84 14B  | 8          |                           |                     |           |
| 18  |                                      |            |             |            |                           |                     |           |
| 19  |                                      |            |             |            |                           |                     |           |
| 20  |                                      |            |             |            |                           |                     |           |
| 21  |                                      |            |             |            |                           |                     |           |
| 22  |                                      |            |             |            |                           |                     |           |
| 23  |                                      |            |             |            |                           |                     |           |
| 24  |                                      |            |             |            |                           |                     |           |
| 25  |                                      |            |             |            |                           |                     |           |
| 26  |                                      |            |             |            |                           |                     |           |
| 27  |                                      |            |             |            |                           |                     |           |
| 28  |                                      |            |             |            |                           |                     |           |
| 29  |                                      |            |             |            |                           |                     |           |
| 30  |                                      |            |             |            |                           |                     |           |
| 31  |                                      |            |             |            |                           |                     |           |
| 32  |                                      |            |             |            |                           |                     |           |
| 33  |                                      |            |             |            |                           |                     |           |
| 34  |                                      |            |             |            |                           |                     |           |

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