

**CONTROL DATA CORPORATION  
FIXED MODULE DRIVE  
(Volume 2 of 2)**

**Models:**

**BZ7E1  
BZ7E2  
BZ7E4**

## PREFACE FOR VOLUME 2

This document (729-1254) is Volume 2 of a two-volume manual for the Control Data Corporation (CDC) 675-Mbyte Fixed Module Disk Drive. Two separate CDC manuals are contained in this document. The first is the CDC Hardware Maintenance Manual (Volume 1 of 2) which provides installation and checkout, maintenance, and parts data for the CDC Fixed Module Disk Drive, Models BZ7E1, BZ7E2, and BZ7E4. The second is the CDC Hardware Maintenance Manual (Volume 2 of 2) which provides logic diagrams and wire lists for the CDC Disk Drive, Models BZ7E1 and BZ7E2.

Volume 1 (729-1253) of this two-volume manual also contains two separate CDC manuals. The first is the CDC Hardware Reference Manual which provides general description, operation, and theory of operation for the CDC Fixed Module Disk Drive, Models BZ7E1 and BZ7E2. The second is the CDC Troubleshooting Manual which provides general information, test and diagnostic descriptions, operating procedures, and a status/error code dictionary for the CDC Fixed Module Disk Drive, Models BZ7E1 and BZ7E2.



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**CDC® FIXED MODULE DRIVE**

**BZ7E1/7E2**

**BZ7E4**

**INSTALLATION AND CHECKOUT**

**MAINTENANCE**

**PARTS DATA**

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**Volume 1 of 2**

**HARDWARE MAINTENANCE MANUAL**

## REVISION RECORD

REVISION	DESCRIPTION
A (4-28-80)	Manual released by ECO 59628A. Incorporate ECOs 59830C, 61196, and 61261. This edition obsoletes all previous editions.
B (6-4-80)	Manual updated with ECOs 61233 and 61363; FCO 61363. Section 1 revised to clarify installation procedures. Technical and editorial changes.
C (9-15-80)	Manual updated with ECOs 61230D, 61274, 61281, 61285A, 61364C, 61376, 61381, 61384D, 61425C, 61442, 61446, 61456A, 61463B, and 61480B; FCO 61456. Technical and editorial changes.
D (12-15-80)	Manual updated with ECOs 59991A, 61556, 61598, 61615, 61650, 61737A. Technical and editorial changes.
E (6-1-81)	Manual updated with ECO's 61325, 61340, 61529A, 61549, 61723A, 61735A, 61751, 61775, 61831A, 61837A, 61863B, 61881; FCO 61837. Technical and editorial changes.
F (9-28-81)	Manual updated with ECO's 02027A, 02144B, 61745, 61835B, 61932A, and 67031A; FCO's 02027, 67031. Technical and editorial changes.
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REVISION LETTERS I, O, Q  
AND X ARE NOT USED.

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of America

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# MANUAL TO EQUIPMENT LEVEL CORRELATION

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This manual reflects the equipment configurations listed below.

EXPLANATION: Locate the equipment type and series code number, as shown on the equipment FCO log, in the list below. Immediately to the right of the series code number is an FCO number. If that number and all of the numbers underneath it match all of the numbers on the equipment FCO log, then this manual accurately reflects the equipment.

This correlation sheet also applies to the following related manuals:

Pub No. 83323550 Rev. E

Pub No. 83323570 Rev. E

EQUIPMENT TYPE	SERIES CODE	WITH FCOs	COMMENTS
BZ7E1/7E2	01-02	None	
	03	61363	Fixed Head units only, Mods E-H.
	04	61456	
	05-07	None	
	08	61837 67031	
	09	02027	
	10	None	
	11	02315	
	12	None	
	13	02335	
	14	None	
	15	02482	

# LIST OF EFFECTIVE PAGES

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New features, as well as changes, deletions, and additions to information in this manual are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

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Blank	-		

# PREFACE

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## INTRODUCTION

This manual contains information for technical personnel who will be installing and maintaining the BZ7E1/BZ7E2 Fixed Module Drive (FMD).

The configuration chart on page xiii lists the various models available for each of the FMDs, together with the specific feature groupings that distinguish one from the other.

## MANUAL ORGANIZATION

Information in this manual is divided into three sections:

- Section 1 - Installation and Checkout: Contains instructions for uncrating and setting up the units, for installing power and I/O cables between the units in the string and other elements in the subsystem, and for checking the operation of each unit as part of the total subsystem.
- Section 2 - Maintenance: Guides for ensuring trouble-free operation of units in the string, along with repair, replacement, and test procedures should problems occur.
- Section 3 - Parts Data: An illustrated parts breakdown of all electrical and mechanical components and assemblies in each unit, together with a list of recommended spare parts.

## OTHER MANUALS

Additional information on the FMD is given in the following manuals:

<u>PUBLICATION NO.</u>	<u>TITLE</u>
83323550	Hardware Reference: General Description, Operation, and Theory of Operation for the FMD.
83323560 H	

- 83323570 Hardware Maintenance Volume 2:  
logic diagrams, assembly dia-  
grams, and backpanel wire lists  
for the FMD.
- 83323580 Troubleshooting: Device micro-  
diagnostic test descriptions, op-  
erating procedures, error code  
dictionary, and corrective ac-  
tion. This manual is not avail-  
able at this time.
- 83322440 CDC Microcircuits Manual Volume 1:  
IC data sheets classified by CDC  
identifiers, logic families, and  
IC symbology.
- 83324440 CDC Microcircuits Manual Volume 2:  
ICs identified by industry  
recognized vendor type numbers.

## CONFIGURATION CHART

MODEL	FREQUENCY		FIXED HEAD INSTALLED	ROUND/FLAT I/O CABLE	SINGLE/ DUAL CHANNEL	INDEX & SECTOR ON A AND/ B CABLE	COLOR CODE*
	60 Hz	50 Hz					
BZ7E1-A	X		No	Round	Single	A	A
-B		X	No	Round	Single	A	A
-C	X		No	Flat	Single	A	A
-D		X	No	Flat	Single	A	A
-E	X		Yes	Round	Single	A	A
-F		X	Yes	Round	Single	A	A
-G	X		Yes	Flat	Single	A	A
-H		X	Yes	Flat	Single	A	A
-J	X		No	Flat	Single	A	B
-K		X	No	Flat	Single	A	B
-M	X		No	Flat	Single	A,B	D
-N		X	No	Flat	Single	A,B	D
-P	X		No	Flat	Single	A	E
-R		X	No	Flat	Single	A	E
-S	X		No	Flat	Single	A,B	H
-T		X	No	Flat	Single	A,B	H
-U	X		No	Flat	Single	A	F
-V		X	No	Flat	Single	A	F
-W	X		No	Flat	Single	A,B	G
-Y		X	No	Flat	Single	A,B	G
-Z	X		No	Flat	Single	A,B	J

NOTE: \* Color chart is located in Parts Data Section, 3A

## CONFIGURATION CHART (Contd)

MODEL	FREQUENCY		FIXED HEAD INSTALLED	ROUND/FLAT I/O CABLE	SINGLE/ DUAL CHANNEL	INDEX & SECTOR ON A AND/ B CABLE	COLOR CODE*
	60 Hz	50 Hz					
BZ7E2-A	X		No	Round	Dual	A	A
-B		X	No	Round	Dual	A	A
-C	X		No	Flat	Dual	A	A
-D		X	No	Flat	Dual	A	A
-E	X		Yes	Round	Dual	A	A
-F		X	Yes	Round	Dual	A	A
-G	X		Yes	Flat	Dual	A	A
-H		X	Yes	Flat	Dual	A	A
-L	X		Yes	Round	Dual	A,B	C
-M	X		No	Flat	Dual	A,B	K
-N		X	No	Flat	Dual	A,B	K
-S	X		No	Flat	Dual	A	F
-T		X	No	Flat	Dual	A	F

NOTE: \* Color chart is located in Parts Data Section, 3A

## CONFIGURATION CHART (Contd)

MODEL	FREQUENCY		FIXED HEAD INSTALLED	ROUND/FLAT I/O CABLE	SINGLE/ DUAL CHANNEL	INDEX & SECTOR ON A AND/ B CABLE	COLOR CODE*
	60 Hz	50 Hz					
BZ7E4-C -D	X	X	No No	Flat Flat	Single Single	A,B A,B	K K

NOTE: \* Color chart is located in Parts Data Section, 3A



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**1**

**INSTAL-**

**LATION**

**AND**

**CHECKOUT**

---

## INTRODUCTION

This section contains information relating to the installation and checkout of the Fixed Module Drive (FMD). The procedures in this section should be applied concurrently with the installation procedures described in the applicable subsystem installation manual.

The information is organized into three major headings:

- Site Requirements -- Describes the environmental, physical, and electrical specifications.
- Equipment Setup -- Describes the procedures for preinstallation inspection, leveling, grounding, cabling, terminations, setting address and sector select switches, and voltage options. A list of required accessories is also provided.
- Initial Startup and Checkout -- Describes the checks that must be made prior to putting the units into normal operation.

## CAUTION

Do not apply power to the unit until it has been temperature stabilized. Refer to the HDA Temperature Stabilization procedure later in this section.

## SITE REQUIREMENTS

### ENVIRONMENTAL SPECIFICATIONS

The site must provide a suitable environment for equipment operation, as defined in table 1-1.

TABLE 1-1. ENVIRONMENTAL SPECIFICATIONS

Characteristics and Conditions	Specifications
<u>Temperature</u>	
Storage	Range -10°C to 50°C (14°F to 122°F) Maximum change 15°C (27°F) per hour
Transit	Range -40°C to 70°C (-40°F to 158°F) Maximum change 20°C (36°F) per hour
Non-operating	Range 10°C to 35°C (50°F to 95°F) Maximum change 10°C (18°F) per hour Gradient 10°C (18°F)
Operating	Range 10°C to 35°C (50°F to 95°F) Maximum change 10°C (18°F) per hour Gradient 10°C (18°F)
<u>Relative Humidity</u>	
Storage	10% to 90%, no condensation
Transit	0% to 100% RH, no condensation
Table Continued on Next Page	

TABLE 1-1. ENVIRONMENTAL SPECIFICATIONS (Contd)

Characteristics and Conditions	Specifications
<u>Relative Humidity (Contd)</u>	
Non-operating	20% to 80% RH, no condensation 10% per hour maximum change
Operating	20% to 80% RH, no condensation 10% per hour maximum change
<u>Barometric Pressure</u>	
Storage/ Non-Operating	-300 m to 2500 m (-980 ft to 8200 ft) 104.69 kPa to 73.96 kPa (31 in to 21.9 in Hg)
Transit	-300 m to 2500 m (-980 ft to 8200 ft) 104.69 kPa to 73.96 kPa (31 in Hg to 21.9 in Hg)
Operating	-300 m to 2000 m (-980 ft to 6560 ft) 104.69 kPa to 79.36 kPa (31 in Hg to 23.5 in Hg)
Table Continued on Next Page	

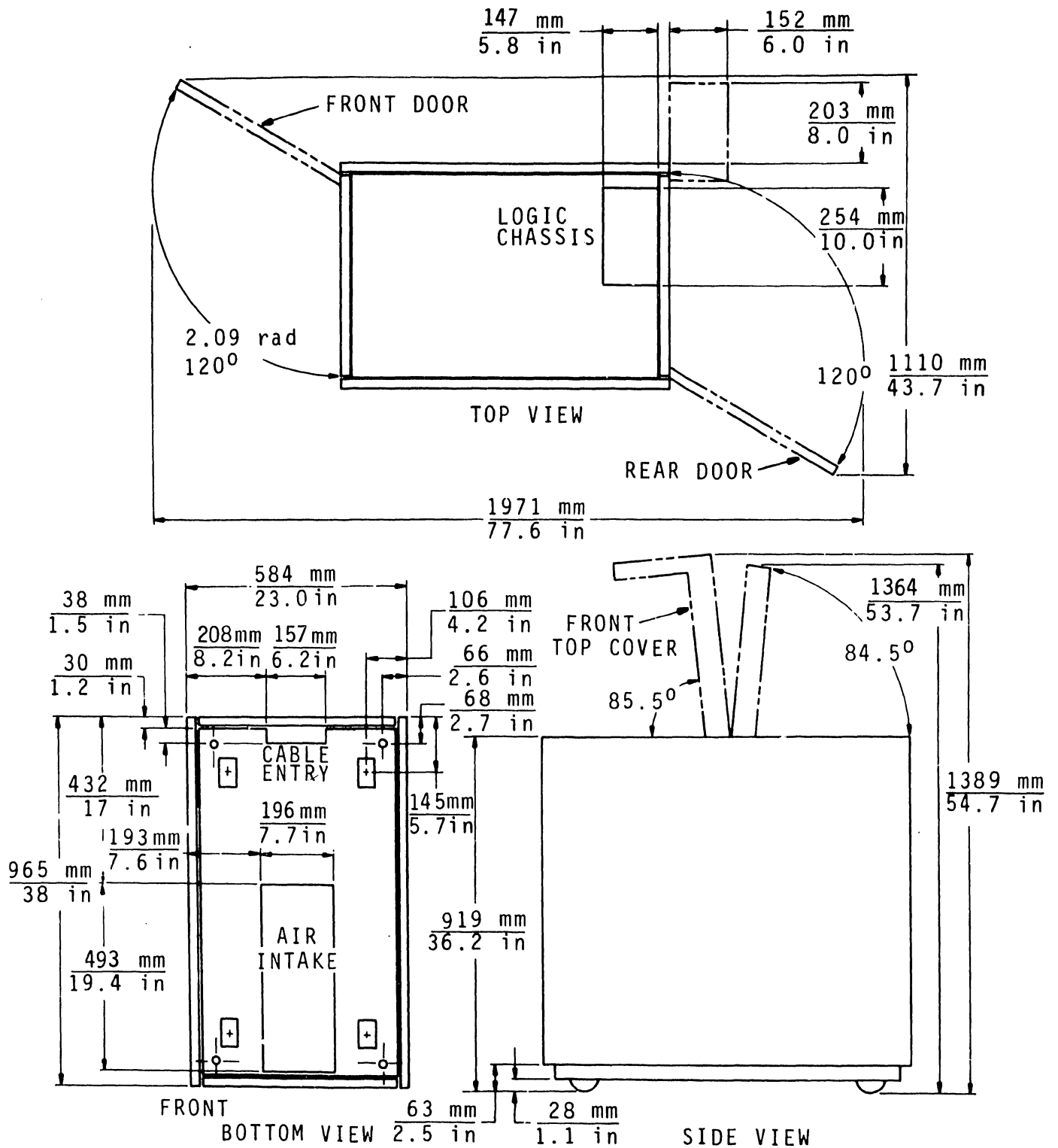
TABLE 1-1. ENVIRONMENTAL SPECIFICATIONS (Contd)

Characteristics and Conditions	Specifications
<p><u>Air Cleanliness</u></p> <p>Storage/Transit</p> <p>Non-operating/ operating</p>	<p>Same as operating with proper packing</p> <p>Particle size                  Particles <u>(microns)</u>                  <u>m<sup>3</sup></u></p> <p>More than 1:      4x10<sup>7</sup></p> <p>More than 1.5: 4x10<sup>6</sup></p> <p>More than 5:      4x10<sup>5</sup></p> <p>Sulphur dioxide: 0.14 parts per million maximum</p>

**PHYSICAL SPECIFICATIONS**

Figure 1-1 illustrates the floor-space requirements for each FMD. A minimum clearance of 914 millimetres (36 inches) must be provided at the front and rear of each unit.

For a standard raised floor, round cables are provided for controller interface and power cabling. Flat cables are utilized for office floors for the controller interface. Care must be taken when using flat cables as they are easily damaged. Each unit weighs approximately 286 kg (635 lb). The concentrated weight on each of the four leveling pads is approximately 71.5 kg (159 lb).



9V1A

Figure 1-1. Floor Space Requirements, One Unit

## ELECTRICAL SPECIFICATIONS

### NOTE

Be sure to connect each drive across two phase conductors. The customer should be careful to maintain a balanced load across all three phases of site power.

The unit receives its power directly from the site power distribution panel. The current-carrying capacity of the site power bus must be 15 amperes per phase for each of the 60-Hz units.

All units are shipped from the factory prewired for 208 V, 60 Hz or 220 V, 50 Hz. Conversions to other line voltages are explained under the Voltage Selections procedure.

Units designed for 60-hertz operation will operate satisfactorily over a frequency range from 59.0 to 60.6 Hz, at any of the following voltages:

<u>Nominal</u>	<u>Range</u>
208 V ac	179 to 223 V ac
230 V ac	198-246 V ac

50-hertz units will operate satisfactorily from 49.0 to 50.5 Hz at any of the following voltages:

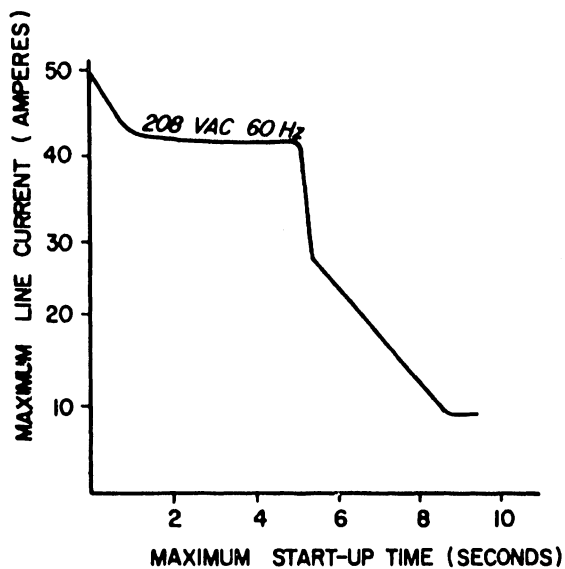
<u>Nominal</u>	<u>Range</u>
220 V ac	198-235 V ac
240 V ac	216-257 V ac

Power consumption for a 208 V, 60 Hz unit with the device accessing is:

Current per phase: 6.5 A  
Apparent power: 1.365 kVA  
Power factor: 0.923

The line current required to start a device of a 208 V, 60 Hz unit is shown in figure 1-2.





9V9

Figure 1-2. Line Current Versus Startup Time

### POWER SYSTEM GROUNDING REQUIREMENTS

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

1. The branch circuit supplying ac power to the drive must include an insulated grounding conductor that has a current-carrying capacity equal to the grounded and ungrounded branch circuit conductors. The color of this insulated grounding conductor shall be either solid green or green with yellow stripe.
2. The grounding conductor specified in condition 1 must be grounded at the service entrance.
3. All power receptacles (including convenience outlets for oscilloscopes or other test gear) must have a common ground conductor to prevent shock hazard if two equipments are touched simultaneously. Therefore, all plug receptacles in the vicinity are to be of the grounding type; furthermore, the grounding conductors serving these

receptacles are to be connected to the grounding conductor that serves the drive.

## **EQUIPMENT SETUP**

The following paragraphs describe how to set up and connect each unit in a disk storage subsystem. Complete the following procedures in the order given below:

- Gaining Access for Installation
- Preinstallation Inspection
- Final Unpacking
- Placement and Leveling
- System Grounding
- Controller Interface Cabling
- Inter-unit Cabling
- Address Selection
- Setting Sector Select Switches
- Voltage Selections

## **GAINING ACCESS FOR INSTALLATION**

### **General**

The doors and covers provide easy access to the major assemblies within the unit. The following discussions describe all of the FMD's accessing doors and covers.

### **Cabinet Doors**

Two self-latching doors allow access to components beneath the deck in the front and rear of the cabinet. To open either door, insert 6-millimetre hex driver tool into the lock and turn mechanism in ether direction.

### **Cabinet Top Covers**

The cabinet has two covers: one front top cover and one rear top cover. When raised, the front top cover provides access to the HDA and the front portion of the deck. To open the front top cover, open the front door and squeeze the latch in the front of the top cover. The front cover has a spring-loaded support.

The rear top cover provides access to the magnet and the rear of the deck. To open the rear top cover, open rear door and loosen the two screws attaching the rear trim strip to the frame. The rear top cover has a friction support.

### **Side Panel Assembly**

Side panels are held in place with quarter-turn fasteners. To remove the side panels, open the front and rear doors. Release the quarter-turn fastener attaching the side panel to the frame and remove the ground cable from the frame to the side panel. Removal of the right side panel (viewed from the front of the unit) allows access to the blower assembly.

### **Logic Chassis**

The logic chassis is located at the rear of the unit and is accessible by opening the rear door. Releasing a catch on the logic chassis allows it to swing outward, thus permitting access to the logic cards and to other assemblies. The logic cards can be accessed by opening the card cover assembly. The card cover assembly can be opened by turning a quarter-turn fastener located at left-center on the cover assembly. The card cover may be removed entirely by removing the hinges (in early units) or by lifting the panel out of its pivots (in later units).

### **AC Power Supply**

The ac power supply can be reached from the rear of the cabinet (by opening the rear door and swinging open the logic chassis). To reach the components within each ac power supply assembly, the unit must be removed from the drive.

### **DC Power Supply**

The dc power supply can be reached from the front of the unit (by opening the front door). To reach the components within dc power supply assembly remove the top covers and flip down the front circuit breaker panel.

### **PREINSTALLATION INSPECTION**

Perform the following steps prior to installing the unit:

1. Inspect the unit for possible shipping damage. Any claims for this type of damage should be promptly filed

with the carrier involved. If a claim is filed, save the original shipping material.

2. Check off all parts listed on the shipping bill accompanying the equipment. Report discrepancies, missing items, and so on, to the CDC Account Sales Representative responsible for the equipment.
3. Verify that all internal cabling is intact and that there are no broken or damaged wires.
4. Check backpanel for broken or shorted pins or wires.
5. Check to ensure that the logic chassis swings properly and locks in place.
6. Read the HDA Temperature Stabilization procedure later in this section before connecting any power.

## **FINAL UNPACKING**

### **Primary Air Filter**

The primary air filter is placed inside the unit to prevent damage during shipment. Install the filter as shown in figure 1-3. The filter slides into the slot in the front of the unit.

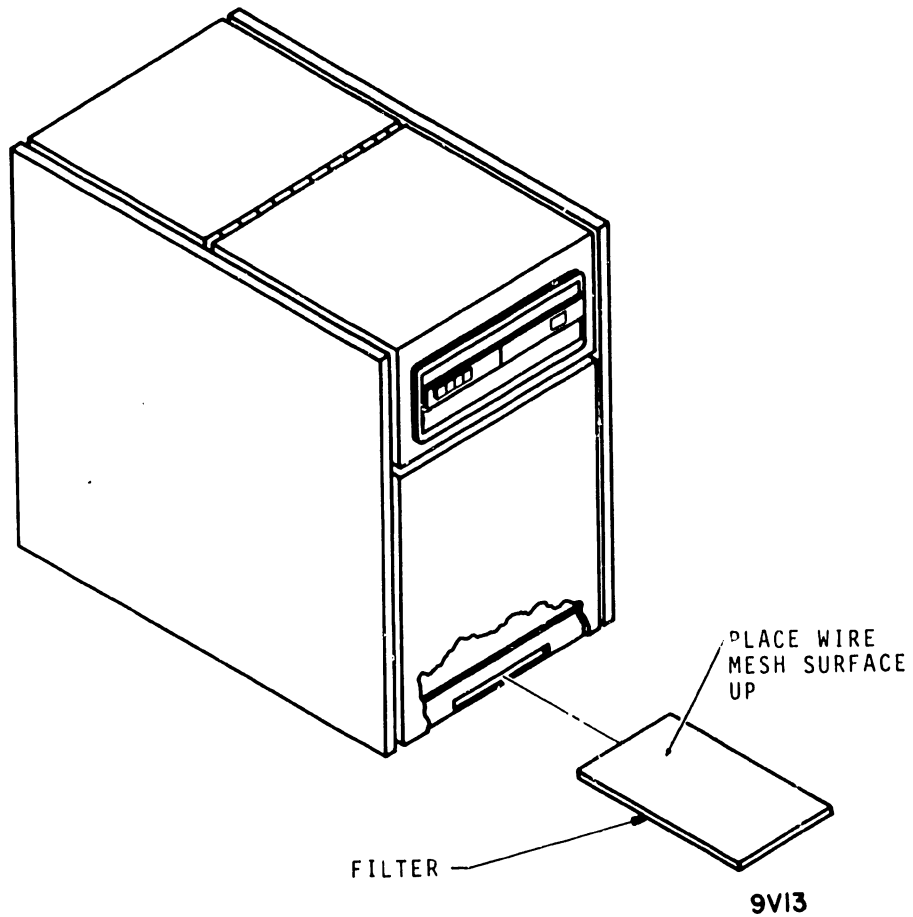


Figure 1-3. Primary Filter Installation

## Desiccant Removal

Perform the following procedure to remove the desiccant (see figure 1-4 and 1-5):

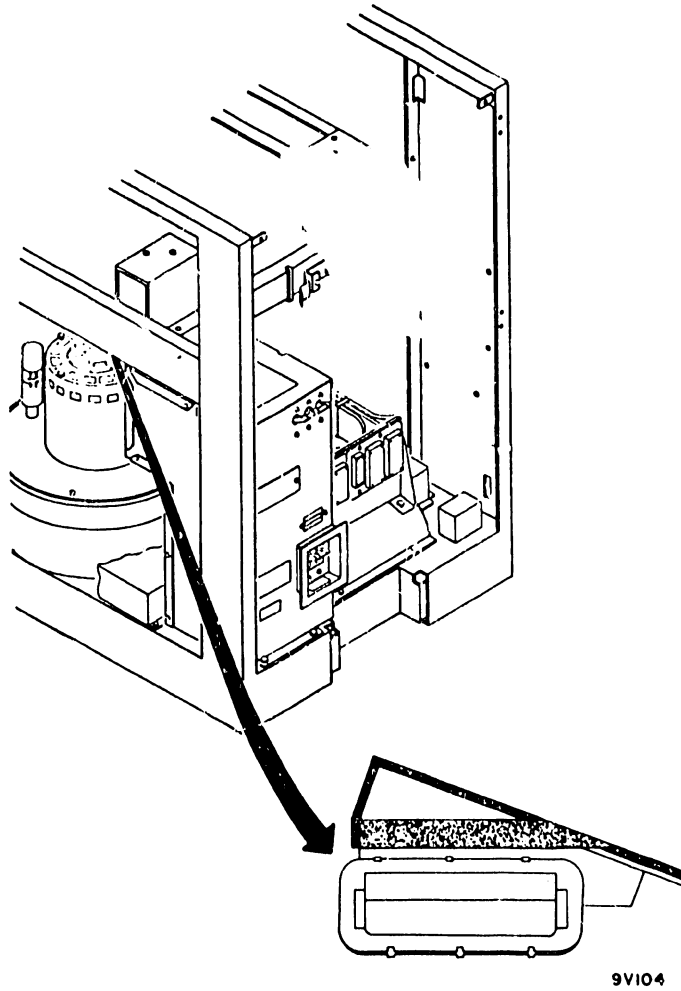
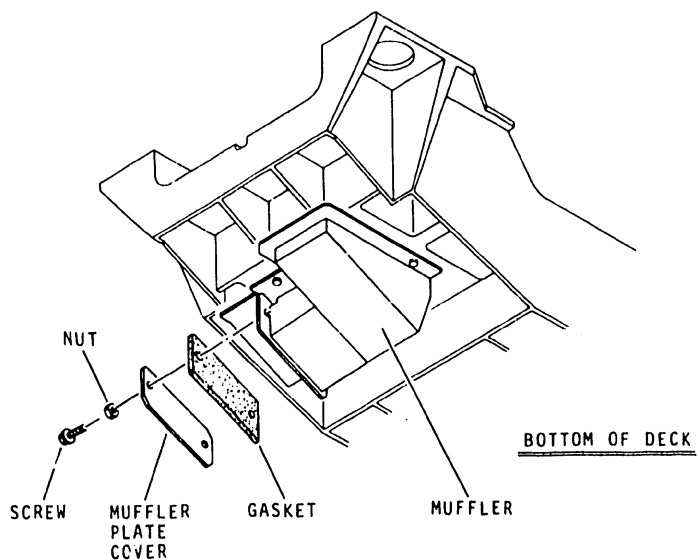


Figure 1-4. Muffler Location



NOTE:  
MUFFLER PLATE, GASKET AND HARDWARE ARE USED ON UNITS  
S/C 02 W/O ECO 61230 & BLW ONLY.

9V84

Figure 1-5. Desiccant Removal

1. Open the front and rear doors.
2. Remove side panel adjacent to blower motor.

### CAUTION

In the following step, carefully examine ducts for desiccant that may have escaped from a ruptured package. Remove with vacuum cleaner or soft cloth. Loose desiccant can cause head crashes if blown into the HDA.

3. Remove the desiccant package as follows depending on unit configuration:
  - a. In S/C 02 & below W/O 61230A , remove the two screws securing the muffle plate cover and remove the desiccant package from the muffle.

NOTE

Do not replace the muffler plate cover. The opening acts as an exhaust port for the HDA air system.

- b. In S/C 02 and above W/ 61230A, lift the flap valve and remove the desiccant package.
4. Replace side panel and close the front and rear doors.
5. Discard the desiccant. In units S/C 02 and below W/O 61230A, retain the muffler plate cover, screws and nuts in the event that the unit is reshipped (see Repackaging).

**Deck Hold-Down Bolts**

Prior to operating the unit, remove the deck hold-down bolts as follows:

1. Open the front and rear doors.
2. Remove side panels.
3. Open the top front and rear covers.
4. Four bolts secure the deck to the frame during shipment. These bolts are located next to the vibration mounts as shown in figure 1-6. A removal instruction tag identifies each bolt.

NOTE

A 7/16-inch hex nut is used as a spacer for each bolt. Be sure to retain these nuts after removing the bolts.

5. Replace the side panels.



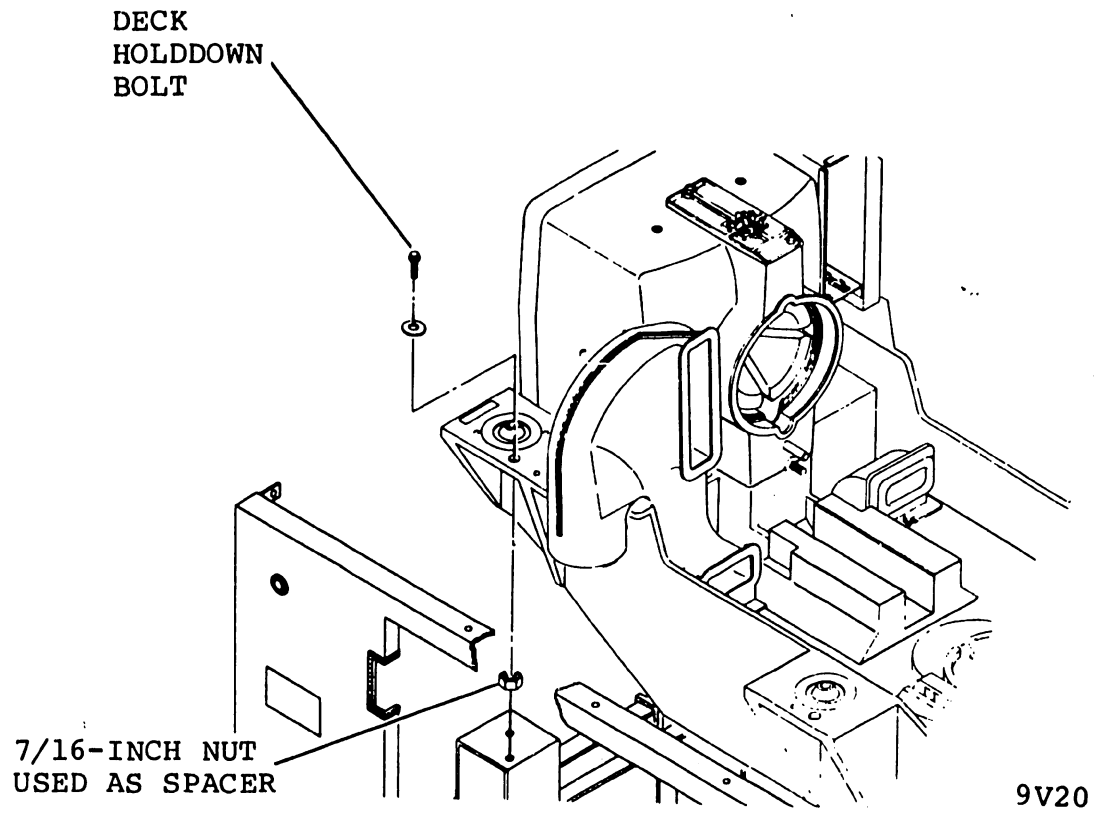


Figure 1-6. Deck Hold-Down Bolt Removal

## PLACEMENT AND LEVELING

Roll the unit into its final floor position. Level the unit by executing the following steps:

1. Open front and rear doors.
2. Insert fingers underneath each corner of the frame. Squeeze the foam pad behind each leveler pad. Twist each leveler pad until it reaches the floor.
3. Use a 9/16-inch wrench on the hex surface (just above the pad) of each leveler to lower the levelers until the casters are off the floor (refer to figure 1-7).

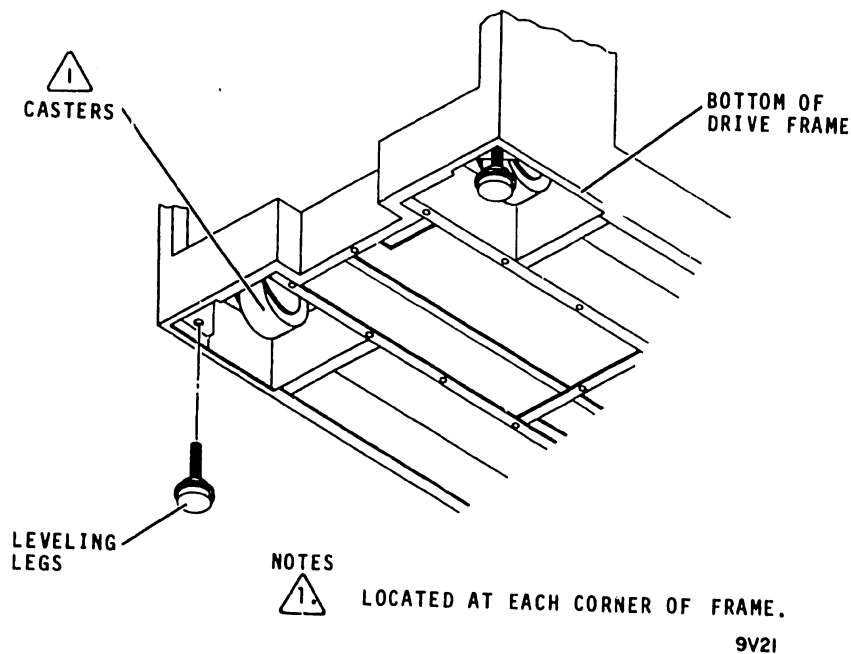


Figure 1-7. Leveler Bolt Access

4. Place spirit level on base of frame so ends of level point to front and rear of unit.

5. Adjust levelers until bubble is centered in spirit level.
6. Place spirit level on base of frame so ends of level point to sides of unit.
7. Adjust levelers until bubble is centered in spirit level.
8. Repeat steps 4 through 7 until unit is level.

### CARRIAGE LOCKING

Before either an FMD or an HDA that has been in transit is allowed to perform Seek operations, it must first undergo a temperature stabilization cycle to ensure compatibility with the site environment. Refer to the HDA Temperature Stabilization procedure later in this section.

To be sure that the carriage remains immobilized during this interim period, see that the carriage locking rod is held firmly in place by the wing nut and washer, as shown in figure 1-8.

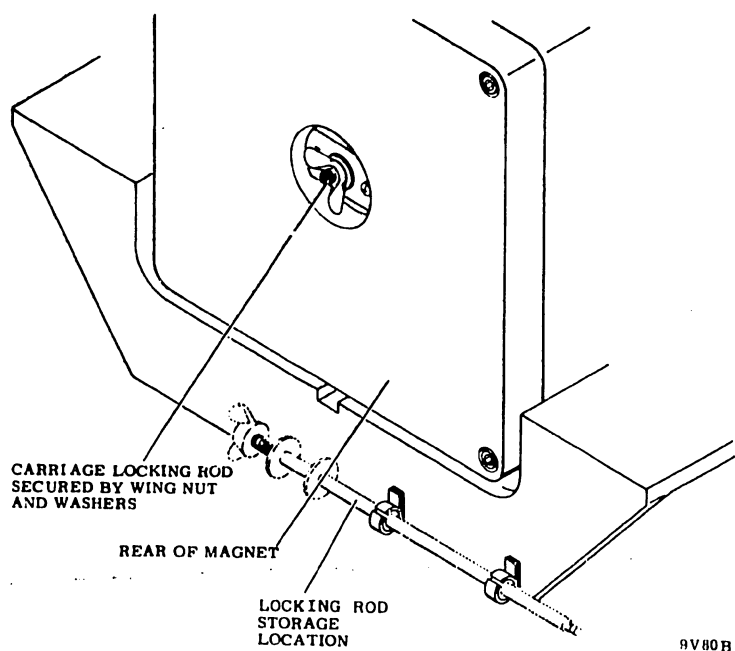


Figure 1-8. Carriage Locking

## **GROUNDING**

### **SAFETY GROUND**

The site ac power system ground is provided by the green with yellow stripe wire in the ac power cord. This wire connects to the drive frame and goes through the ac power cord to earth ground, via the ac branch circuit supplying the drive. Also, all power receptacles in the vicinity of the drive must be at the same ground potential as the drive.

### **SYSTEM GROUND**

The power system safety ground does not necessarily satisfy all system grounding requirements. Therefore, additional connections to earth ground are required to ensure proper drive and system operation. This is referred to as the system ground. The system ground can be installed using any of the following methods:

- Floor Grid (grounded) - Drives and controller are connected to a floor grid consisting of horizontal and vertical members that are mechanically secured and have ground straps, or their equivalent, joining them. The ground straps ensure a constant ground potential at all units connected to the grid. This grid is located under a false floor and connects directly to earth ground.
- Floor Grid (not grounded) - Drives and controller connect to a floor grid that is isolated from earth ground. In this case, the controller connects to earth ground to ground the grid.

#### **NOTE**

Do not use daisy chain grounding for more than ten units.

- Daisy Chain - Drive ground terminals are connected in a daisy chain to one another and then to the controller that connects to earth ground.

## I/O SYSTEM NOISE CONSIDERATION

All EDP site environments are exposed to electrical noise. The type and magnitude of noise depends upon the location and conditions at each site. When adequate grounding precautions are not taken, noise will degrade system performance.

Noise, whether conducted or radiated, may enter the system via cabinets or inter-connecting I/O cabling. Also, noise may be generated within an I/O system in the form of "cross-talk".

Even though the drive cabinet meets stringent EMC requirements, often the I/O system is generally unshielded and may be susceptible to radiated, conducted or self-generated noise.

## SPECIFIC GROUNDING RECOMMENDATIONS

The single most important consideration for an I/O installation is proper grounding. The integrity of the I/O system depends on a low impedance ground path for the return currents of transmitters and to minimize common-mode transients on receiver inputs.

The preferred cable system is a fully shielded type, with the shield connected to the equipment at each end. A shield clamp is included on the drive for this purpose.

If, for some reason, you cannot use a shielded cable, you can use an unshielded cable which will result in a reliable I/O system if you observe the following precautions:

1. Connect the system ground points of all equipments together with a good ground conductor. The ground strap must have a conductor cross-sectional area of at least  $0.19\text{cm}^2$  ( $.0075\text{ in}^2$ ). Since the consideration is for high frequency grounding, a thin, side section is desirable. A minimum example would be a braid of 8 x 48 strands of number 36 wire with a flattened width of 1.43 cm (0.563 in).

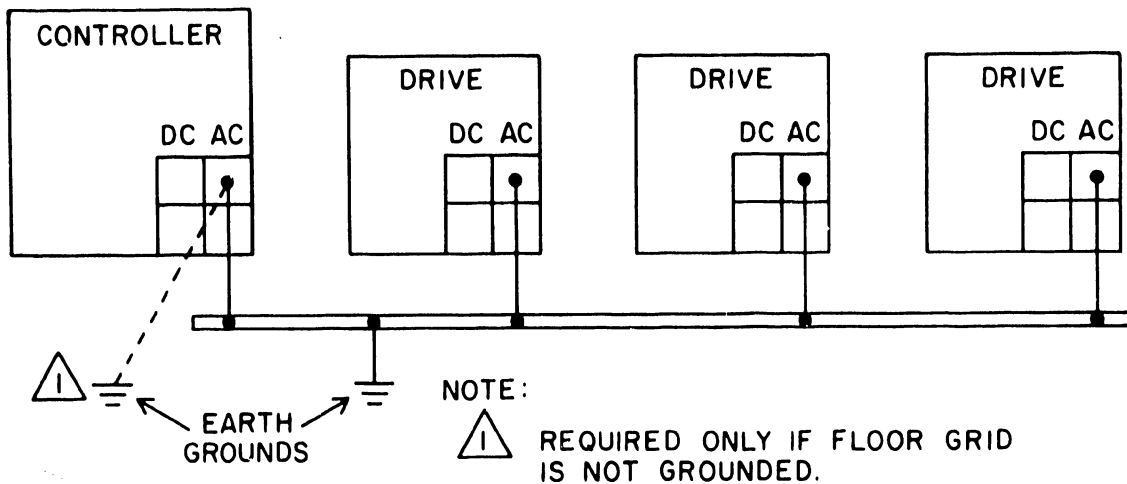
Daisy chain the ground strap with the "A" cable, or connect the strap to an under-floor grid system. Under certain conditions using unshielded I/O cable, cross-talk may cause occasional unreliable "select" command problems. Usually, you can avoid this problem by wrapping the ground strap around the "A" cable with a wrap of one twist per foot. In extreme cases, you may have to use shielded cable.

2. Keep system I/O cables as short as possible. This is also especially true for system ground straps.
3. If possible, avoid routing I/O cables adjacent to noise-radiating sources (power cables, etc.).

## GRID GROUND INSTALLATION

### Floor Grid Grounding

If a floor grid is available (either grounded or ungrounded), each drive individually connects to the floor grid (refer to figure 1-9). A three-foot cable is provided with the unit to facilitate the use of grid grounding. This cable can also be used for star-grounding systems when the units are placed close together. The following describes the procedure to be used for grid grounding (refer to table 1-2 for grounding accessories).



9V68

Figure 1-9. Floor Grid Grounding

TABLE 1-2. GROUNDING ACCESSORIES

Part	CDC Part Number
Flat Braided Shielding	93267009 (50 ft)
Terminal Lug	40125601
External tooth lock washer, #10	10126403
Pan head cross recessed screw, 10x32x1/2	17901524

1. If not already connected, connect one end of flat braided shielding (identified as system groundstrap in figure 1-12) to ac terminal of grounding block.
2. Route free end of system groundstrap through cable entry port and into cutout in floor.
3. Cut strap to proper length and attach terminal lug to free end.
4. Drill 11/32 inch hole in floor grid.
5. Secure terminal lug to grid using 10x32x1/2 screw and #10 external tooth lock washer.
6. If grid is not connected directly to earth ground, connect it to earth ground via the controller.

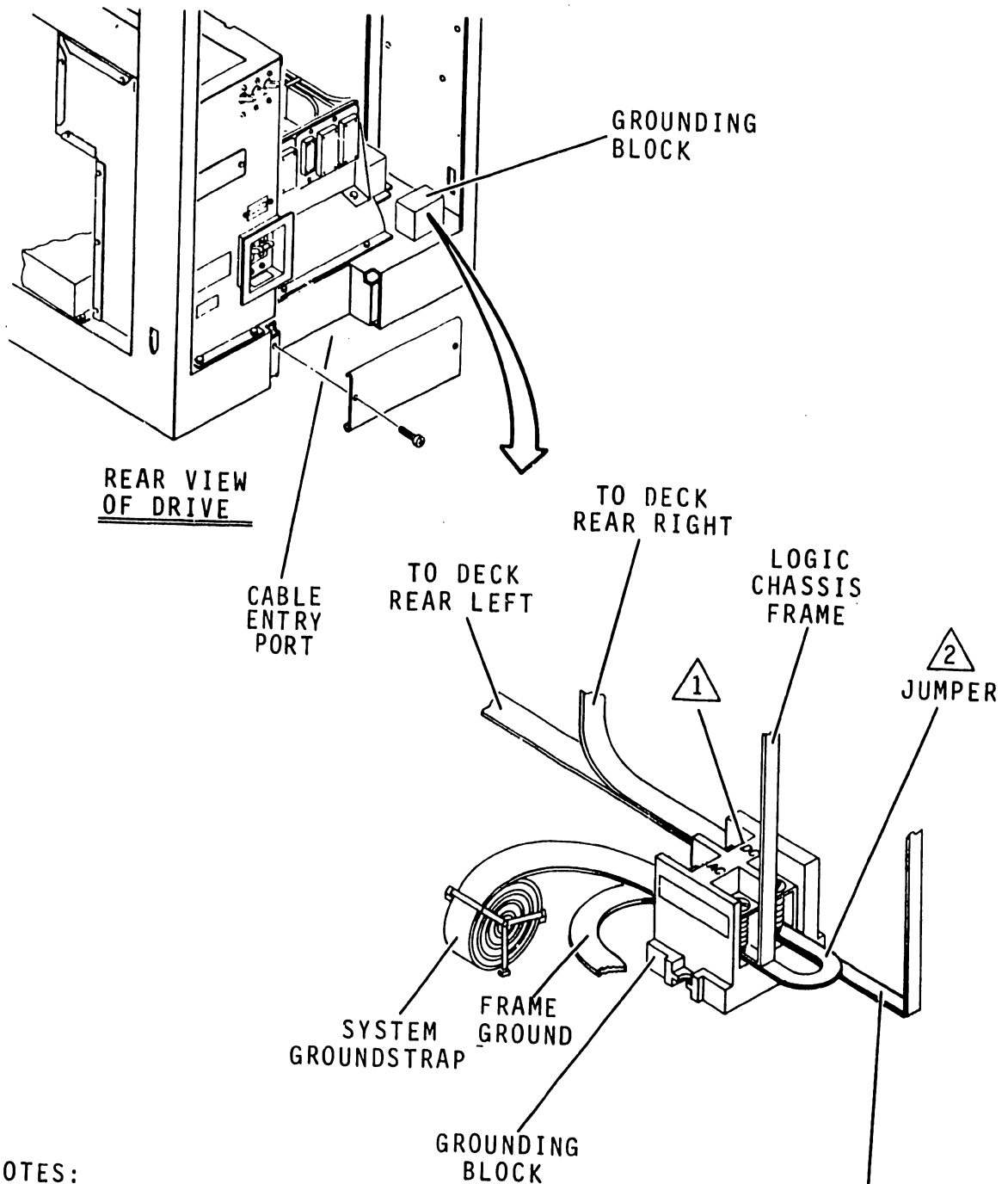
#### NOTE

The system ground must connect both the drive dc (logic) and ac (frame) ground to earth. In most installations, the drive's ac and dc grounds are tied together by a jumper (refer to figure 1-10), and only one system ground connection is required. However, some installations may require the ac and dc grounds to be isolated. In these cases, the jumper must be removed and both ac and dc grounds must connect to earth via separate system ground connections. If the drive is to have isolated ac and dc grounds, remove the jumper between ac and dc portions of the grounding block (figure 1-10), perform steps 1 through 6 to connect ground strap to dc terminal of grounding block.

#### **Daisy Chain Grounding**

If a floor grid is not available, connect all drives to the controller in a daisy chain grounding configuration (refer to figures 1-10 and 1-11). Connect the controller to earth ground. The following describes this procedure (refer to table 1-2 for grounding accessories).





NOTES:

- ① APPLICABLE ONLY WHEN DRIVE HAS ISOLATED AC AND DC GROUNDS. (JUMPER IS REMOVED)
- ② JUMPER IS REMOVED TO ISOLATE AC AND DC GROUNDS.

TO TERMINAL BOARD (LOGIC GROUND) LOGIC CHASSIS FRAME

9V26

Figure 1-10. Drive Grounding Block

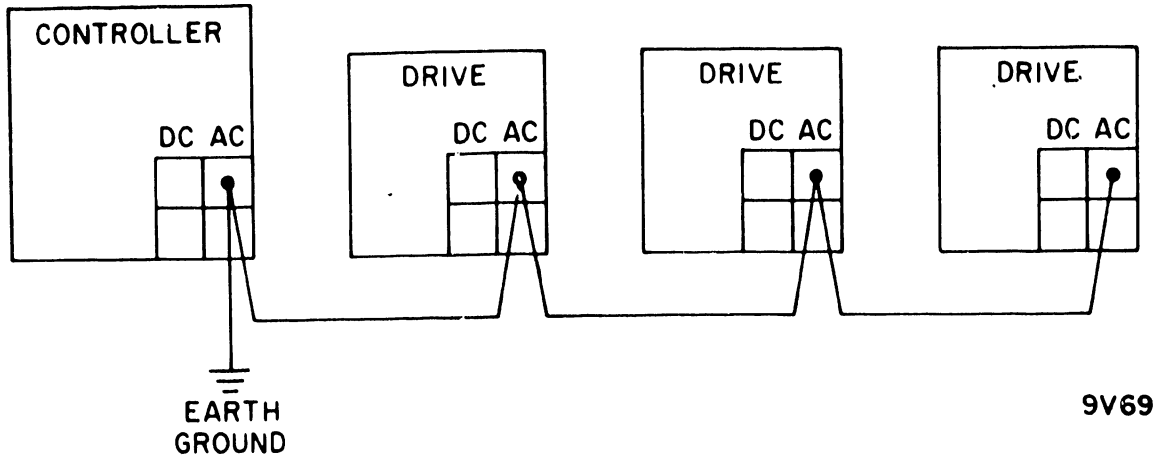


Figure 1-11. Daisy Chain System Grounding

1. Cut lengths of flat braided shielding (identified as system groundstrap in figure 1-10) to lengths required to go from drive to drive, last drive in chain to controller, and controller to earth ground.
2. Connect two straps to ac terminal of grounding block, route straps through I/O cable guide and connect to each of the two closest drives.

NOTE

The system ground must connect both the drive dc (logic) and ac (frame) ground to earth. In most installations, the drive's ac and dc grounds are tied together by a jumper (refer to figure 1-10), and only one system ground connection is required. However, some installations may require the ac and dc grounds to be isolated. In these cases, the jumper must be removed and both ac and dc grounds must connect to earth via separate system ground connections. If the drive is to have isolated ac and dc grounds, remove the jumper between ac and dc portions of the grounding block (figure 1-10), perform steps 1 and 2 to connect ground strap to dc terminal of grounding block.

3. Ensure that the following conditions exist.
  - a. All drives are connected in a daisy chain (10 units maximum).
  - b. Drive closest to controller connects to the controller.
  - c. Controller connects to earth ground.
  - d. Repeat steps b and c for each controller that connects to the drives in a daisy chain.

## **CONTROLLER INTERFACE (I/O) CABLING**

### **SITE CONSIDERATIONS**

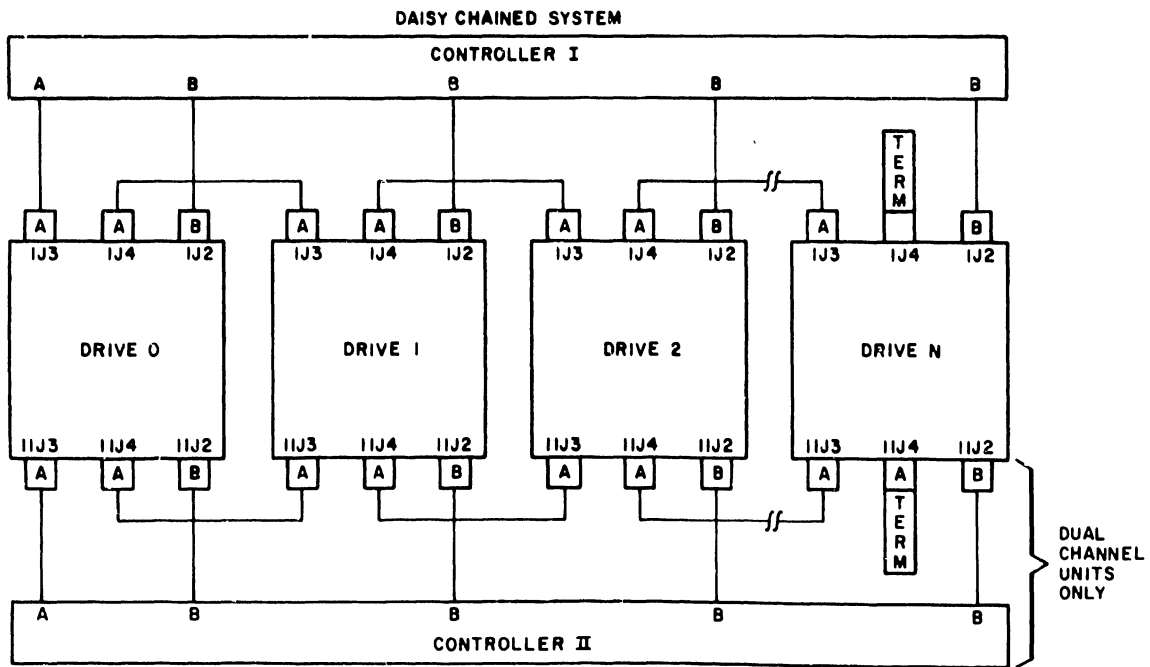
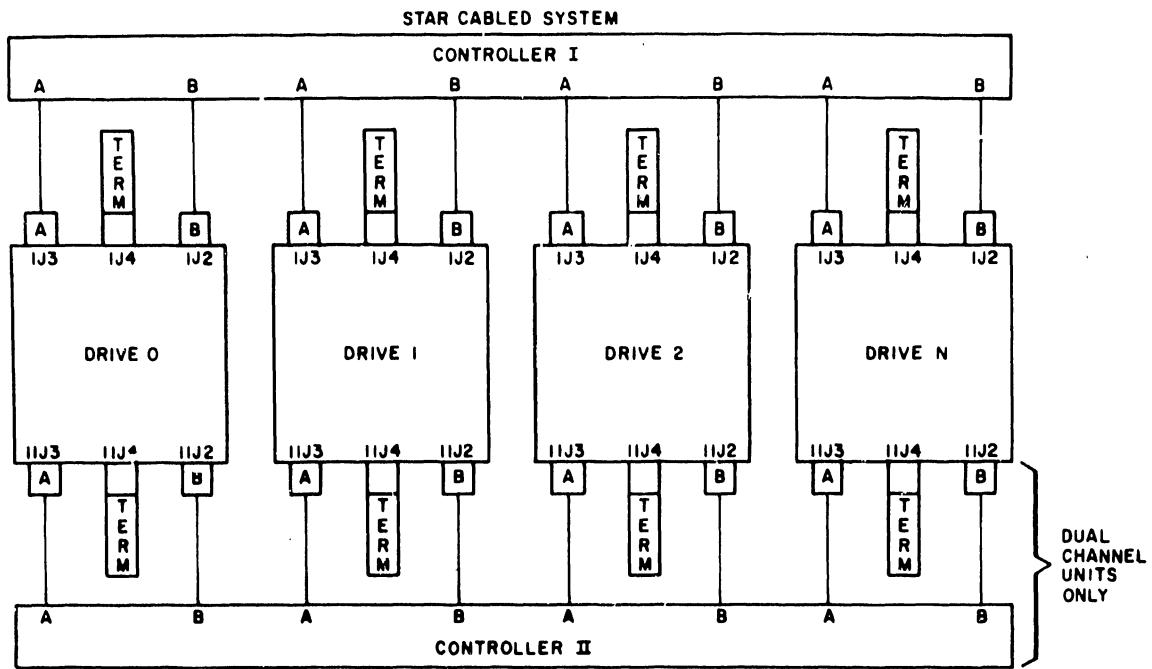
In laying out the site, consideration must be given to the routing of I/O cables (flat or round) and terminators for the drives. The I/O cables are designated as A cable and B cable.

I/O cables may be configured in either a "star" or "daisy-chain" pattern as illustrated in figure 1-12. Both configurations may use either flat or round cables. In addition, the cables may be shielded or unshielded in accordance with site requirements. The A and B cables (either shielded or unshielded) come in varying lengths as listed in tables 1-3 and 1-4. The maximum cumulative length is 15.2 metres (50 feet) for the shielded A cable and 30.5 metres (100 feet) for the unshielded A cable. The maximum cumulative length for the unshielded or shielded B cable is 15.2 metres (50 feet).

The star system requires that the A and B cables go directly from each drive to the controller. It also requires an A cable terminator assembly at each drive. The daisy chain system requires one B cable from each drive to the controller. However, only the first drive in the chain requires an A cable directly to the controller. The other drives have A cables strung from the first drive to the second to the third, and so forth. In the daisy chain configuration, only the last drive in the chain has an A cable terminator assembly.

Both I/O cables and terminators are considered accessories separate from the drive. The part numbers of the terminators and the lengths of I/O cables are listed in tables 1-3 and 1-4.

I/O cables A and B (either flat or round) have assigned signal names and pin assignments. Figures 1-13 and 1-14 define the pin assignments for flat cables. Figures 1-15 and 1-16 define the pin assignments for round cables.



9VI9

Figure 1-12. I/O Cable Configurations

TABLE 1-3. I/O FLAT CABLE ACCESSORIES

CABLE LENGTH IN FEET/METRES											
	4	5	6	8	10	15	20	25	30	40	50
	1.2	1.5	1.8	2.4	3.0	4.5	6.1	7.6	9.1	12.2	15.3
A CABLE (Flat, 60-Pin)											
775642XX (Unshielded)	10	00	01	02	03	04	05	06	07	08	09
823724XX (Shielded)	10	00	01	02	03	04	05	06	07	08	09
823855XX (Jacketed)	10	NA	NA	NA	03	04	05	06	07	08	09
A CABLE (Flat, 50-Pin)											
774594XX (Unshielded)	NA	00	01	02	03	04	05	06	07	08	09
B CABLE (Flat)											
775643XX (Unshielded)	NA	00	01	02	03	04	05	06	07	08	09
823659XX (Shielded)	10	00	01	02	03	04	05	06	07	08	09
823857XX (Jacketed)	NA	NA	NA	NA	03	04	05	06	07	08	09
OTHER ACCESSORIES											
A Cable Terminator (60-pin): 75841300											
A Cable Terminator (50-pin): 75841301											
Logic Plug: 943724XX											
NOTE: NA = Not Available											

TABLE 1-4. I/O ROUND CABLES

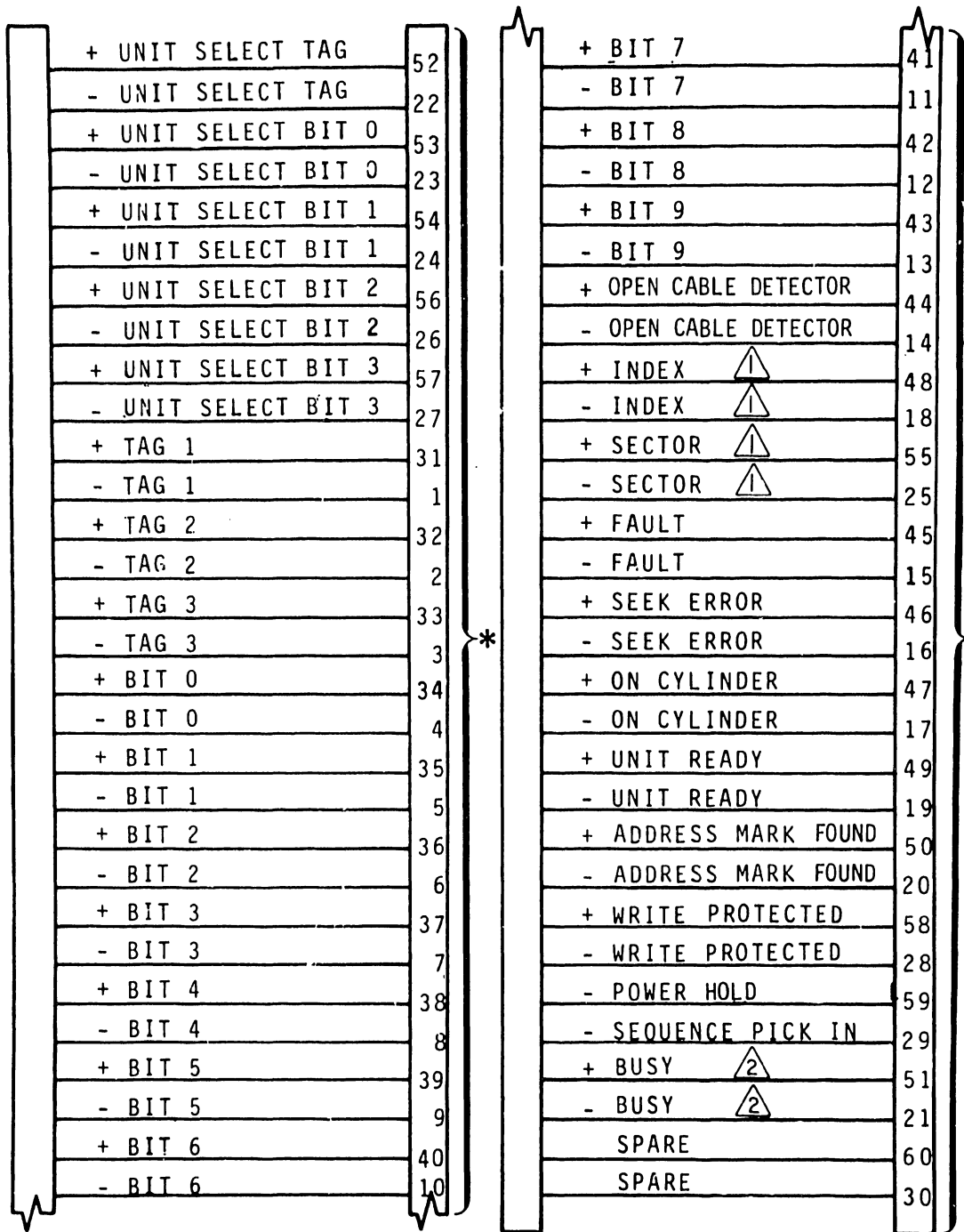
Cable Type and Part Number				
Cable Length	A Cable (Round)	A Cable (Round, Shielded)	B Cable (Round)	B Cable (Round, Shielded)
228.6 mm (9 in)		77569700		
1.219 m (4 ft)	77439101	77569701	75241318	47201718
1.37 m (4.5 ft)			75241319	47201719
1.53 m (5 ft)	77439102	77569702	75241300	47201700
3.05 m (10 ft)	77439103	77569703	75241301	47201701
4.58 m (15 ft)	77439104	77569704	75241302	47201702
6.10 m (20 ft)	77439105	77569705	75241303	47201703
7.62 m (25 ft)	77439106	77569706	75241313	47201713
9.14 m (30 ft)	77439107	77569707	75241304	47201704
10.7 m (35 ft)	77439108	77569708	75241314	47201714
12.2 m (40 ft)	77439109	77569709	75241305	47201705
13.7 m (45 ft)	77439110	77569710	75241315	47201715
15.2 m (50 ft)	77439111	77569711	75241306	47201706
16.8 m (55 ft)	77439112			
18.3 m (60 ft)	77439113			
21.3 m (70 ft)	77439114			
24.4 m (80 ft)	77439115			
27.4 m (90 ft)	77439116			
30.5 m (100 ft)	77439117			
Round Cable Terminator Part Number: 40067209				

**INDEX AND SECTOR CABLE SELECTION (For Units S/C 07 and Above)**

Index and Sector may be routed via the A cable only or via both the A and B cables by means of a jumper plug. This miniature jumper plug is pushed onto the proper pins on the face of the MFAX card (logic chassis slots A08 and B08) at card coordinate location 2223.

To select the A cable only, push the jumper plug onto the "A" and "COM" pins.

To select the A and B cables, push the jumper plug onto the "A and B" and "COM" pins.







\* MATES WITH DRIVE  
NOTES:


9V14

-  MAY BE ON B CABLE, DEPENDING ON OPTION
-  DUAL CHANNEL UNITS ONLY

Figure 1-13. A (Flat Cable) Pin Assignments

GROUND (SHIELD)	1	} MATES WITH DRIVE
- SERVO CLOCK	2	
+ SERVO CLOCK	14	
GROUND (SHIELD)	15	
- READ DATA	3	
+ READ DATA	16	
GROUND (SHIELD)	4	
- READ CLOCK	5	
+ READ CLOCK	17	
GROUND	18	
- WRITE CLOCK	6	
+ WRITE CLOCK	19	
GROUND (SHIELD)	7	
- WRITE DATA	8	
+ WRITE DATA	20	
GROUND	21	
- UNIT SELECTED	22	
+ UNIT SELECTED	9	
- SEEK END	10	
+ SEEK END	23	
GROUND	11	
- INDEX 	12	
+ INDEX 	24	
GROUND	25	
- SECTOR 	13	
+ SECTOR 	26	

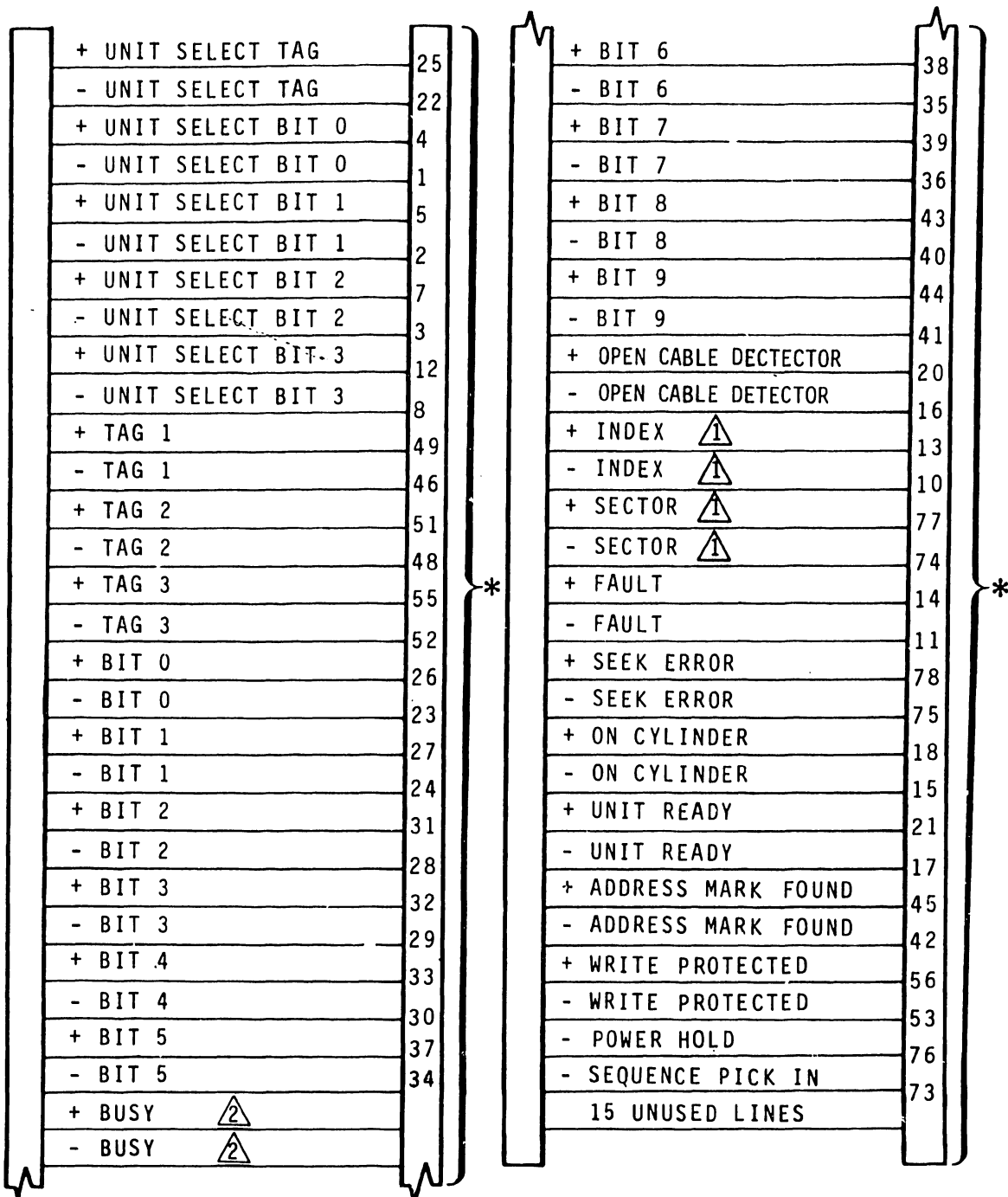
NOTES:

 MAY BE ON A CABLE DEPENDING ON OPTION

9V15

Figure 1-14. B (Flat Cable) Pin Assignments





\* MATES WITH DRIVE

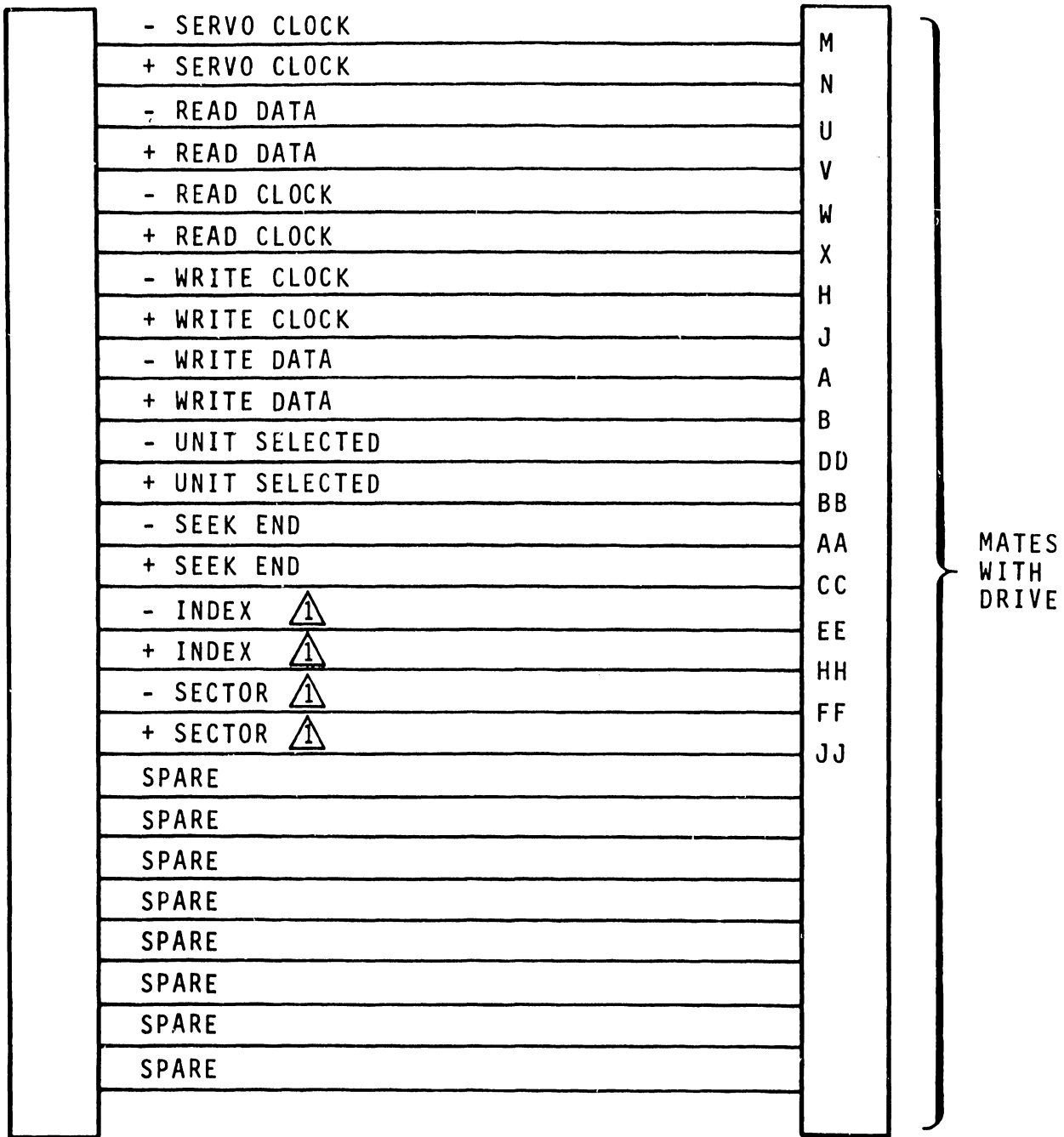
NOTES:

 MAY BE ON B CABLE  
DEPENDING ON OPTION.

 DUAL CHANNEL UNITS ONLY

9V16A

Figure 1-15. A (Round Cable) Pin Assignments



9V17

NOTES:

 MAY BE ON A CABLE, DEPENDING ON OPTION

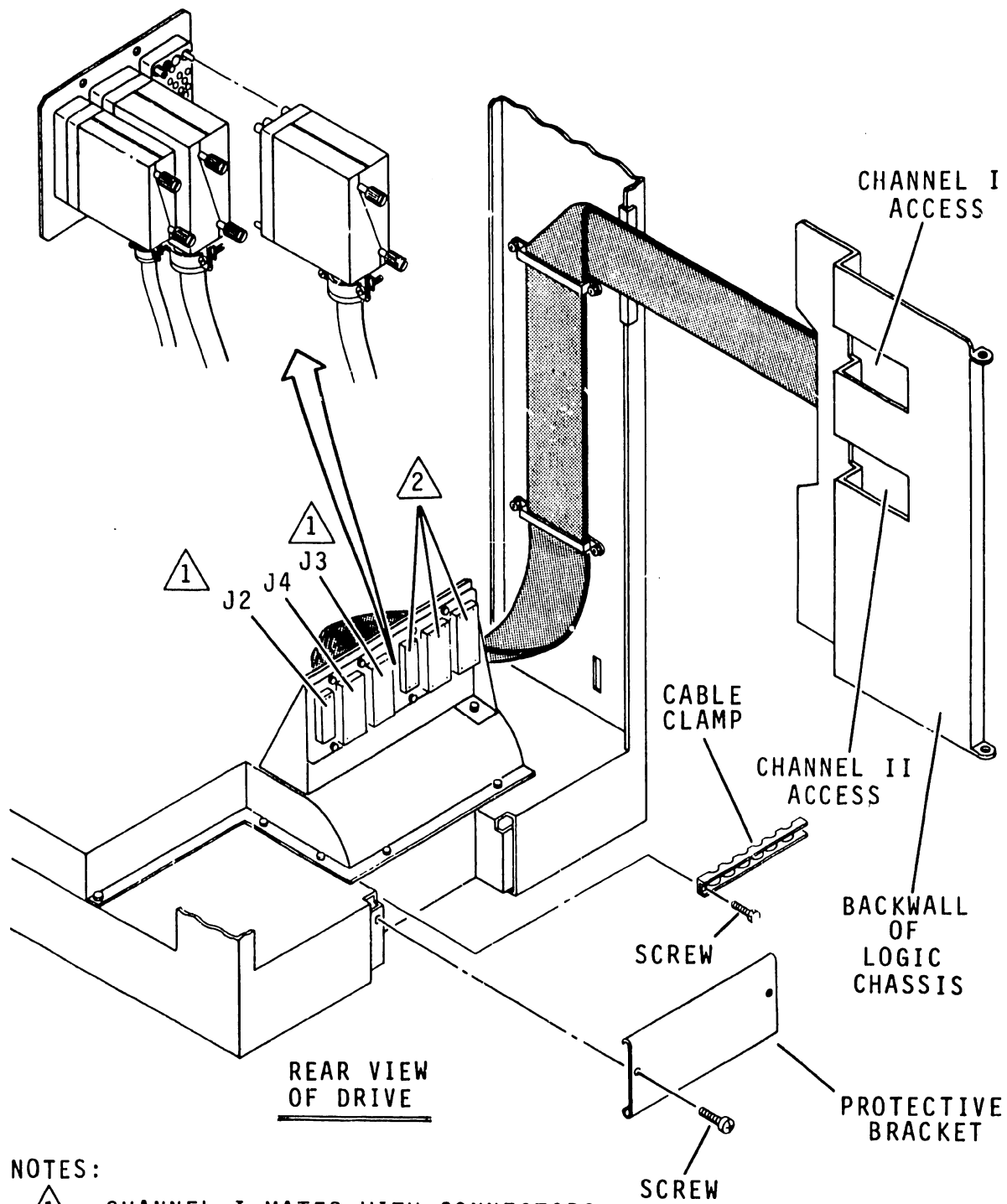
Figure 1-16. B (Round Cable) Pin Assignments

## I/O CABLE INSTALLATION

This procedures describe the installation of drive I/O cables (round or flat) and terminators. Figure 1-17 shows the routing of the round cable. Figure 1-18 illustrates the routing of the flat cable. The following steps describe the installation of star and daisy chain configurations (refer to figure 1-12).

### Round Cable Installation

1. Remove power from drive by setting MAIN AC circuit breaker to OFF.
2. Open rear door.
3. If using the star configuration, connect all cables to the I/O panel as shown in figures 1-12 and 1-17.
  - a. Channel I: Connect first A cable to connector IJ3. Connect terminator to connector IJ4. Connect B cable to connector IJ2.
  - b. Channel II: Connect first A cable to connector IIJ3. Connect terminator to connector IIJ4. Connect B cable to connector IIJ2.
  - c. Clamp shielded round cables to frame. Strip back shielding from cables approximately 15 cm (6 in.). Place clamp over cable and attach clamp to frame using two screws.
4. When using the daisy chain configuration, connect all cables to the I/O panel as shown in figures 1-12 and 1-17.
  - a. Channel I: Connect the first A cable to connector IJ3. Connect the second A cable from connector IJ4 on the first drive to connector IJ3 on the next drive. Repeat the same step for the remaining drives in the chain. On the last drive in the chain, connect a terminator to connector IJ4. Connect B cable to connector IJ2.
  - b. Channel II: Connect the first A cable to connector IIJ3. Connect the second A cable from connector IIJ4 on the first drive to connector IIJ3 on the next drive. Repeat the same step for the remaining drives in the chain. On the last drive in the chain, connect a terminator to connector IIJ4. Connect B cable to connector IIJ2.



NOTES:

- ① CHANNEL I MATES WITH CONNECTORS (IJ2, IJ3, IJ4) at I/O PANEL (A8).
- ② CHANNEL II MATES WITH CONNECTORS (IIJ2, IIJ3, IIJ4) at I/O PANEL (A8).

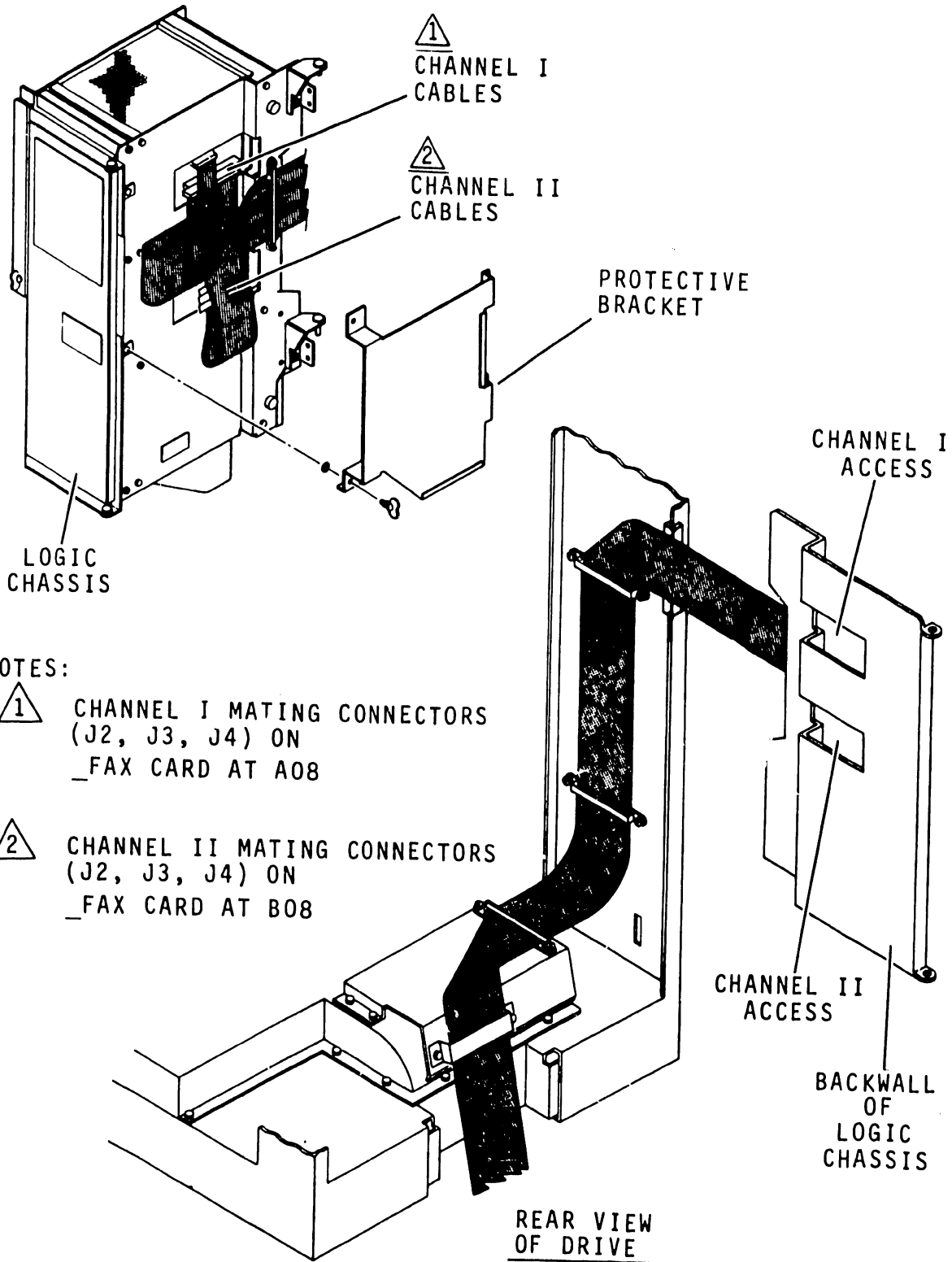
9V24 B

Figure 1-17. Round Cable Installation

- c. Clamp shielded round cables to frame. Strip back shielding from cables approximately 15 cm (6 in.). Place clamp over cable and attach clamp to frame using two screw.
5. Replace the protective bracket on the logic chassis. Insert the bracket tabs in the logic chassis. See figure 1-17.

### Flat Cable Installation

1. Remove power from drive by setting MAIN AC circuit breaker to OFF.
2. Open rear door.
3. Remove the two wing nuts securing the protective bracket to the logic chassis. Unhook the tabs securing the right side of the bracket. Remove the protective bracket. See either figure 1-18, 18.1, or 1-19.
4. Remove cable clamps attached to I/O bracket, route cables to logic chassis as shown in either figure 1-18, 18.1, or 1-19, and replace clamp.
5. Using the star configuration, cables are connected directly to the logic chassis at the locations described below (see figures 1-12 and 1-18, 1-18.1, or 1-19).
  - a. Channel I: All cable connections are made at the card at location A08 in the logic chassis. Connect first A cable to connector J3. Connect terminator to connector J4. Connect B cable to connector J2.
  - b. Channel II: All cable connections are made at the card at location B08 in the logic chassis. Connect all cables as described under Channel I.
6. Using the daisy chain configuration, cables are connected to the logic chassis at the locations described below (see figure 1-12):
  - a. Channel I: All cable connections are made at the card location A08 in the logic chassis. Connect the first A cable to connector J3. Connect the second A cable to connector J4 on the first drive and to connector J3 on the second drive. Repeat the same step for the remaining drives in the chain. On the last drive in the chain, connect a terminator to connector J4. Connect B cable to connector J2.

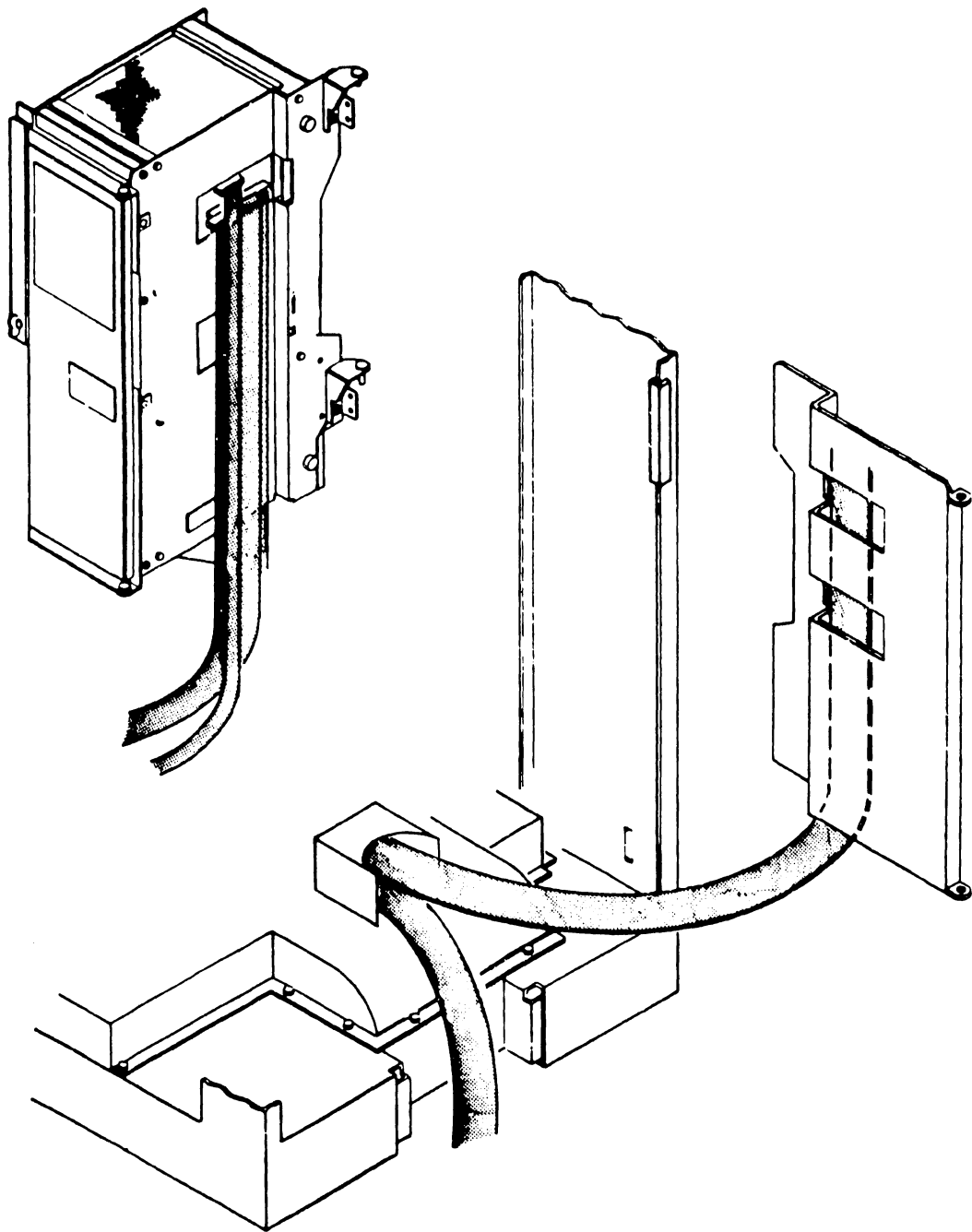


NOTES:

- 1 CHANNEL I MATING CONNECTORS (J2, J3, J4) ON \_FAX CARD AT A08
- 2 CHANNEL II MATING CONNECTORS (J2, J3, J4) ON \_FAX CARD AT B08

9V25

Figure 1-18. Flat Cable Installation (S/C 08 & Below)



9V110

Figure 1-18.1. Flat Cable Installation (S/C 09 - 14, W/O 02489)

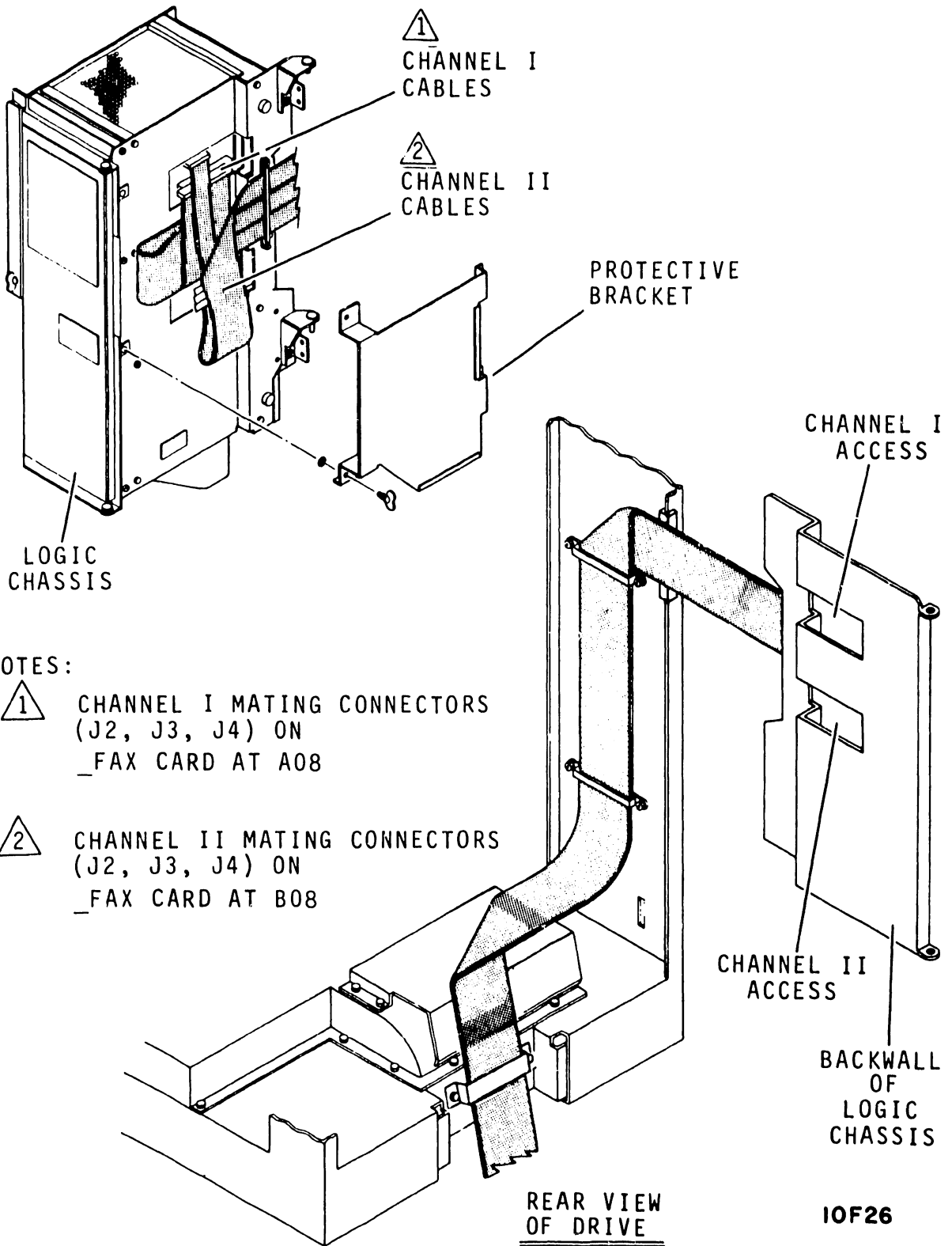


Figure 1-19. Flat Cable Installation (S/C 14 & Abv, W/ 02489)



b. Channel II: All cable connections are made at the card at location B08 in the logic chassis. Connect all cables as described under Channel I.

## AC POWER CABLE

The site layout must provide an ac power source for each drive. All 60 Hz units are equipped with a 2.7-metre (9 foot) power cord. Cords used on 60 Hz units have their own prewired connectors (refer to figure 1-20). All 50 Hz units are shipped from the factory with a 2.7 metre (9-foot) power cord. Cords

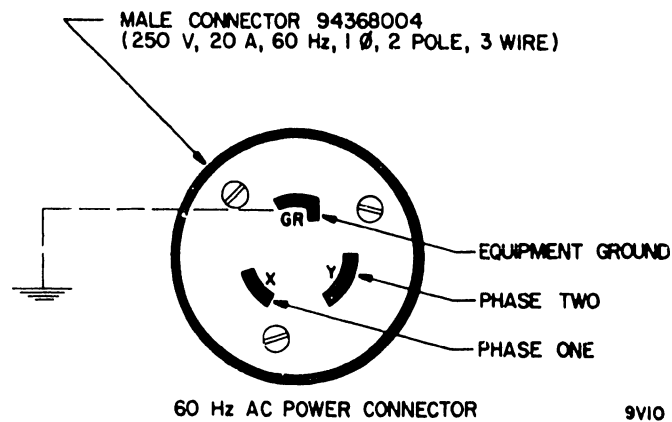
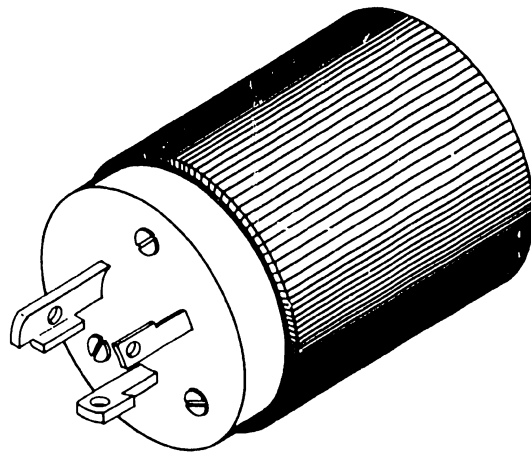


Figure 1-20. 60 Hz AC Power Connector

used on 50 Hz units are not supplied with connectors. The 50 Hz connector is wired at the installation site as follows:

- Green/yellow wire to safety ground terminal.
- Brown to Phase One
- Blue to neutral

## VOLTAGE SELECTIONS

All drives are shipped from the factory configured either for 208 V, 60 Hz or 220 V, 50 Hz.

### WARNING

Disconnect the unit from site power before making any wire changes.

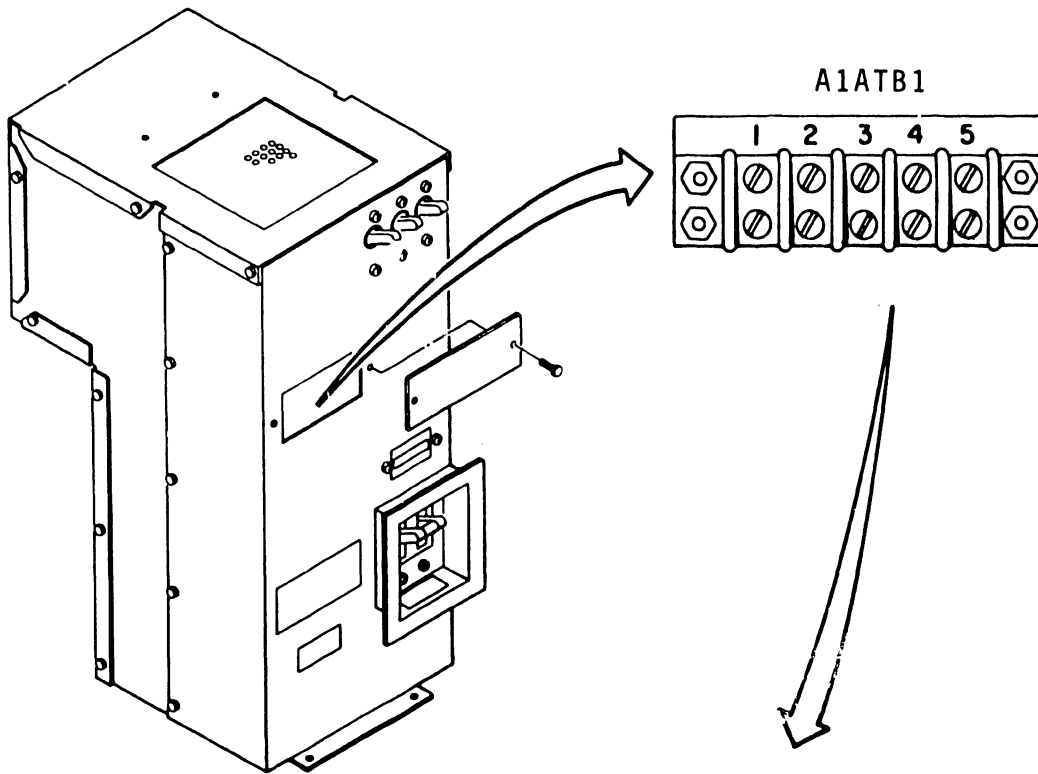
To rewire 60 Hz or 50 Hz units to accept other voltages, move the conductors at A1TB1 in the ac power supply and at A2TB3 in the dc power supply as shown in figures 1-21 and 1-22.

The required wiring for each terminal board input is shown in the logic diagrams cross reference page 3002 in Volume 2 of the Hardware Maintenance Manual (Publication Number 83323570). It should be noted that a drive cannot be converted from one frequency to another (50 Hz to 60 Hz for example) without making major mechanical changes.

## AC POWER SUPPLY

The following wire changes (as shown in figure 1-21) are required at terminal board inputs A1ATB1 if source voltages other than 208 V, 60 Hz or 220 V, 50 Hz are selected. To gain access to terminal board inputs A1ATB1, the following procedure is necessary.

1. Remove the two screws securing the plate to terminal board A1ATB1 (refer to figure 1-21).
2. Connect the red wire to terminal board inputs as shown in figure 1-21.
3. Reinstall plate cover.



FREQ (HZ)	NOMINAL VOLTAGES	TERMINAL BOARD RED WIRE LOCATION	MATING WIRE COLOR
50/60	200/208	A1ATB1-3	BLK
	230	A1ATB1-2	YEL
	240	A1ATB1-1	ORN

9V22

Figure 1-21. AC Power Supply Voltage Selections

## **DC POWER SUPPLY**

If source voltages other than 208 V, 60 Hz or 220 V, 50 Hz are selected, then the following wire changes are required at terminal board inputs A2TB3 (as shown in figure 1-22). The following procedure is necessary to gain access to terminal board inputs A2TB3.

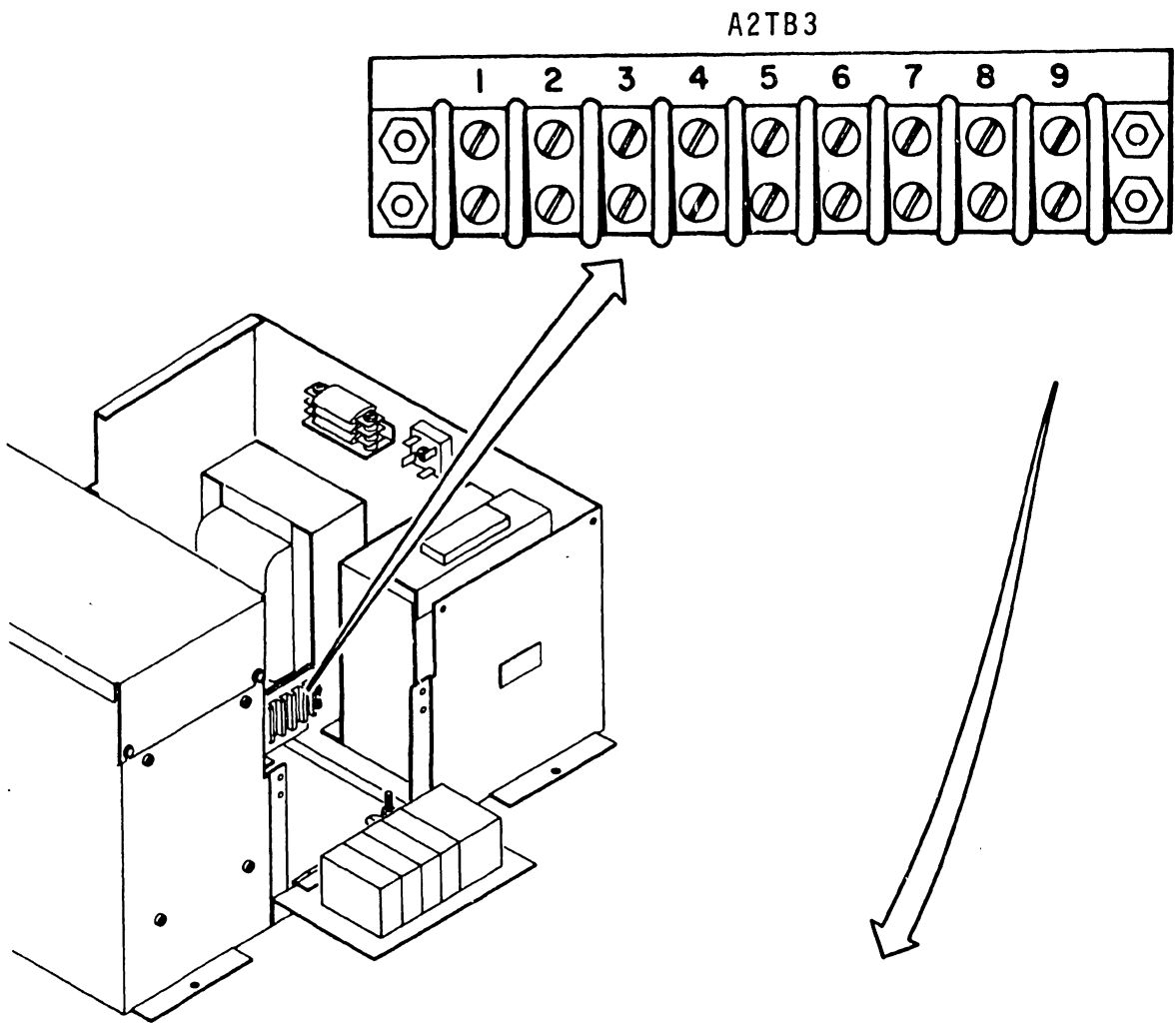
1. Remove the two screws securing the circuit breaker cover.
2. Remove the circuit breaker cover.
3. Remove the two screws securing the circuit breaker panel.
4. Pull the circuit breaker panel forward and down.
5. Connect the black and brown wires to the terminal board inputs A2TB3 as shown in figure 1-22.
6. Close circuit breaker panel. Reinstall circuit breaker cover.

## **ADDRESS SELECTION**

Figure 1-23 identifies the address select switches at card location A3B04/A3C04. The address select switch consists of four independent switches, numbered one through four. The switches have sixteen possible hexadecimal addresses. The hexadecimal address selections show the switches in either open or closed positions.

## **SETTING SECTOR SELECT SWITCHES**

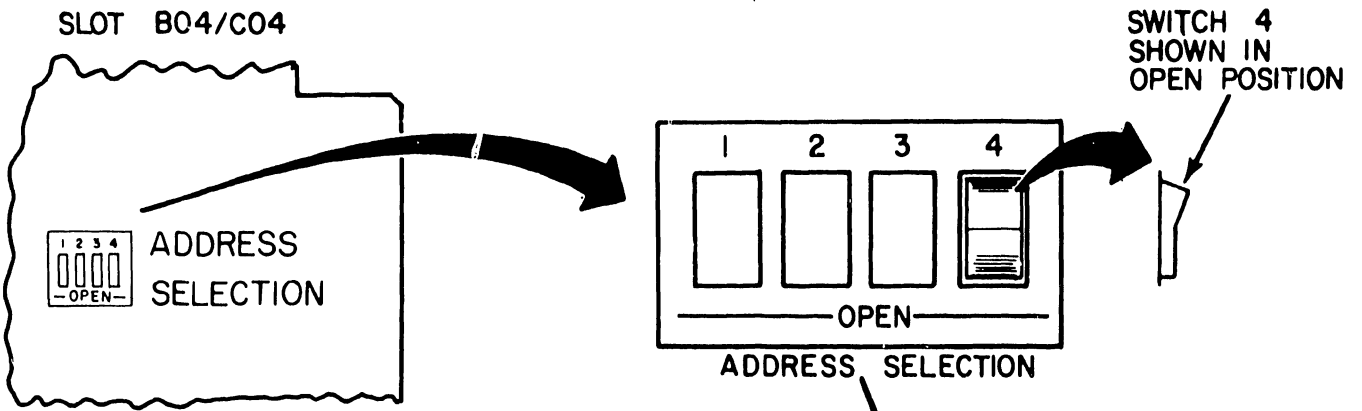
The number of sectors per revolution generated by the drive logic must be matched to that selected by the customer. Therefore, sector select switches are provided in the drive logic to allow selection of different sector counts. These switches are located on logic card A3B04/A3C04 and appear as shown in figure 1-23.



FREQ (HZ)	NOMINAL VOLTAGES	TERMINAL BOARD WIRE LOCATION	MATING COLOR REFERENCE	TRANSFORMER
60	200/208	A2TB3-1 (BLACK)	GRAY	A2T1
		A2TB3-4 (BROWN)	GRAY	A2T2
	220/230	A2TB3-2 (BLACK)	YEL	A2T1
		A2TB3-5 (BROWN)	YEL	A2T2
50	200	A2TB3-8 (BLACK)	GRAY	A2T1
		A2TB3-9 (BROWN)	GRAY	A2T2
	220	A2TB3-1 (BLACK)	YEL	A2T1
		A2TB3-4 (BROWN)	YEL	A2T2
	240	A2TB3-2 (BLACK)	BLK	A2T1
		A2TB3-5 (BROWN)	BLK	A2T2

9V23A

Figure 1-22. DC Power Supply Voltage Selections



ADDRESS	SWITCH NUMBER			
	1(2 <sup>0</sup> )	2(2 <sup>1</sup> )	3(2 <sup>2</sup> )	4(2 <sup>3</sup> )
0	C	C	C	C
1	O	C	C	C
2	C	O	C	C
3	O	O	C	C
4	C	C	O	C
5	O	C	O	C
6	C	O	O	C
7	O	O	O	C
8	C	C	C	O
9	O	C	C	O
A	C	O	C	O
B	O	O	C	O
C	C	C	O	O
D	O	C	O	O
E	C	O	O	O
F	O	O	O	O

C = CLOSED  
O = OPEN

9V12A

Figure 1-23. Address Select Switches

Select the number of sectors and then locate that number in table 1-5. Across from the number of sectors listed in the table is a row of Cs and Os. C represents the Closed position of the sector switch. O represents the Open position of the sector switch. Set the switches to the positions designated in the table while referring to figure 1-24 for an illustration of the switch positions.

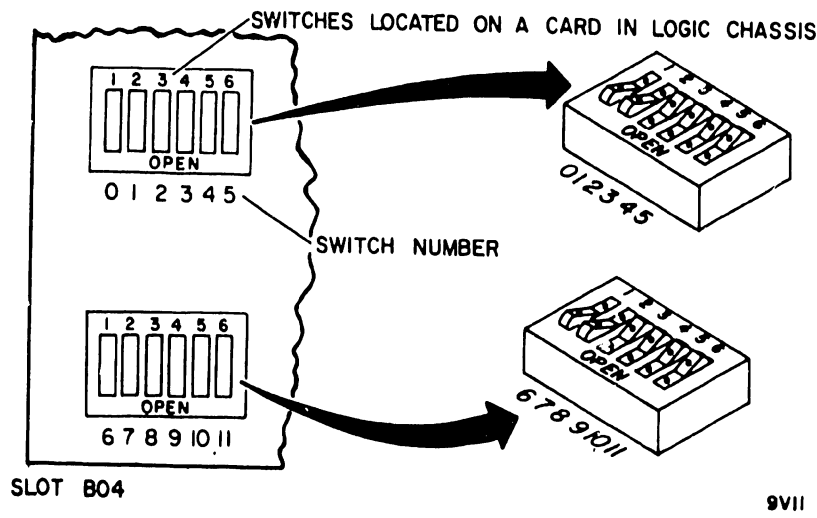


Figure 1-24. Sector Select Switches

TABLE 1-5. SECTOR SELECT SWITCH SETTINGS

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
4	C	C	C	C	C	O	O	O	C	O	C	C
5	C	C	C	C	C	C	C	O	O	C	O	C
6	C	C	C	C	C	C	O	C	O	O	O	C
7	C	C	C	C	C	C	C	O	C	C	C	O
8	C	C	C	C	O	O	O	C	O	C	C	O
9	O	O	C	O	C	O	C	C	C	O	C	O
10	C	C	C	C	C	C	O	O	C	O	C	O
11	O	O	C	O	O	O	C	C	O	O	C	O
12	C	C	C	C	C	O	C	O	O	O	C	O
13	O	O	O	C	O	O	O	O	O	O	C	O
14	C	C	C	C	C	C	O	C	C	C	O	O
15	C	C	C	C	C	C	C	O	C	C	O	O
16	C	C	C	O	O	O	C	O	C	C	O	O
17	C	O	C	O	C	O	O	O	C	C	O	O
18	C	O	O	C	O	C	C	C	O	C	O	O
19	O	C	O	O	O	O	C	C	O	C	O	O
20	C	C	C	C	C	O	O	C	O	C	O	O
21	C	C	C	C	C	C	C	O	O	C	O	O
22	C	O	O	O	O	C	C	O	O	C	O	O
23	C	C	C	O	O	O	C	O	O	C	O	O
24	C	C	C	C	O	C	O	O	O	C	O	O
25	O	O	O	C	C	O	O	O	O	C	O	O
26	C	C	O	O	O	O	O	O	O	C	O	O
27	O	O	O	O	C	C	C	C	C	O	O	O

Table Continued on N xt Page



TABLE 1-5. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
28	C	C	C	C	C	O	C	C	C	O	O	O
29	O	C	C	C	O	O	C	C	C	O	O	O
30	C	C	C	C	C	C	O	C	C	O	O	O
31	O	O	O	O	C	C	O	C	C	O	O	O
32	C	C	O	O	O	C	O	C	C	O	O	O
33	O	C	C	O	C	O	O	C	C	O	O	O
34	O	C	O	C	O	O	O	C	C	O	O	O
35	C	C	C	C	C	C	C	O	C	O	O	O
36	O	O	C	O	C	C	C	O	C	O	O	O
37	O	C	O	C	O	C	C	O	C	O	O	O
38	O	O	O	O	O	C	C	O	C	O	O	O
39	C	C	C	O	C	O	C	O	C	O	O	O
40	C	C	C	C	O	O	C	O	C	O	O	O
41	O	C	C	O	O	O	C	O	C	O	O	O
42	C	C	C	C	C	C	O	O	C	O	O	O
43	C	C	C	O	C	C	O	O	C	O	O	O
44	O	O	O	O	C	C	O	O	C	O	O	O
45	C	O	O	C	O	C	O	O	C	O	O	O
46	C	C	O	O	O	C	O	O	C	O	O	O
47	O	O	C	C	C	O	O	O	C	O	O	O
48	C	C	C	O	C	O	O	O	C	O	O	O
49	C	O	O	O	C	O	O	O	C	O	O	O
50	C	C	O	C	O	O	O	O	C	O	O	O
51	O	C	C	O	O	O	O	O	C	O	O	O

Table Continued on Next Page

TABLE 1-5. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
52	C	O	O	O	O	O	O	O	C	O	O	O
53	O	O	C	C	C	C	C	C	O	O	O	O
54	C	C	C	O	C	C	C	C	O	O	O	O
55	C	C	O	O	C	C	C	C	O	O	O	O
56	C	C	C	C	O	C	C	C	O	O	O	O
57	O	C	O	C	O	C	C	C	O	O	O	O
58	O	C	C	O	O	C	C	C	O	O	O	O
59	O	C	O	O	O	C	C	C	O	O	O	O
60	C	C	C	C	C	O	C	C	O	O	O	O
61	C	C	O	C	C	O	C	C	O	O	O	O
62	C	C	C	O	C	O	C	C	O	O	O	O
63	O	O	C	O	C	O	C	C	O	O	O	O
64	C	O	O	O	C	O	C	C	O	O	O	O
65	C	O	C	C	O	O	C	C	O	O	O	O
66	O	C	O	C	O	O	C	C	O	O	O	O
67	C	C	C	O	O	O	C	C	O	O	O	O
68	O	O	C	O	O	O	C	C	O	O	O	O
69	C	O	O	O	O	O	C	C	O	O	O	O
70	C	C	C	C	C	C	O	C	O	O	O	O
71	O	O	C	C	C	C	O	C	O	O	O	O
72	C	O	O	C	C	C	O	C	O	O	O	O
73	C	C	C	O	C	C	O	C	O	O	O	O
74	O	O	C	O	C	C	O	C	O	O	O	O
75	O	C	O	O	C	C	O	C	O	O	O	O

Table Continued on Next Page

TABLE 1-5. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
76	C	C	C	C	O	C	O	C	O	O	O	O
77	C	O	C	C	O	C	O	C	O	O	O	O
78	C	C	O	C	O	C	O	C	O	O	O	O
79	C	O	O	C	O	C	O	C	O	O	O	O
80	C	C	C	O	O	C	O	C	O	O	O	O
81	O	O	C	O	O	C	O	C	O	O	O	O
82	O	C	O	O	O	C	O	C	O	O	O	O
83	O	O	O	O	O	C	O	C	O	O	O	O
84	C	C	C	C	C	O	O	C	O	O	O	O
85	C	O	C	C	C	O	O	C	O	O	O	O
86	C	C	O	C	C	O	O	C	O	O	O	O
87	C	O	O	C	C	O	O	C	O	O	O	O
88	C	C	C	O	C	O	O	C	O	C	O	O
89	O	C	C	O	C	O	O	C	O	O	O	O
90	O	O	C	O	C	O	O	C	O	O	O	O
91	O	C	O	O	C	O	O	C	O	O	O	O
92	C	O	O	O	C	O	O	C	O	O	O	O
93	C	C	C	C	O	O	O	C	O	O	O	O
94	C	O	C	C	O	O	O	C	O	O	O	O
95	O	O	C	C	O	O	O	C	O	O	O	O
96	C	C	O	C	O	O	O	C	O	O	O	O
97	C	O	O	C	O	O	O	C	O	O	O	O
98	O	O	O	C	O	O	O	C	O	O	O	O
99	O	C	C	O	O	O	O	C	O	O	O	O

Table Continued on Next Page

TABLE 1-5. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
100	C	0	C	0	0	0	0	C	0	0	0	0
101	0	0	C	0	0	0	0	C	0	0	0	0
102	0	C	0	0	0	0	0	C	0	0	0	0
103	C	0	0	0	0	0	0	C	0	0	0	0
104	0	0	0	0	0	0	0	C	0	0	0	0
105	C	C	C	C	C	C	C	0	0	0	0	0
106	C	0	C	C	C	C	C	0	0	0	0	0
107	0	0	C	C	C	C	C	0	0	0	0	0
108	C	C	0	C	C	C	C	0	0	0	0	0
109	0	C	0	C	C	C	C	0	0	0	0	0
110	C	0	0	C	C	C	C	0	0	0	0	0
111	0	0	0	C	C	C	C	0	0	0	0	0
112	C	C	C	0	C	C	C	0	0	0	0	0
113	C	0	C	0	C	C	C	0	0	0	0	0
114	0	0	C	0	C	C	C	0	0	0	0	0
115	C	C	0	0	C	C	C	0	0	0	0	0
116	0	C	0	0	C	C	C	0	0	0	0	0
117	C	0	0	0	C	C	C	0	0	0	0	0
118	0	0	0	0	C	C	C	0	0	0	0	0
119	C	C	C	C	0	C	C	0	0	0	0	0
120	C	C	C	C	0	C	C	0	0	0	0	0
121	0	C	C	C	0	C	C	0	0	0	0	0
122	C	0	C	C	0	C	C	0	0	0	0	0
123	0	0	C	C	0	C	C	0	0	0	0	0

Table Continued on Next Page

TABLE 1-5. SECTOR SELECT SWITCH SETTINGS (Contd)

Number of Sectors	Switch Number											
	0	1	2	3	4	5	6	7	8	9	10	11
124	C	C	O	C	O	C	C	O	O	O	O	O
125	O	C	O	C	O	C	C	O	O	O	O	O
126	C	O	O	C	O	C	C	O	O	O	O	O
127	O	O	O	C	O	C	C	O	O	O	O	O
128	O	O	O	C	O	C	C	O	O	O	O	O

Note: C = Closed position; O = Open position.

**HDA TEMPERATURE STABILIZATION**

Before an HDA is used, it must be stable in temperature and humidity with respect to the site environment. If not, moisture that condenses within the HDA can cause HDA failure. The problem is worsened if a shipped unit is moved from a cold outdoor environment to a much warmer computer site. No Seek operations should be performed before the HDA temperature is greater than the dewpoint of the FMD intake air supply. The following procedures describe steps you must take to ensure that the unit can be operated safely.

After the temperature stabilization requirements are met, the HDA and FMD air system must be purged for a minimum of one hour. Refer to the HDA Purge procedure.

**DRIVE TEMPERATURE STABILIZATION**

Upon arrival of the FMD at the customer site, unpack it and, if possible, allow at least 24 hours for it to temperature stabilize. If the installation time delay allowed is critical, al-

low the following minimum times for the HDA to warm to 22° C (70° F) with a site ambient temperature of 24° C (75° F) and 80% relative humidity:

<u>Initial Temperature</u>	<u>Waiting Time</u>
-40° C (-40° F)	23 hours
-23° C (-10° F)	21 hours
-7° C (+20° F)	19 hours
+10° C (+50° F)	14 hours

Leveling and cabling can be performed during the stabilization period; however, observe the following precautions:

1. Do not apply power to the unit. Even blower motor operation can cause condensation.
2. Leave the carriage locking rod secured.

### **SPARE HDA STABILIZATION**

Upon arrival of a spare HDA at the customer site, unpack it and remove the plastic bag. A stabilization time of at least 8 hours is preferred. If the replacement time delay allowed is critical, allow the following minimum times for the HDA to warm to 22° C (70° F) with a site ambient temperature of 24° C (75° F) and 80% relative humidity:

<u>Initial Temperature</u>	<u>Waiting Time</u>
-40° C (-40° F)	8 hours
-23° C (-10° F)	7 hours
-7° C (+20° F)	6 hours
+10° C (+50° F)	4-1/4 hours

### **INITIAL STARTUP AND CHECKOUT**

#### **FINAL VISUAL CHECKS**

Before applying power to any unit, and after the unit has been temperature stabilized, make the following visual checks:

1. See that the primary air filter is in place.
2. Check that all four hold-down bolts have been removed.

3. Reaffirm that the carriage locking rod is in place as shown in figure 1-8.
4. Check all air hoses to ensure they are intact, are properly connected, and that the hose clamps are tight.
5. Check that all the I/O cables are properly mated and firmly seated.
6. Check that all wire-harness connectors are properly mated.
7. Check that all backpanel connectors are firmly seated and that the terminating jumpers are installed over the correct pins.
8. For a single-channel unit, check the backpanel to ensure that the jumper plug is installed at the backpanel location A07. A dual-channel unit requires no jumper plug at backpanel location A07.
9. Check that all logic cards have been installed and are firmly seated in the card slots.

#### **HDA PURGE**

After the physical installation of the subsystem has been completed, the following power-up and purge procedure should be observed for each drive.

1. Connect the ac power cable from the unit to the site power source.
2. Turn off all dc power supply circuit breakers; turn off all circuit breakers on the ac power supply in each drive.
3. On operator panel of each device: ensure that START switch is in the off position (popped out).
4. At the site power distribution panel, turn on the breaker that controls ac power to the unit.
5. Turn on MAIN circuit breaker on the ac power supply in the cabinet.
6. As the ac power is applied, the unit's blower motor will come on.

7. Allow the blower to operate (drive motor not operating) for at least one hour.
8. Test and diagnostic Linked Series Test 03 may be run on unit while HDA is purging.

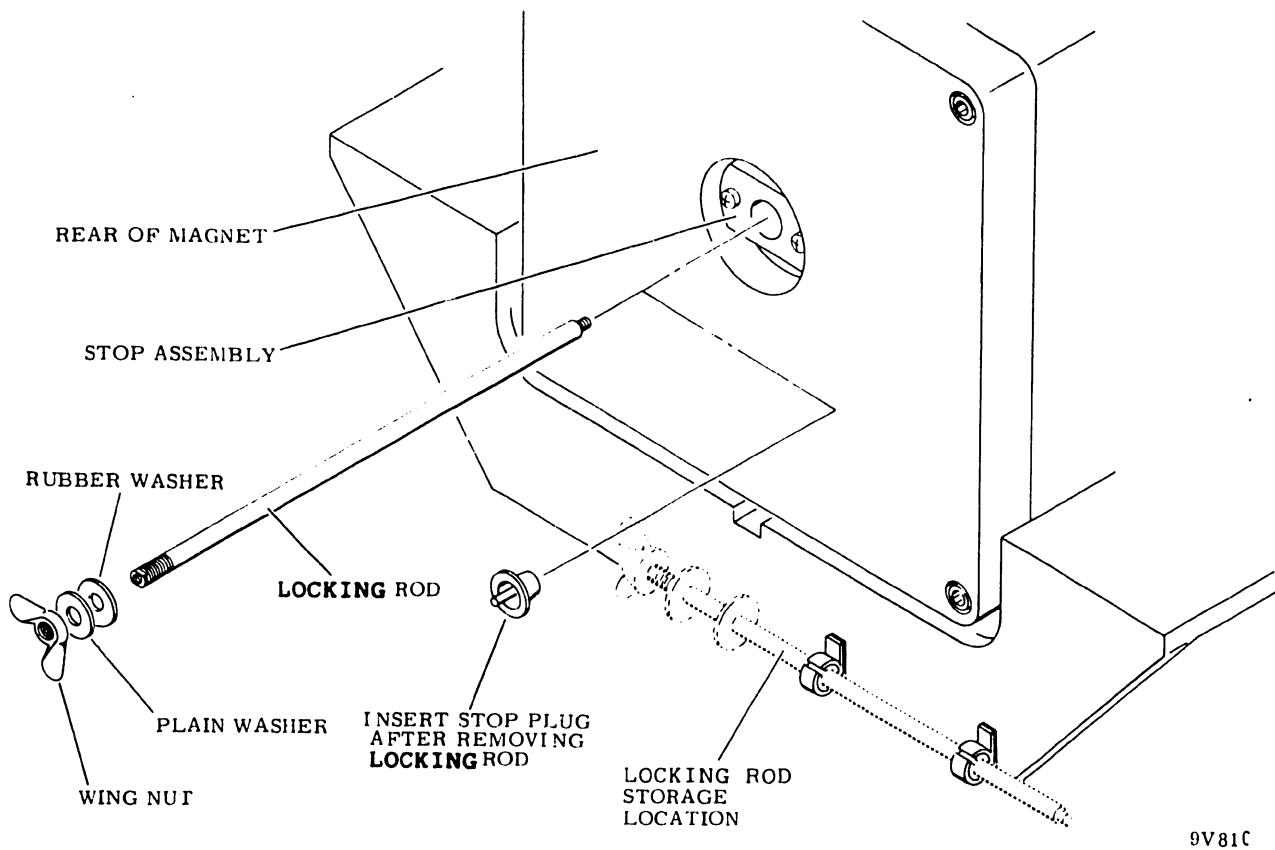
### **CARRIAGE LOCKING ROD REMOVAL**

The carriage locking rod assembly (for the HDA) must be removed after the one-hour temperature stabilization period has expired. Referring to figure 1-25, remove locking rod assembly by first removing wing nut and washers and then unscrewing the rod from the carriage. If the rod cannot be removed with fingers, a 3/16-inch open-end wrench may be used. Store the locking rod assembly in the clips provided on the rear of the deck. After removing the locking rod, insert plastic stop plug (S/C 02 and above, W/ 61384) in magnet hole to prevent moist air from getting into magnet. Stop plugs are shipped in the accessories package.

### **CAUTION**

The carriage locking rod assembly must be re-installed whenever the unit is moved even a short distance (for example, across the room). The wing nut must be tightened until a slight resistance is felt and then tightened 1/2 turn more.





9V81C

Figure 1-25. Carriage Locking Rod Removal

## INITIAL CHECKOUT

### Voltage Checks and Adjustments

1. Ensure that START switch is in OFF position (LED off.)
2. Place Local/Remote switch located on   KTX card in Local (down) position.
3. Check the following voltages at the logic chassis (A3):

<u>VOLTAGE</u>	<u>TOLERANCE</u>	<u>LOCATION</u>
+5 V	<u>+0.05 V</u>	A3A01-44A
-5.1 V	<u>+0.05 V</u>	A3A01-02A
+24 V	<u>+2.4 V</u>	A3A01-45A
-24 V	<u>+2.4 V</u>	A3A01-01A
+5 V MPU	<u>+0.05 V</u>	A3C03-43A
-36 V	<u>-7.2 +0 V</u>	A3B02-18A
+24 V MPU	<u>+2.4 V</u>	A3C02-18B

NOTE: All voltages are references to ground (GND) on the backpanel.

4. Voltage adjustments, if necessary, should be made according to Section 2C, Checks and Adjustments, of this manual.

### Linked Series Test

1. Enter the Diagnostic Test Mode (62) (Reference BZ7E1/7E2 Troubleshooting Manual, Publication 83323580).
2. Perform Linked Series test 03 for a minimum of 15 minutes.
3. Exit the Diagnostic Test Mode (63).

### Free Carriage Movement

Perform this procedure after removing the carriage locking rod from the unit. Check the device for free carriage movement as follows:

1. Place Local/Remote switch located on the   KTX card in Remote (up) position.

2. Insert carriage tool in the hole in the center of magnet, through the front hole in stop assembly, and screw it into carriage.
3. Disable voice coil by disconnecting either of the two quick-connect leads from the top of magnet assembly.
4. Place Local/Remote switch in Local (down) position.
5. Move carriage to the retracted position (away from the spindle) and hold in this position while drive motor comes up to speed.
6. Depress START switch (to light START indicator).
7. As soon as drive motor is up to speed (10 to 15 seconds), check for free carriage movement by moving carriage tool forward and back a few times. If the carriage binds, follow applicable steps in the HDA Removal and Replacement procedure in Section 2D of this manual. If the carriage moves freely, go to step 8.
8. Move carriage to retracted position (away from spindle) before stopping drive motor.
9. Release START switch to stop drive motor.
10. When spindle has stopped, place Local/Remote switch in Remote (up) position.
11. Remove carriage tool and replace voice coil lead removed in step 3.
12. Insert plastic stop plug in magnet hole to prevent moist air from entering magnet and HDA. Stop plugs are provided in drive accessories package.
13. Place Local/Remote switch in Local (down) position to return dc power to drive.

### **First Seek**

To start unit, press START switch. The drive motor will begin to cycle up. As the device reaches operating speed, it will perform a First Seek and the READY indicator will light.

## Ready Indication

When the READY indicator is on, it signifies that the power-up sequence has been successfully completed and the drive is ready for operation.

## FINAL CHECKOUT

### Average Access Time Check

1. Enter FTU Mode (60) and perform the "X to N" Seek Test (A7) for a minimum of 30 minutes to allow the drive to stabilize. Should an error occur, the Maximum Seek Velocity may be checked and adjusted using Diagnostic Test Mode, Test 28 (Reference Velocity Gain Check and Adjustment, Section 2C of this manual.). Exit FTU Mode (61).
2. Enter Diagnostic Test Mode (62) and perform Test 28, "Average Access Time." If necessary, adjust the average access time according to the Velocity Gain Check and Adjustment, Section 2C of this manual.

### Linked Series Tests

1. Perform the following Linked Series Tests:

04	Linked Series with Drive Ready	15 minutes, minimum
05	Linked Series, Tests 03 and 04	1 Pass minimum
2. Exit Diagnostic Test Mode (63) if no other tests are desired.

### System Checkout

Procedures for diagnosing proper operation of each device, as well as the FMD sub-system as a whole on a computer system will be determined by customer software and are outside the scope of this manual.

## REPACKAGING

If it becomes necessary to repackage the unit for reshipment, packaging instructions can be obtained from:

Packaging Engineer, Material Services Dept.  
Normandale Division  
Magnetic Peripherals, Inc.  
7801 Computer Ave.  
Minneapolis, MN 55435

When ordering packaging instructions, specify unit serial number and series code, as listed on the unit equipment identification plate.

**2**

**MAINT-  
ENANCE**

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## GENERAL

Section 2 contains preventive and corrective maintenance information. The corrective information contained here pertains to repair of the unit once a problem has been isolated.

All maintenance discussed in this section is limited to that which can be performed in the field, and unless otherwise specified, applies to all equipments listed in the front of this manual.

This section is divided into the following subsections:

- 2A General Maintenance Information: Contains general information that a person must be familiar with prior to performing any of the maintenance discussed in this manual.
- 2B Preventive Maintenance: Describes the preventive maintenance that must be performed in order to keep the unit in proper operating condition.
- 2C Checks and Adjustments: Provides the electrical checks and adjustments necessary to keep the unit operating within the system. All mechanical adjustments are provided in Repair and Replacement as part of replacement procedure.
- 2D Repair and Replacement: Describes replacement of unit assemblies and components that may be replaced or adjusted in the field (except for adjustments included in Checks and Adjustments).

**2A**

**GENERAL  
MAINTENANCE  
INFORMATION**



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## GENERAL

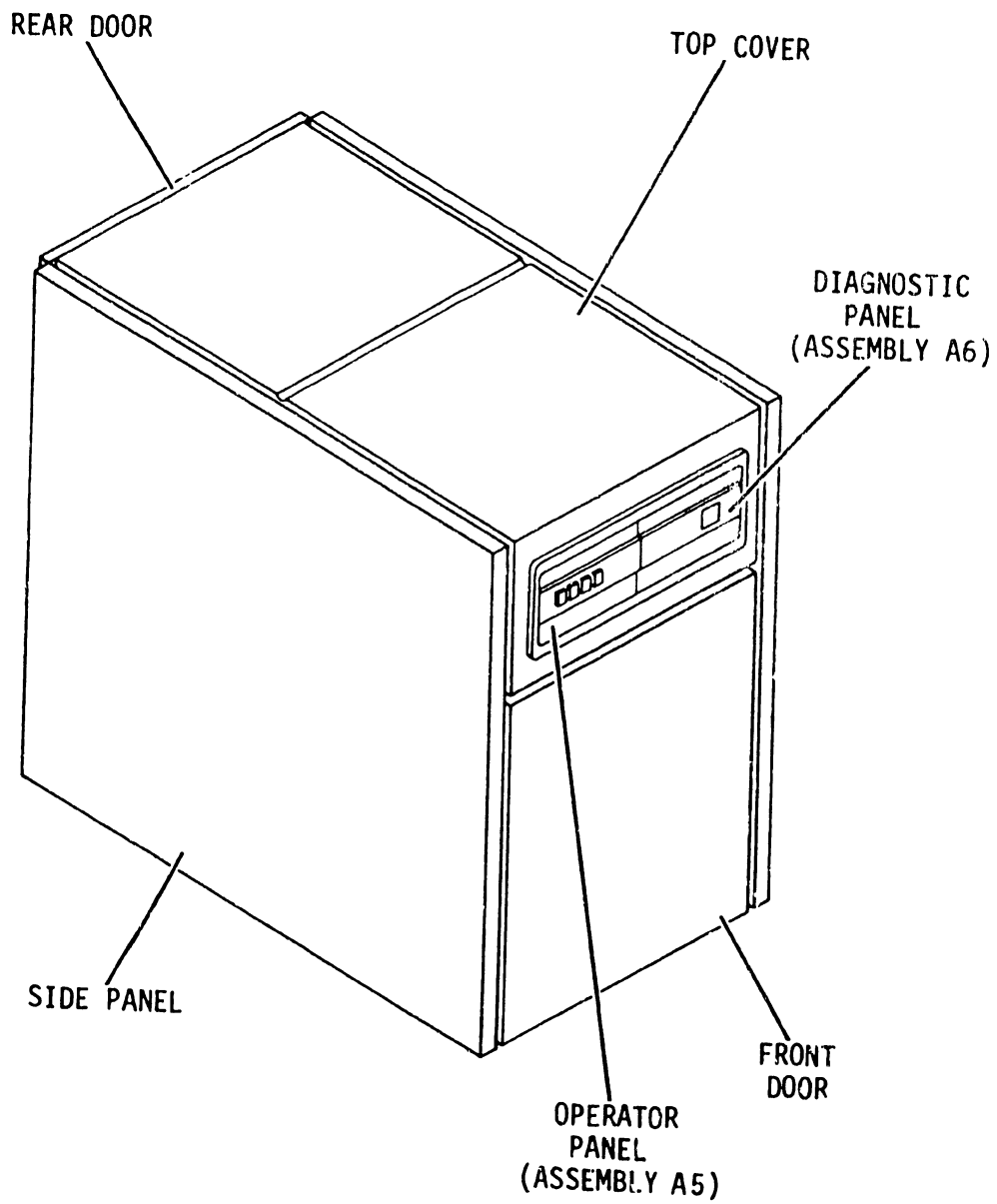
This section contains general maintenance information for the fixed module drive (FMD). Anyone performing maintenance on the unit should be familiar with the content of this section, as well as with the operating procedures contained in the Hardware Reference Manual. The information contained in this section relates to the following areas:

- Physical Locations - Identification of all major assemblies and those components which are most frequently encountered during maintenance.
- Safety Precautions - Safety precautions that must be observed when working on the unit.
- Maintenance Tools and Materials - Tools and materials required to perform maintenance.
- Gaining Access for Maintenance - How to get at the assemblies for maintenance.
- Electrostatic Discharge Protection - Correct procedures for handling logic cards and electronic assemblies which are sensitive to static electricity.
- Protective Devices - Thermal and overload protection for motors and logic chassis.

## PHYSICAL LOCATIONS

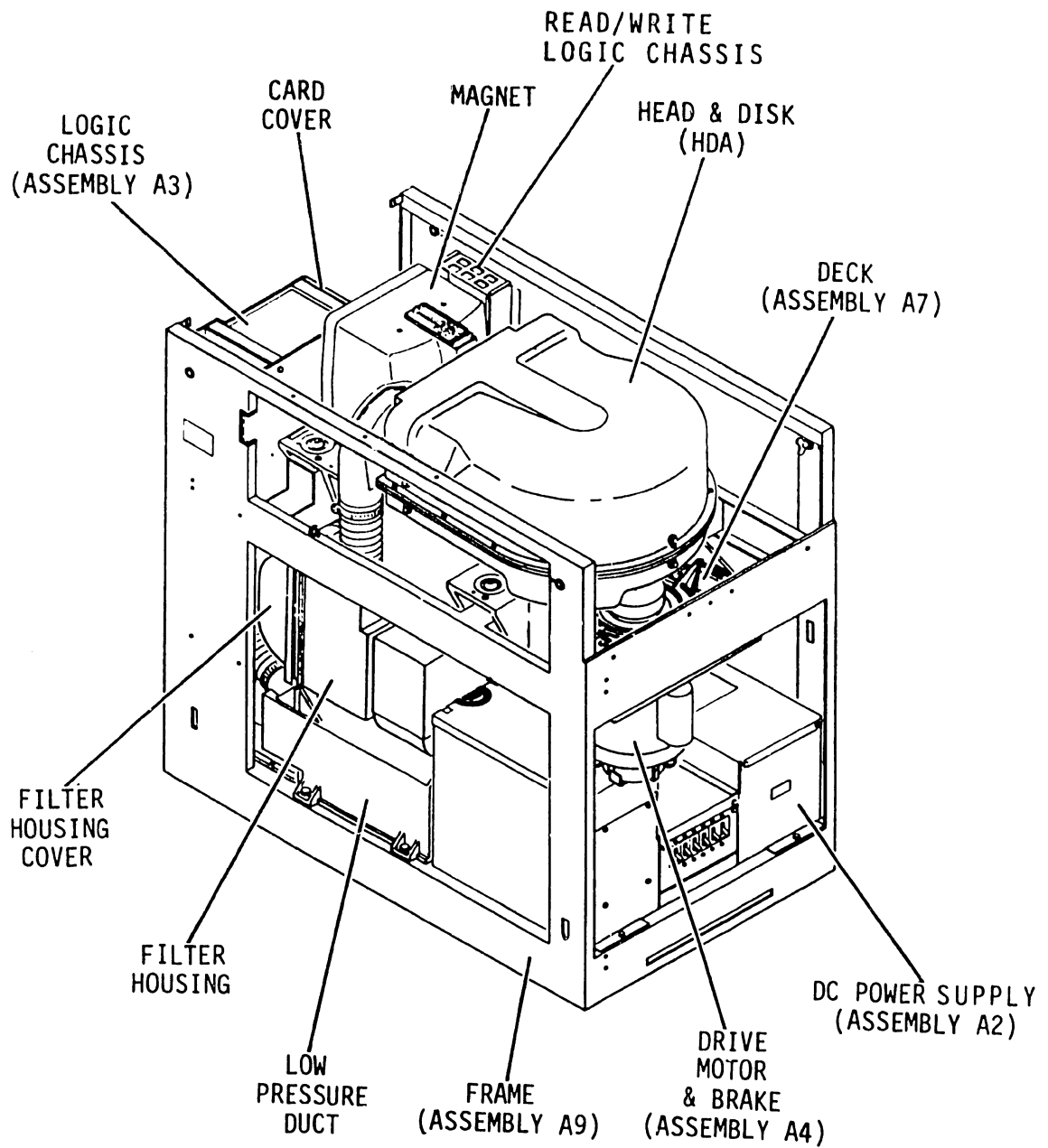
Figure 2A-1 may be used to identify and locate the major components in the FMD.

The major assemblies of the FMD have been assigned physical location codes such as A1, A2, etc. (See table 2A-1.) Each component or subassembly in the FMD carries one of these major assembly codes as part of its complete physical identification. Thus, A2TB3 identifies terminal board 3 in major assembly A2, whereas A1A1 and A1A2 identify the first two subassemblies in major assembly A1. If subassembly A1A1 could itself be broken down into still smaller assemblies, those would be designated A1A1A1, A1A1A2, etc. Figure 2A-1 locates and identifies all the physical location codes listed in table 2A-1.



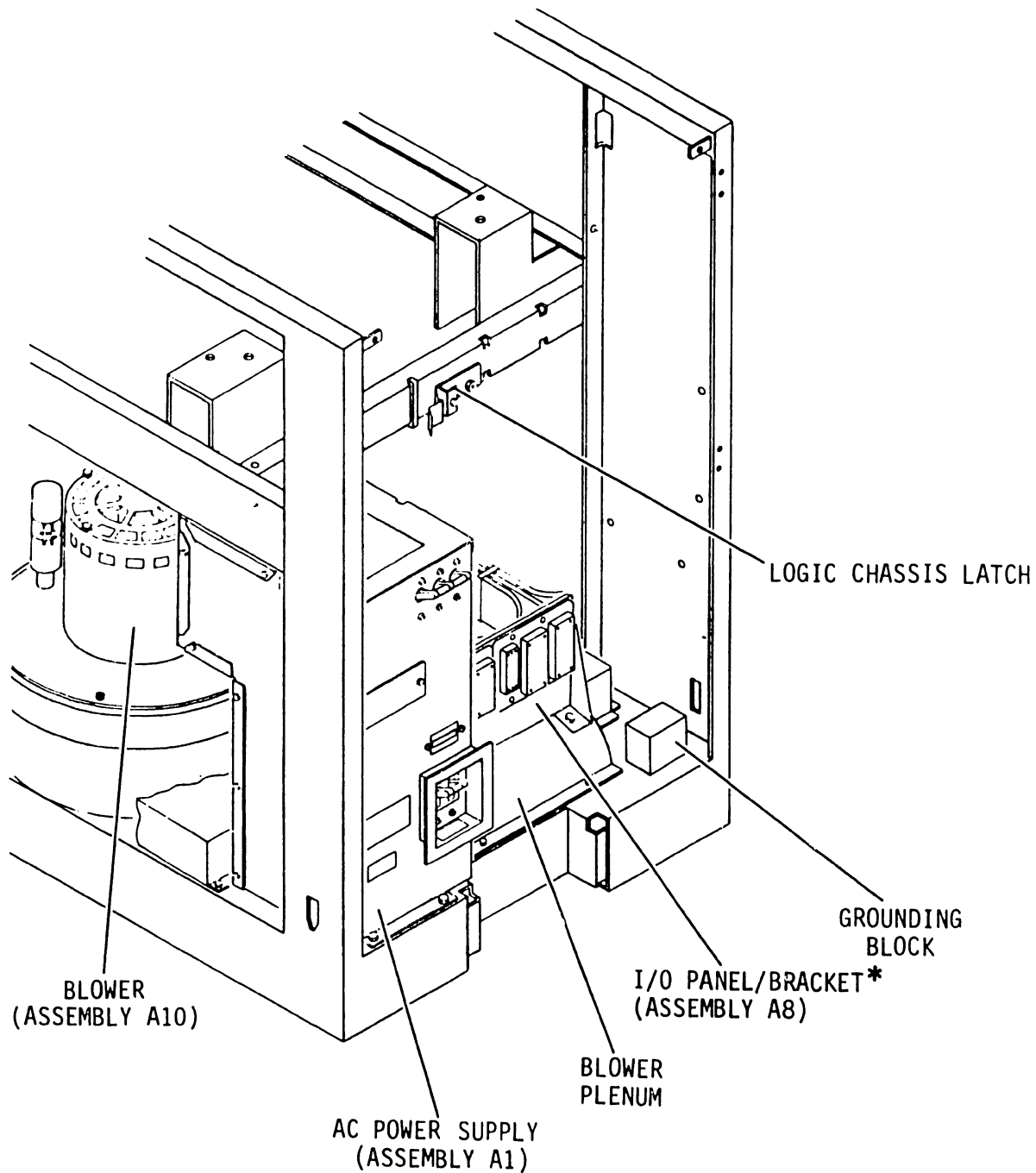
9V43-1

Figure 2A-1. Assembly Locator (Sheet 1 of 3)



9V43-2

Figure 2A-1. Assembly Locator (Sheet 2)



\* ILLUSTRATION SHOWS I/O PANEL USED FOR ROUND CABLE INTERFACE. I/O BRACKET IS SUBSTITUTED FOR I/O PANEL TO ACCOMODATE FLAT CABLE INTERFACE.

9V43-3B

Figure 2A-1. Assembly Locator (Sheet 3)

TABLE 2A-1. PHYSICAL LOCATION CODES

Code	Title
A1	AC Power Supply (PDU)
A2	DC Power Supply
A3	Logic Chassis
A4	Drive Motor
A5	Operator Panel
A6	Diagnostic Control Panel
A7	Deck
A8	I/O Panel/Bracket
A9	Frame and Frame Components
A10	Blower

### SAFETY PRECAUTIONS

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

- Whenever removing or replacing cards in the logic or read/write chassis, always remove dc power by placing the +24Y XFMR circuit breaker (S/C 03 and below W/O 61615) and ganged circuit breakers (S/C 03 and above W/ 61615) on the ac power supply to OFF.
- When replacing components or assemblies where exposure to ac line voltage is possible (ac/dc power supplies, blower, drive motor), always remove power from the unit by turning off the MAIN circuit breaker on the ac power supply.
- When performing any maintenance on the ac power supply, or any of its connecting cables, disconnect the unit power cord from the site power panel.
- Wear safety glasses whenever working with sealants.

- Keep watches and other permeable metal objects at least 600 centimeters (two feet) away from voice coil magnet.
- Observe precautions described in discussion on Handling Electrostatic Devices (this section) when handling cards containing MOS integrated circuits.
- Before removing power from the unit for maintenance, check the START switch on the operator panel to be certain that it is not lit. Press START switch to turn off the lights (and power down the drive motor).

## MAINTENANCE TOOLS AND MATERIALS

When performing preventive and corrective maintenance on any unit, certain special tools are required. A list of these tools, along with their part numbers, is provided in table 2A-2.

TABLE 2A-2. MAINTENANCE TOOLS AND MATERIALS

Description	CDC Part Number
Anaerobic Sealant, (Type 242)	95125322
Anaerobic Sealant, (Type C)	95044213
Card Extender (1/2)	82318800
Card Extender (Full)	82318700
Coil Installation Tool	87285300
Conductive Static Shielding Bag	90538604 (8 x 10)**
	90538606 (12 x 16)**
DC Multimeter	Fluke 3000A* or equivalent
* Denotes vendor part or model number	
** Vendor, Minnesota Mining & Mfg. Co.	
Table Continued on Next Page	

TABLE 2A-2. MAINTENANCE TOOLS AND MATERIALS (CONTD)

Description	CDC Part Number
Dielectric Grease	94657900
Dust Cover	77573100
Dust Cover	77573101
Go/No-Go Tool (Pulley Height Adjustment)	87199200
Carriage Tool	77795800
Hex Driver Tool (6 mm)	94391311
Hex Driver Tool	94391300
Hex Driver Tool	47481600
Lead Guide	47155100
Oscilloscope, Dual Trace	Tektronix 454* or equivalent
Pin straightener	87369400
Potentiometer Adjustment Tool	12212278
Scope Probe Tip (Hatchet Type)	12212885
Voice Coil Replacement Tools:	
Torque Screwdriver	12218425
Bit for above	12263477
Wire Wrap Bit, 30 Gage	12218402
Wire Wrap Gun, Electric	12259111
Wire Wrap Removal Tool 20-30 Gage	12259183
Wire Wrap Handle	12210851
Wire Wrap Sleeve, 30 Gage	12218403
Wrist Strap	12263496

## **GAINING ACCESS FOR MAINTENANCE**

### **GENERAL**

The doors and covers provide easy access to the major assemblies within the unit. The following discussions describe all of the FMD's accessing doors and covers.

### **CABINET DOORS**

Two self-latching doors allow access to components beneath the deck in the front and rear of the cabinet. To open either door, insert 6-millimetre hex tool driver into the lock and turn mechanism in either direction.

### **CABINET TOP COVERS**

The cabinet has two covers: one front top cover and one rear top cover. When raised, the front top cover provides access to the HDA and the front portion of the deck. To open the front top cover, open the front door and squeeze the latch in the front of the top cover. The front cover has a spring-loaded support.

The rear top cover provides access to the magnet and the rear of the deck. To open the rear top cover, open rear door and loosen the two screws attaching the rear trim strip to the frame. The rear top cover has a friction support.

### **SIDE PANELS**

Side panels are held in place with quarter-turn fasteners. To remove the side panels, open the front and rear doors. Release the quarter-turn fastener attaching the side panel to the frame and remove the ground cable from the frame to the side panel. Removal of the right side panel (viewed from the front of the unit) allows access to the blower assembly.

### **LOGIC CHASSIS**

The logic chassis is located at the rear of the unit and is accessible by opening the rear door. Releasing a catch on the logic chassis allows it to swing outward, thus permitting access to the logic cards and to other assemblies. The logic cards can be accessed by opening the card cover assembly. The



card cover assembly can be opened by turning a quarter-turn fastener located at left-center on the cover assembly. The card cover may be removed entirely by removing its hinges (in early units) or by lifting the panel out of its pivots (in later units).

### **AC POWER SUPPLY**

The ac power supply can be reached from the rear of the cabinet (by opening the rear door and swinging open the logic chassis). To reach the components within each ac power supply assembly, the unit must be removed from the drive.

### **DC POWER SUPPLY**

The dc power supply can be reached from the front of the unit (by opening the front door). To reach the components within dc power supply assembly remove the top covers and flip down the front circuit breaker panel.

## **ELECTROSTATIC DISCHARGE PROTECTION**

### **HANDLING ELECTROSTATICALLY SENSITIVE ASSEMBLIES**

All drive electronic assemblies are sensitive to static electricity, due to the electrostatically sensitive devices used within the drive circuitry. Although some of these devices such as metal-oxide semiconductors (MOS) on logic cards are extremely sensitive, all semiconductors as well as some resistors and capacitors may be damaged or degraded by exposure to static electricity.

Electrostatic damage to electronic devices may be caused by a direct discharge of a charged conductor, or by exposure to the static fields which surround charged objects. To avoid damage to drive electronic assemblies, service personnel must observe the following precautions when servicing the drive:

- Ground yourself to the drive - whenever the drive electronics are or will be exposed, connect yourself to ground with a wrist strap (see table 2A-2 for part number). Make the connection to any metal assembly or to the dc grounding block at the rear of the drive. As a general rule, remember that you, the drive, and the circuit cards must all be at ground potential to avoid potentially damaging static discharges.
- Keep cards in conductive bags - when circuit cards are not installed in the drive, keep them in conductive static shielding bags. These bags provide absolute protection from static discharge and from static fields surrounding charged objects. Remember that these bags are conductive and should not be placed where they might cause an electrical short circuit.
- Remove cards from bags only when you are grounded - all cards received from the factory are in static shielding bags, and should not be removed unless you are grounded.

#### **HANDLING ELECTROSTATICALLY SENSITIVE LOGIC CARDS**

Metal oxide semiconductor (MOS) integrated circuits are used on several logic cards in the unit. The logic cards are identified by orange colored injectors/ejectors. MOS integrated circuits are extremely sensitive and therefore require special handling to avoid damage caused by static electricity. Observe the following precautions when handling or working with logic cards using MOS integrated circuits:

- Turn off power before removing and installing the logic card.
- Ensure that anything or anyone coming in contact with the card is electrically connected to ground, including tools, the body, clothing, containers, etc.
- Touch the logic chassis to bleed off any accumulated static charge before removing or installing the card.
- Handle the card only by a non-circuit portion. Do not touch pins and circuit connection points.
- Never use an ohmmeter on cards having microprocessor assemblies.
- Always remove the microprocessor cards before using an ohmmeter on the drive.

- Place the card in a conductive shielded bag immediately following its removal from the unit. The card and the bag must be in contact with logic chassis ground before and during the time that the card is inserted or removed from the bag. The bag should have a warning label indicating that it contains an electrostatic-sensitive device. The logic card must remain in the bag or at a properly prepared work station whenever it is not installed in the logic chassis.

## **MOTOR OVERLOAD PROTECTION**

Protection against thermal overload is provided for all motors in the unit:

- The blower motor (50/60 Hz) is protected by a thermal switch contained within the motor. The switch automatically resets when the motor has cooled.
- The 50/60 Hz drive motor contains a built-in breaker that opens if the motor overheats. After the motor has cooled, the breaker can be reset by pressing the red reset button underneath the motor.

## **HDA AIR FLOW DETECT**

An air pressure switch mounted in the air duct senses the air flow entering the HDA. Failure to detect air flow causes the drive to drop power to the spindle motor and dc power supply. This error condition causes a unique error code to be automatically displayed on the diagnostic panel.

## **USE OF CARD EXTENDER**

Troubleshooting should be limited to the card level. Replacement of individual ICs or other discrete components on a card is strongly discouraged. Although a card extender is available, its use is not recommended except when absolutely necessary. The extender adds 25.4 cm (10 inches) to each signal path entering or leaving the card, and this added length could cause false error indications or other side effects completely unrelated to the original problem.

**2B**

**PREVEN-**

**TIVE**

**MAINT-**

**ENANCE**

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## PREVENTIVE MAINTENANCE SCHEDULE

There are three items of preventive maintenance:

- Replacing primary filter
- Checking effectiveness of spindle brake on each HDA
- Replacing absolute filter.

The first two of these are to be performed during the same maintenance period; the procedures are given below.

The absolute filter is to be replaced every 9000 operating hours or every eighteen months, whichever comes first.

### PRIMARY FILTER REPLACEMENT PROCEDURE

The primary filter should be replaced on a quarterly basis or after approximately 1500 hours of operation. This schedule will vary, depending upon the level of dust contamination in the operating area.

Refer to figure 2B-1 and replace the filter as follows:

1. Remove power from unit by placing MAIN ac circuit breaker to OFF.
2. Slide old filter out front of unit.
3. Install new filter (wire mesh surface up).
4. Restore unit power.

### SPINDLE STOP-TIME CHECK PROCEDURE

Failure of a brake to stop disk rotation within the prescribed 20 seconds can impose additional wear on the heads. No readily noticeable symptoms of this extra wear are exhibited during normal operation, so it is important that periodic checks of braking time be made if the HDA is to be kept performing at top efficiency.

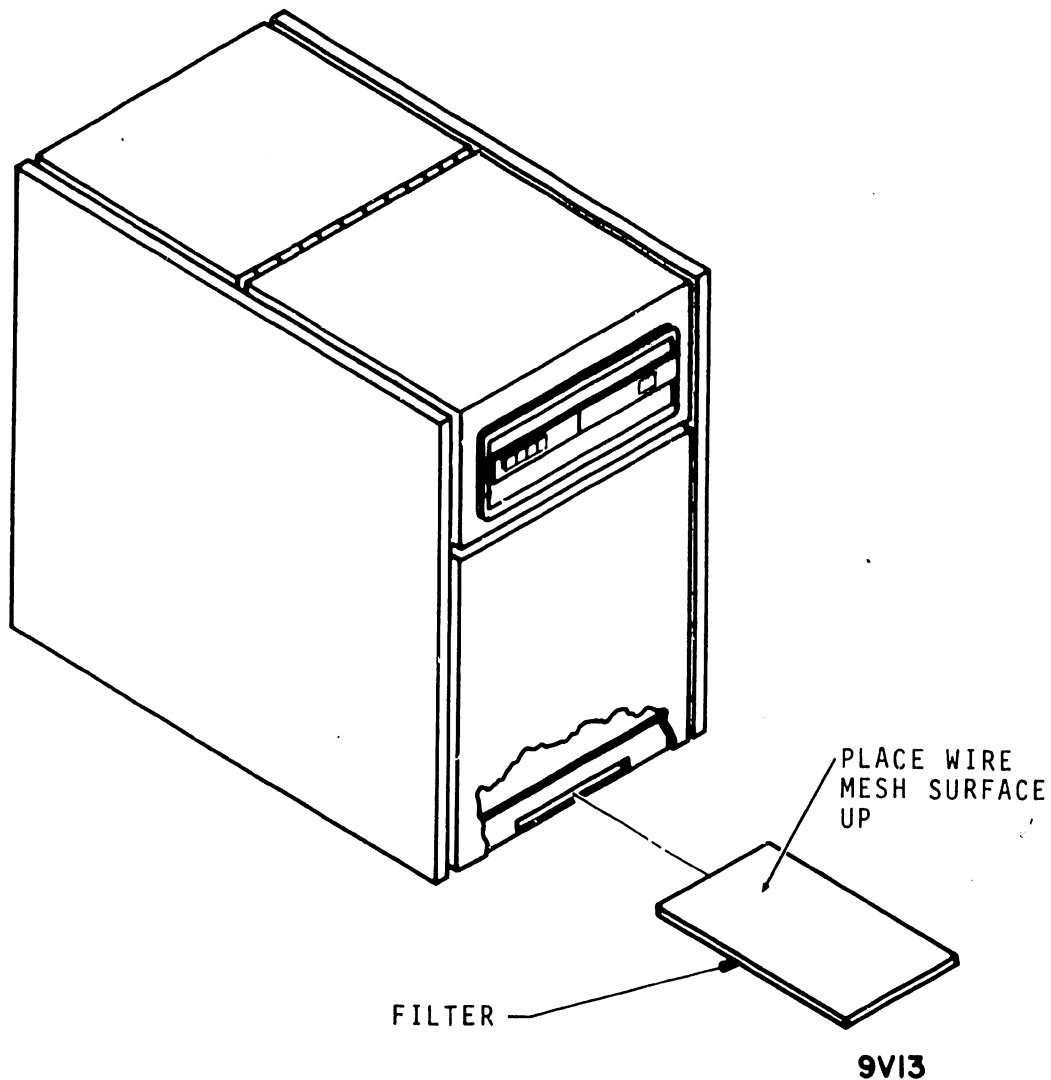


Figure 2B-1. Primary Filter Location

Perform the following procedure on a quarterly basis or after approximately 1500 hours of operation.

1. Apply power to the unit and activate the START switch on the operator panel.
2. Verify that HDA disk rotation has reached full operating speed (READY indicator lit).
3. Open the front door and lift the front top cover.
4. Using a watch (sweep-second hand or digital "seconds" readout), time the interval required for the disks to stop rotating after pressing the START switch to deacti-

vate the drive motor. The disks should stop within 20 seconds. Use either of the following methods to determine when the disks stop rotating.

- a. Six black boltheads around the hub of the disk pack will appear as a solid black line when the disks are up to speed, and will become individually distinguishable as the disks slow down.
  - b. If the boltheads are not visible, observe the drive motor's pulley (viewed directly below the HDA) to determine when rotation has stopped.
5. If the disks do not stop rotating within 20 seconds, remove power from the unit and replace the brake assembly in accordance with the procedure given in section 2D (Repair and Replacement) of this manual.

## **ABSOLUTE FILTER REMOVAL/REPLACEMENT**

### **NOTE**

Record date and hour meter reading on new filter before installing.

1. Remove power from the unit by placing MAIN circuit breaker to OFF.
2. Open rear door of unit.
3. Release logic chassis latch and swing logic chassis out of the way.
4. Release two jackscrews securing the filter cover to the unit. See figure 2B-2.
5. Remove old filter and install replacement filter. Note the air flow direction arrow in figure 2B-2. The new filter must be installed for proper air flow direction to prevent damage to the HDA
6. Replace filter cover.
7. Close and latch logic chassis.
8. Close rear door.
9. Restart blower motor and purge filter system for a minimum of five minutes before initiating drive motor rotation.

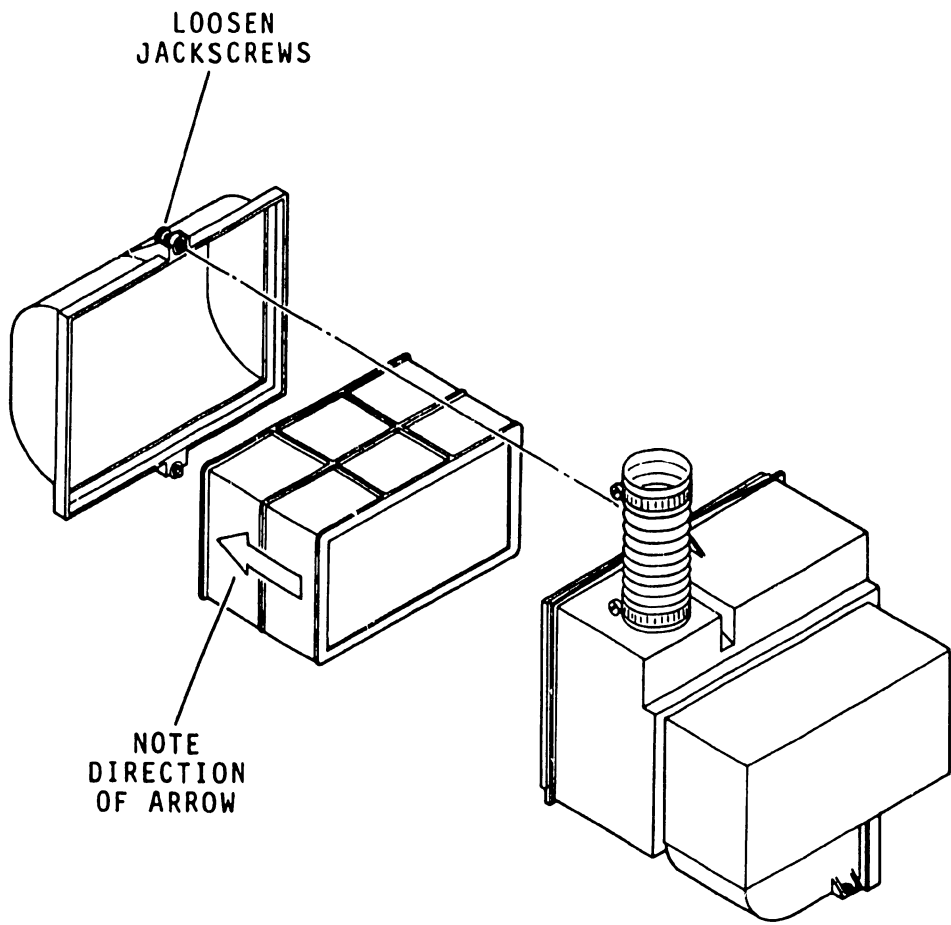


Figure 2B-2. Absolute Filter Replacement



**2C**  
**CHECKS**  
**AND**  
**ADJUST-**  
**MENTS**

**GENERAL**

This section provides information on the only electrical checks and adjustments that can be performed in the field. These checks and adjustments should only be performed as required elsewhere in this manual, or when it is suspected that the unit is not functioning properly.

**VOLTAGE CHECKS**

Power supply voltages are checked to determine that the dc voltages are within specifications. These checks (and adjustments if required) should be made prior to replacing any parts. This assures that malfunctioning is not due to improper voltage levels.

The voltage checks may be performed either by using a voltmeter or by using the diagnostic panel. Both methods are acceptable; however, the method using the voltmeter is the most accurate and the preferred method. The diagnostic panel reading may disagree with the voltmeter and in some cases may be out of spec if tolerances for voltage checks using voltmeter are used.

**VOLTAGE CHECKS USING VOLTMETER**

With the device performing 255-track repeated seeks, check the following voltages at the logic chassis (assembly A3) with a voltmeter:

<u>Voltage</u>	<u>Tolerance</u>	<u>Location</u>
+5 V	$\pm 0.05$ V	A3A01-44A
-5.1 V	$\pm 0.05$ V	A3A01-02A
+24 V	$\pm 2.4$ V	A3A01-45A
-24 V	$\pm 2.4$ V	A3A01-01A
-36 V	-7.2, +0 V	A3B02-18A
+24Y	$\pm 6.0$ V	A3C03-33A (+24Y) to A3C03-32A (+24Y Return)

All voltages are referenced to ground (GND) on the backpanel.

The +5 V MPU power supply should provide +5 V  $\pm 0.05$  V power and should be measured at A3C03-43A. The voltage is referenced to ground on the backpanel.

### VERSION 3.0 ALTERNATE VOLTAGE CHECKS WITH DIAGNOSTIC PANEL

In Version 3.0 drives, a diagnostic test may be executed to monitor voltages. If adjustment is required and allowed (see table below), the adjustment may be made while the diagnostic test is executing. Refer to voltage adjustments routines.

Voltages that may be monitored are listed below along with their test numbers.

TABLE 2C-1. Diagnostic Test Descriptions

Test Number	Test	Tolerances
76	-36 V Servo	-7.2 + 0 V
77	-15 V MPU	$\pm 1.5$ V
78	+15 V MPU	$\pm 1.5$ V
79	-24 V MPU	$\pm 6.0$ V
7A	+24 V MPU	$\pm 6.0$ V
7B	+5 V MPU*	$\pm 0.05$ V
7C	+5 V LOGIC*	+0.10 V -0.00 V
7D	-5 V LOGIC*	$\pm 0.05$ V
7E	+24 V LOGIC	$\pm 2.4$ V
7F	-24 V LOGIC	$\pm 2.4$ V

\* ADJUSTABLE VOLTAGES - Refer to Voltage Adjustments for procedure if adjustment is necessary.

#### NOTE

If +5V Logic is out of tolerance when read with the diagnostic panel and if adjustment is made using the diagnostic panel, adjust voltage to +5.05  $\pm$ 0.05 V.

Perform the following procedure to monitor the selected voltage. Adjustments may be done, if allowed, by observing the display.

#### VOLTAGE MONITORING WITH DIAGNOSTIC PANEL

1. Ensure that power is applied to the drive and all circuit breakers are on.

#### NOTE

Drive motor does not have to be powered up, nor does usage of the drive interfere with customer voltage monitoring.

2. Actuate CLEAR switch.
3. From table 2C-1, select the test number (76 thru 7F) for the voltage to be monitored. Test 7C (+5 V LOGIC) will be used in this example.
4. Set PARAMETER switches to 7C. Actuate LOAD switch. DISPLAY equals 007C.
5. Actuate INITIATE switch. DISPLAY equals 7CF0 (Test Running) for about one second. It then changes to XXYY, where XX is the voltage in tens and units while YY is the voltage in hundredths. In this example, the display is 0502, indicating that +5 V LOGIC supply is +05.02 volts. The display will vary as the voltage varies. For specific adjustment procedure, refer to +5 V adjustment procedure step 2.
6. Actuate INITIATE switch. Test stops with 7CF1 display (Test Stopped).

If a voltage fault occurs that prevents voltage monitoring from running, diagnostic test 6E (Set Voltage Margin Flag) may be executed before executing voltage monitoring, this allows voltage faults to be ignored.

If parameter 6E is used parameter 6F (Clear Voltage Margin Flag) must be used at the end of voltage monitoring.

## VOLTAGE ADJUSTMENTS

Only the output voltages of the +5 V and -5 V and the +5 V MPU power supplies are adjustable. The +5 V and the -5 V adjustment potentiometers are located inside the dc power supply as shown in figure 2C-1. The adjustment potentiometer for the +5 V MPU power supply is accessed from a slot in the back of the ac power supply as shown in figure 2C-2.

### +5 V ADJUSTMENT

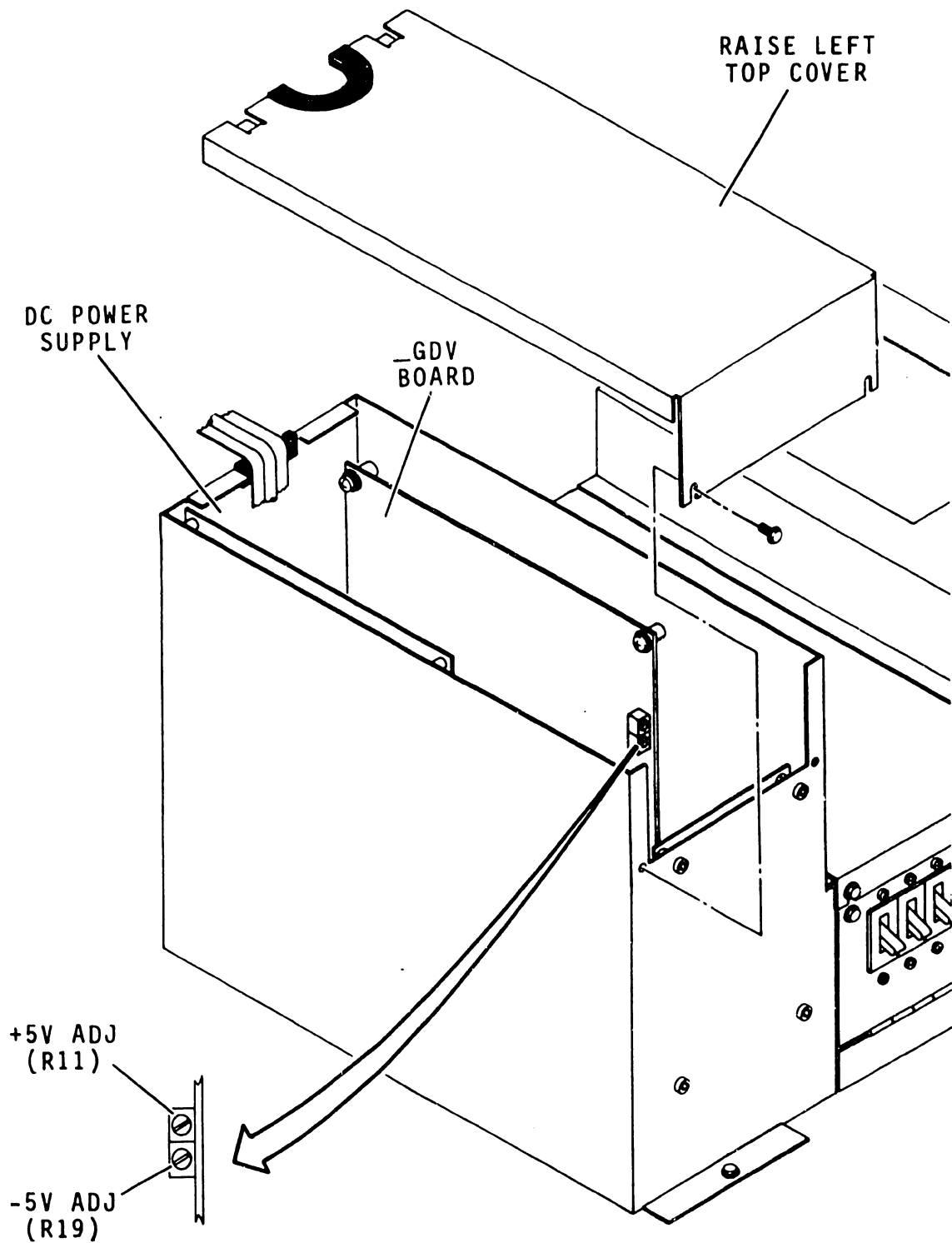
1. To adjust +5 V, connect dc multimeter probes to A3A01-44A and ground (GND).
2. Adjust +5 V potentiometer (see figure 2C-1) if needed to bring voltage to +5 V,  $\pm 0.05$  V.

### -5 V ADJUSTMENT

1. To adjust -5 V, connect dc multimeter probes to A3A01-02A and ground (GND).
2. Adjust -5 V potentiometer (see figure 2C-1) if needed to bring voltage to -5.1 V,  $\pm 0.05$  V.

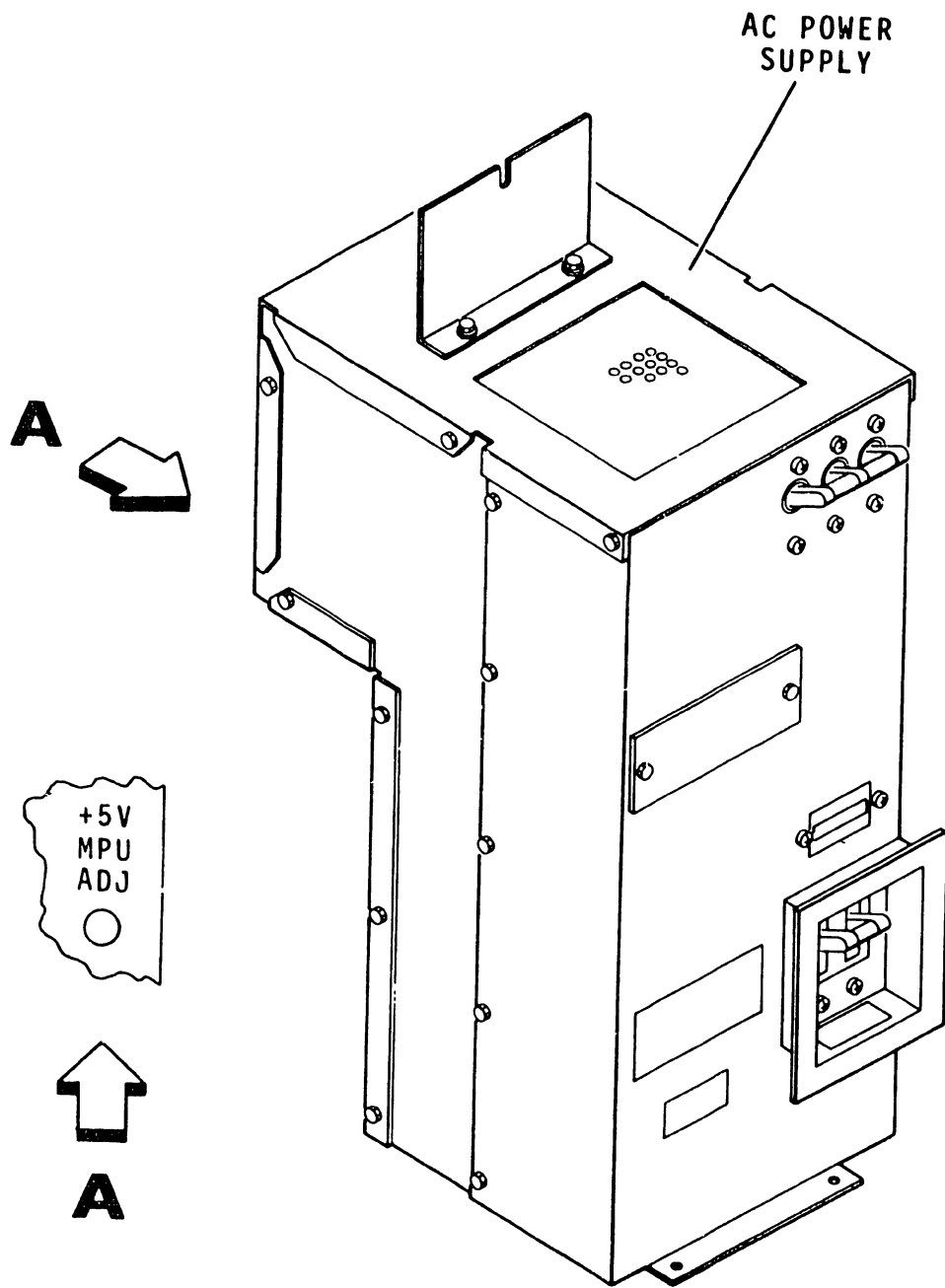
### +5 V MPU ADJUSTMENT

1. Remove right side panel.
2. To adjust +5 V MPU, connect dc multimeter probes to A3C03-43A and ground (GND) on the backpanel.
3. Adjust +5 V MPU potentiometer (see figure 2C-2) if needed to bring voltage to +5 V,  $\pm 0.05$  V.



9V31

Figure 2C-1. +5 V and -5 V Adjustment Potentiometers



9V32A

Figure 2C-2. +5 V MPU Adjustment Potentiometer

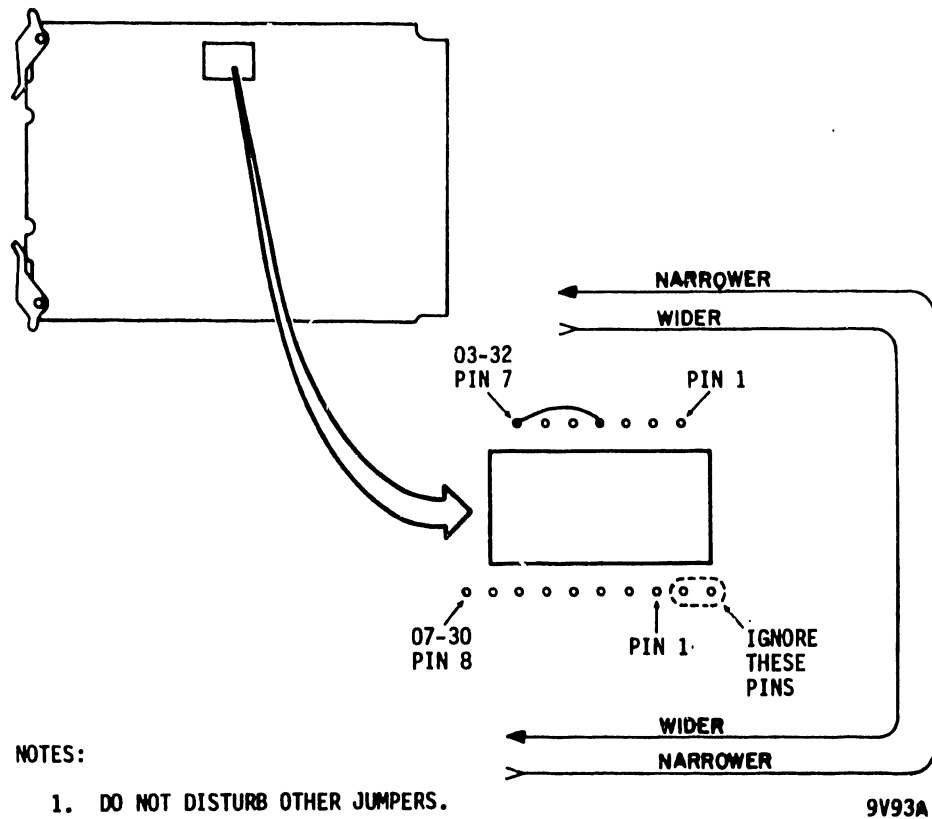
## SERVO PULSE WIDTH CHECK AND ADJUSTMENT

This procedure provides information on checking and if necessary, adjusting the servo pulse width.

Servo pulse width must be checked whenever the HDA or one of the servo cards is replaced. This procedure should be performed before starting the Velocity Gain Check and Adjustment procedure.

1. Start the drive motor and allow the drive to become Ready. Allow drive to run a minimum of two hours.
2. Monitor and sync positive on the signal at A03-13A(+Gated Servo Clock).
3. Measure the positive pulse width at the 1.5 V level of each edge. The servo pulse width should be 100  $\pm$ 15 ns. Perform remainder of this procedure only if the servo pulse width is wrong.
4. Power down the unit.
5. Remove KDX card at location A03.
6. Adjust the pulse width as follows:
  - (a) If pulse width is less than 85 ns, the pulse width must be made wider as shown in figure 2C-3. The other end of the jumper wire from location 0332 pin 7 determines the pulse width. Re-wrap the other end of the wire to next pin using the following order: 0332 pins 5 through pin 1, then 0730 pin 1 through pin 5. Each pin increases the pulse width approximately 10 ns.
  - (b) If pulse width exceeds 115 ns, the pulse width must be narrower as shown in figure 2C-3. The other end of the jumper wire from location 0332 pin 7 determines the pulse width. Re-wrap the other end of wire to next pin using the following order: 0730 pin 5 through pin 1, then 0332 pin 1 through pin 5. Each pin decreases the pulse width approximately 10 ns.





NOTES:

1. DO NOT DISTURB OTHER JUMPERS.

9V93A

Figure 2C-3. Servo Pulse Width Adjustment

7. Replace card. Close logic chassis and rear door.
8. Start spindle and allow drive to become Ready.
9. Allow drive to run for 15 additional minutes.
10. Measure pulse width and adjust as necessary.

## VELOCITY GAIN CHECK AND ADJUSTMENT

This procedure provides information for checking and if necessary, adjusting the velocity gain of the servo.

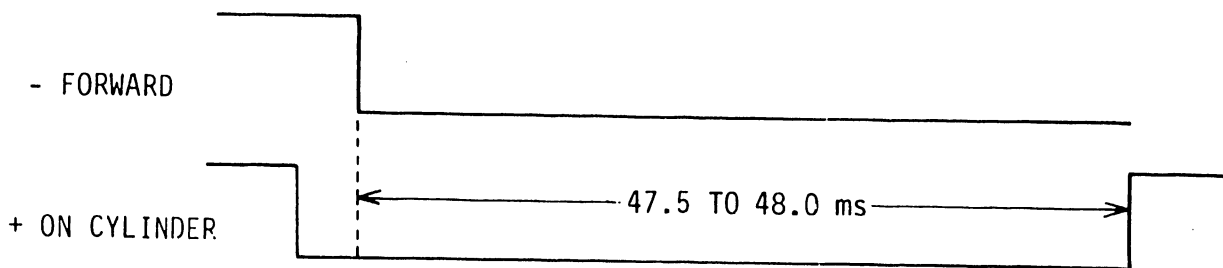
Check Velocity Gain whenever the HDA or one of the servo cards is replaced.

1. Perform Servo Pulse Width Check and Adjustment procedure.

### CAUTION

When using test and diagnostics tests, take the drive off line at the CPU, otherwise the system may hang.

2. Enter the Diagnostic Test Mode (62). (Refer to troubleshooting manual 83323580, Section 3).
3. Activate test 28. This test does a series of 842 track seeks and averages the time of groups and displays the time.
4. Raise front cover so diagnostic panel can be viewed from the rear of drive.
5. Adjust pot on A04 at coordinates 1309 while measuring time from trigger to rising edge of signal, until this interval equals 47.5 to 48.0 milliseconds as shown in figure 2C-4.
6. Stop test. Exit the Diagnostic Test Mode (63) and close front cover. Return unit to normal condition.



9V52A

Figure 2C-4. Velocity Gain Adjustment

## FTU READ CIRCUIT ADJUSTMENT

Either of two procedures can be used to check and adjust the read circuit potentiometer at coordinates 6814 on the MPU T and D memory card ( KTX at chassis location B03/C03). The first procedure, called Preliminary FTU Read Circuit Check, is the shorter of the two and is used to check the potentiometer's adjustment when any of the following conditions exist:

- If any card in read/write chain has been replaced, such as:

Write PLO (A01)

Write Compensation (A02)

Read Decoder (B06/C06)

Read PLO (C08)

Deck cards (read/write chassis, A7)

- If the drive motor or its belt have been replaced.
- If any of the servo cards (A03-A06) have been replaced.
- If the HDA has been replaced.

The second procedure, called Detailed FTU Read Circuit Check, must be performed when the  KTX (B03/C03) card has been replaced.

### NOTE

When using the FTU mode of testing with the drive's diagnostic control panel, be sure to take the drive off line at the CPU and be sure that the LOCAL/REMOTE switch on the  KTX card is in the LOCAL (down) position.

Note that in both testing procedures all data is entered into, and the results displayed on the diagnostic control panel.

### NOTE

In the following procedures, notes and DISPLAY letters and/or numbers enclosed in brackets ([ or ]) refer to units having a full complement of test and diagnostic capabilities (referred to as Version 3 drives in the Troubleshooting manual, publication number 83323580).

## PRELIMINARY FTU READ CIRCUIT CHECK

1. Ensure that drive is up to speed and READY. DISPLAY shows EEOC.
2. Place drive in FTU mode as follows:
  - a. Set PARAMETER switches to 60.
  - b. Actuate LOAD switch; DISPLAY shows 0060.
  - c. Actuate INITIATE switch; DISPLAY shows 60F1 [60F2].
  - d. READY indicator on operator panel will momentarily turn off. Drive is now in FTU mode.
3. Select an error-free head on CE cylinder (842) as follows:
  - a. Check label on top of HDA or HDA certification data (flaw map) for an error-free head number.
  - b. Actuate CLEAR switch.
  - c. Set PARAMETER switches to 85.
  - d. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows previous contents of head register.
  - e. Set PARAMETER switches to 00.
  - f. Actuate LOAD switch. DISPLAY shows 00XX where XX equals previous contents of head register.
  - g. Set parameter switches to error-free head number determined in step a above.
  - h. Actuate LOAD switch to load head register. Display shows 00XX where XX equals error-free head number.
  - i. Actuate INITIATE switch.
  - j. Set PARAMETER switches to 80 (Test/FTU option).
  - k. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of test/FTU option register.
  - l. Set PARAMETER switches to 00.

- m. Actuate LOAD switch. DISPLAY shows 00XX where XX equals previous contents of test/FTU option register.
  - n. Set PARAMETER switches to 48 (manual head, read error override); [set switches to 08 (read error override) for version 3 drives].
  - o. Actuate LOAD switch. DISPLAY shows 0048 [0008].
  - p. Actuate INITIATE switch.
3. Write data as follows:

NOTE

In FTU mode, write and read operations are permitted only on tracks within CE cylinder. (Servo is automatically driven to cylinder 842).

- a. Set PARAMETER switches to 8C (data pattern).
  - b. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of data pattern register.
  - c. Set PARAMETER switches to 00.
  - d. Actuate LOAD switch twice. DISPLAY shows 0000 (low frequency pattern).
  - e. Actuate INITIATE switch.
  - f. Set PARAMETER switches to AA (write).
  - g. Actuate LOAD switch. DISPLAY shows 00AA.
  - h. Actuate INITIATE switch to start write operation. DISPLAY shows AAFO. Test continues writing until INITIATE is actuated a second time to stop test. When test is stopped, DISPLAY shows AAFl.
  - i. Actuate CLEAR switch.
4. Read data as follows:
- a. Set PARAMETER switches to AB (read).
  - b. Actuate LOAD switch. DISPLAY shows 00Ab.

- c. Actuate INITIATE switch to start read operation. DISPLAY shows AbF0. Read test continues until INITIATE switch is actuated a second time to stop test. Allow read test to run continuously while performing \_KTX card potentiometer adjustment.
5. Adjust potentiometer on \_KTX card as follows:
  - a. Connect channel 1 of oscilloscope to backpanel location B03-05B (+Diagnostic Read Enable) and set it to trigger internally on positive slope.
  - b. Connect channel 2 of the oscilloscope to B03-08A (-Read Error).
  - c. Rotate potentiometer (bottom pot at card coordinates 6814) clockwise until negative pulses occur at B03-08A (channel 2 on oscilloscope). Now rotate potentiometer counterclockwise (counting turns as you go) until negative pulses re-occur at B03-08A. Set potentiometer halfway between these two limits.
  - d. Actuate INITIATE switch to stop read operation.
  - e. Actuate CLEAR switch.
6. Perform low frequency read data verification test as follows:
  - a. Set PARAMETER switches to 80 (Test/FTU option).
  - b. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of test/FTU option register.
  - c. Set PARAMETER switches to 00.
  - d. Actuate LOAD switch.
  - e. Set PARAMETER switches to 40 (manual head) [00].
  - f. Actuate LOAD switch. DISPLAY shows 0040 [0000].
  - g. Actuate INITIATE switch.
  - h. Set PARAMETER switches to AB (read).
  - i. Actuate LOAD switch. DISPLAY shows 00Ab.
  - j. Actuate INITIATE switch to start read operation.

- k. Drive must perform the read operation without error (NO AbF1 [AbF3] shown on DISPLAY) for three minutes, minimum.
  - l. Actuate INITIATE switch to stop read operation.
  - m. Actuate CLEAR switch.
7. Perform the high frequency read data verification test as follows:
- a. Set PARAMETER switches to 8C (data pattern).
  - b. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of data pattern register.
  - c. Actuate LOAD switch twice to load data pattern upper and lower (high frequency pattern). DISPLAY shows 8C8C.
  - d. Actuate INITIATE switch.
  - e. Set PARAMETER switches to AA (write).
  - f. Actuate LOAD switch. DISPLAY shows 00AA.
  - g. Actuate INITIATE switch to start write operation. Write test continues until INITIATE switch is actuated a second time to stop test.
  - h. Set PARAMETER switches to AB (read).
  - i. Actuate LOAD switch. DISPLAY shows 00Ab.
  - j. Actuate INITIATE switch to start read operation. DISPLAY shows AbF0.
  - k. Drive must perform read operation without error (NO AbF1 [AbF3] shown on DISPLAY) for three minutes, minimum.
  - l. Actuate INITIATE switch to stop read operation.
  - m. Set PARAMETER switches to 8C (data pattern).
  - n. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of data pattern register.
  - o. Set PARAMETER switches to 00.

- p. Actuate LOAD switch twice.
- q. Actuate INITIATE switch.
- r. Set PARAMETER switches to AB (read).
- s. Actuate INITIATE switch to start read operation. DISPLAY shows AbF1 [AbF3].
- t. Drive will perform read operation and stop; DISPLAY must show error of AbF1 [AbF3].
- u. Actuate CLEAR switch.
- v. Set PARAMETER switches to 61 (exit FTU mode).
- w. Actuate LOAD switch. DISPLAY shows 0061.
- x. Actuate INITIATE switch. DISPLAY shows 61F1 [61F2]. Unit is now out of FTU mode.
- y. Actuate CLEAR switch.

#### DETAILED FTU READ CIRCUIT CHECK

Use this procedure to check the adjustment of the bottom potentiometer at card coordinates 6814 when the   KTX card has been replaced.

#### NOTE

When using the FTU mode of testing with the drive's diagnostic control panel, be sure to take the drive off line at the CPU and be sure that the LOCAL/REMOTE switch on the   KTX card is in the LOCAL (down) position.

1. Set MAIN circuit breaker ALCB1 to off (down) position to remove power from unit.
2. Remove   KTX card from location B03/C03 in logic chassis.
3. Using an ohmmeter, preset bottom potentiometer at card coordinates 6814 to 700 ohms.
4. Re-install   KTX card into logic chassis on a card extender [Extender not needed for version 3 drives].



5. Apply power to drive via ALCB1 and note the letters and numbers on diagnostic control panel DISPLAY. It should show EEOC (completed first seek).
6. Place drive in FTU mode as follows:
  - a. Set PARAMETER switches to 60.
  - b. Actuate LOAD switch; DISPLAY shows 0060.
  - c. Actuate INITIATE switch; DISPLAY shows 60F1 [60F2].
  - d. READY indicator on operator panel will momentarily turn off. Drive is now in FTU mode.
7. Select an error-free head on CE cylinder (842) as follows:
  - a. Check label on top of HDA or HDA certification data (flaw map) for an error-free head number.
  - b. Actuate CLEAR switch.
  - c. Set PARAMETER switches to 85.
  - d. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of head register.
  - e. Set PARAMETER switches to 00.
  - f. Actuate LOAD switch; DISPLAY shows 00XX where XX equals previous contents of head register.
  - g. Set parameter switches to error-free head number determined in step a above.
  - h. Actuate LOAD switch; DISPLAY shows 00XX where XX equals error-free head number.
  - i. Actuate INITIATE switch.
  - j. Set PARAMETER switches to 80 (Test/FTU option).
  - k. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of test/FTU option register.
  - l. Set PARAMETER switches to 00.
  - m. Actuate LOAD switch. DISPLAY shows 00XX where XX equals previous contents of test/FTU option register.

- n. Set PARAMETER switches to 48 (manual head, read error override); [set switches to 08 (read error override)].
  - o. Actuate LOAD switch. DISPLAY shows 0048 [0008].
  - p. Actuate INITIATE switch.
8. Write data as follows:

NOTE

In FTU mode, write and read operations are permitted only on tracks within CE cylinder. (Servo is automatically driven to cylinder 842).

- a. Set PARAMETER switches to 8C (data pattern).
  - b. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of data pattern register.
  - c. Set PARAMETER switches to 00.
  - d. Actuate LOAD switch twice; DISPLAY shows 0000 (low frequency pattern).
  - e. Actuate INITIATE switch.
  - f. Set PARAMETER switches to AA (write).
  - g. Actuate LOAD switch. DISPLAY shows 00AA.
  - h. Actuate INITIATE switch to start write operation. DISPLAY shows AAFO. Test continues writing until INITIATE is actuated a second time to stop test. When test is stopped, DISPLAY shows AAF1.
  - i. Actuate CLEAR switch.
9. Read data as follows:
- a. Set PARAMETER switches to AB (read).
  - b. Actuate LOAD switch. DISPLAY shows 00Ab.
  - c. Actuate INITIATE switch to start read operation. DISPLAY shows AbFO. Read test continues until INITIATE switch is actuated a second time to stop test.

d. Allow read test to run continuously while checking the -FTU R/(Not)W Window pulse or while performing KTX card potentiometer adjustment.

10. Check -FTU R/(Not)W Window pulse as follows:

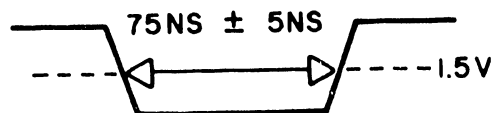
a. Connect channel 1 of an oscilloscope to pin 9 of chip at card coordinates 6539. Do not use a chip clip. Connect oscilloscope's probe ground wire to the card's ground foil. Set oscilloscope to trigger internally on negative slope (The logic element being monitored is shown on cross reference sheet 1212 in the logic diagrams manual, publication number 83323570.). [For version 3 drives, connect channel 1 of an oscilloscope to backpanel pin C03-42A. Connect oscilloscope's probe ground wire to C03-39A.]

b. Measure pulse width of -FTU R/(Not)W Window pulse at the 1.5 volt level. Figure 2C-5 shows the approximate shape of the pulse and the tolerance permitted.

NOTE

Steps 11-14 do not apply to version 3 drives.

11. Remove power from the drive by setting MAIN circuit breaker AlCB1 to off (down) position.



9V106

Figure 2C-5. -FTU R/(Not)W Window Pulse

12. Remove KTX card from extender, remove extender from logic chassis, and reinstall KTX card in logic chassis.

13. Apply power to drive via A1CB1 and note the letters and numbers on diagnostic control panel DISPLAY. It should show EEOC (completed first seek).
14. Repeat steps 6 through 9c.
15. Adjust potentiometer on \_KTX card as follows:
  - a. Connect channel 1 of oscilloscope to backpanel location B03-05B (+Diagnostic Read Enable) and set it to trigger internally on positive slope.
  - b. Connect channel 2 of the oscilloscope to B03-08A (-Read Error).
  - c. Rotate potentiometer (bottom pot at card coordinates 6814) clockwise until negative pulses occur at B03-08A (channel 2 on oscilloscope). Now rotate potentiometer counterclockwise (counting turns as you go) until negative pulses re-occur at B03-08A. Set potentiometer halfway between these two limits.
  - d. Actuate INITIATE switch to stop read operation.
  - e. Actuate CLEAR switch.
16. Perform low frequency read data verification test as follows:
  - a. Set PARAMETER switches to 80 (Test/FTU option).
  - b. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of test/FTU option register.
  - c. Set PARAMETER switches to 00.
  - d. Actuate LOAD switch.
  - e. Set PARAMETER switches to 40 (manual head) [00].
  - f. Actuate LOAD switch. DISPLAY shows 0040 [0000].
  - g. Actuate INITIATE switch.
  - h. Set PARAMETER switches to AB (read).
  - i. Actuate LOAD switch. DISPLAY shows 00Ab.
  - j. Actuate INITIATE switch to start read operation.

- k. Drive must perform the read operation without error (NO AbF1 [AbF3] shown on DISPLAY) for three minutes, minimum.
  - l. Actuate INITIATE switch to stop read operation.
  - m. Set PARAMETER switches to 8C (data pattern).
  - n. Actuate LOAD switch. DISPLAY shows contents of data pattern register.
  - o. Actuate LOAD switch twice to load data pattern upper and lower (high frequency pattern). DISPLAY shows 8C8C.
  - p. Set PARAMETER switches to AB (read).
  - q. Actuate LOAD [and INITIATE] switches.
  - r. Drive will perform read operation and stop; DISPLAY must show error of AbF1 [AbF3].
  - s. Actuate CLEAR switch.
17. Perform the high frequency read data verification test as follows:
- a. Set PARAMETER switches to AA (write).
  - b. Actuate LOAD switch. DISPLAY shows 00AA.
  - c. Actuate INITIATE switch to start write operation. DISPLAY shows AAF0. Write test continues until INITIATE switch is actuated a second time to stop test.
  - d. Set PARAMETER switches to AB (read).
  - e. Actuate LOAD switch. DISPLAY shows 00Ab.
  - f. Actuate INITIATE switch to start read operation. DISPLAY shows AbF0.
  - g. Drive must perform read operation without error (NO AbF1 [AbF3] shown on DISPLAY) for three minutes, minimum.
  - h. Actuate INITIATE switch to stop read operation.
  - i. Actuate CLEAR switch.

18. Perform the write/read test as follows:
  - a. Set PARAMETER switches to 8C (data pattern).
  - b. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of data pattern register.
  - c. Actuate LOAD switch twice. DISPLAY shows 8C8C.
  - d. Actuate INITIATE switch.
  - e. Set PARAMETER switches to AC (write/read).
  - f. Actuate LOAD switch. DISPLAY shows 00AC.
  - g. Actuate INITIATE switch to start write/read operation. DISPLAY shows ACF0.
  - h. Drive must write/read without error (NO ACF1 [ACF3] on DISPLAY) for three minutes, minimum.
  - i. Actuate INITIATE switch again to stop write/read operation.
  - j. Set PARAMETER switches to 8C (data pattern).
  - k. Actuate LOAD [and INITIATE] switch[es]; DISPLAY shows contents of data pattern register.
  - l. Set PARAMETER switches to 00.
  - m. Actuate LOAD switch twice. DISPLAY shows 0000.
  - n. Actuate INITIATE switch.
  - o. Set PARAMETER switches to AC (write/read).
  - p. Actuate LOAD switch. DISPLAY shows 00AC.
  - q. Actuate INITIATE switch to start write/read operation. DISPLAY shows ACF0.
  - r. Drive must write/read without error (NO ACF1 [ACF3] on DISPLAY) for three minutes, minimum.
  - s. Actuate INITIATE switch again to stop write/read operation. DISPLAY shows ACF1.
  - t. Actuate CLEAR switch.

- u. Set PARAMETER switches to 61 (exit FTU mode).
- v. Actuate LOAD switch. DISPLAY shows 0061.
- w. Actuate INITIATE switch. DISPLAY shows 61F1 [61F2]  
and drive is out of FTU mode.
- x. Actuate CLEAR switch.

**2D**

**REPAIR**

**AND**

**REPLACE-**

**MENT**



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## GENERAL

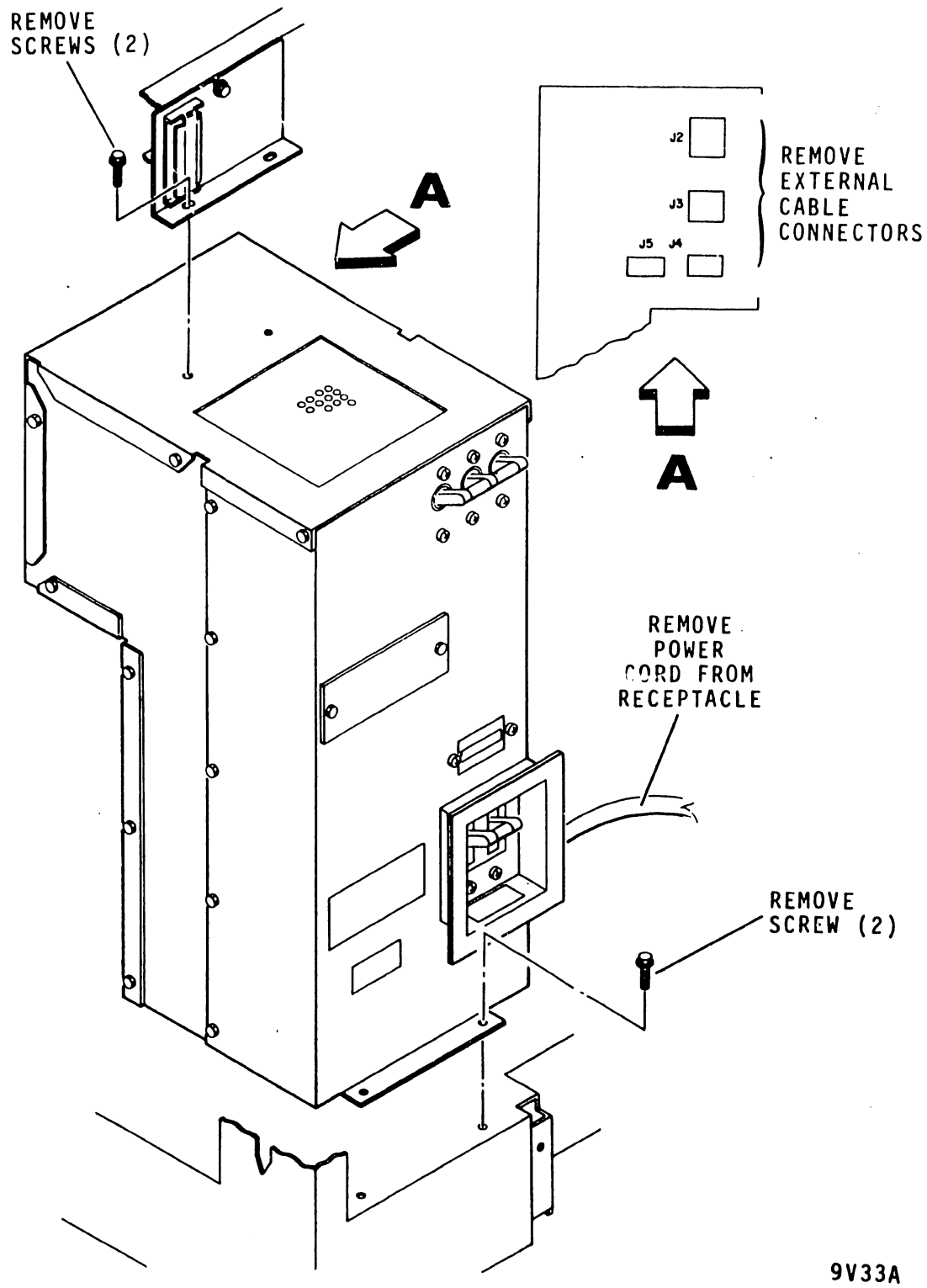
This section contains repair and replacement procedures for the field-replaceable components and assemblies in the FMD. The exploded views presented in the Parts Data section (3A) will be a great help in carrying out the removal/replacement procedures described here. For the most part, the drawings in this section (2D) relate to adjustments that must be made during the repair or replacement process.

The procedures begin with the assumption that the unit is properly positioned for servicing, i.e. service clearances are available if required, etc. A second assumption is that that the person performing the maintenance is thoroughly familiar with the operation of the FMD (and system), and with the information in the General Maintenance (2A) portion of this manual.

## AC POWER SUPPLY

To remove the ac power supply, proceed as follows (see figure 2D-1):

1. Remove power from the drive by placing MAIN circuit breaker to OFF. Remove power cord from receptacle.
2. Open rear door and swing logic chassis open.
3. Disconnect cables from J2 through J5 on the ac power supply.
4. Remove the screws (4) securing the power supply to the frame.
5. The ac power supply may now be removed by sliding it out the rear of the cabinet.
6. Install repaired power supply, or its replacement, by reversing the above procedure.
7. If repair involves replacement of VLV card within the ac power supply, continue with step 8, otherwise proceed to step 9.



9V33A

Figure 2D-1. AC Power Supply Replacement

8. Power up unit and adjust +5 V MPU voltage regulator as described in section 2C.
9. Close logic chassis and rear door.

### **AIR FILTER ASSEMBLY REPLACEMENT**

The unit has two air filters: a primary filter and an absolute filter. Replacement information for these filters is in Section 2B - Preventive Maintenance.

### **BLOWER MOTOR ASSEMBLY REPLACEMENT**

The following procedure describes removal and replacement of the blower motor assembly is shown in figure 2D-2.

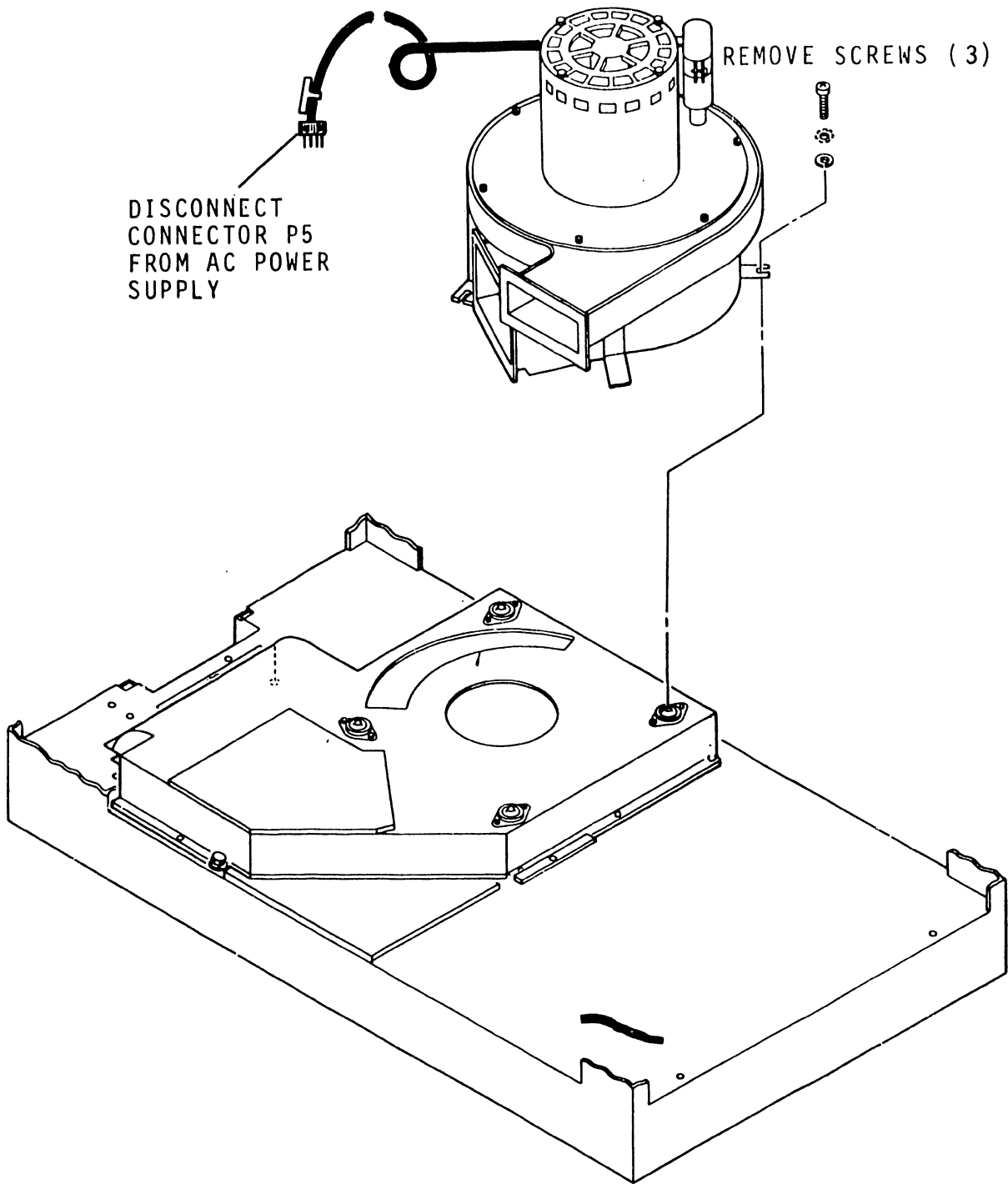
1. Remove power from the unit by placing MAIN circuit breaker to OFF.
2. Remove right side panel (see description of side panel replacement).
3. Disconnect blower assembly connector P5 from ac power supply.
4. Remove screws (3) and washers (3) securing blower motor assembly to vibration mounts.
5. Remove blower motor assembly through the right side of the unit.
6. Install replacement blower assembly by reversing the above procedure for removing the blower motor assembly.

### **FRONT AND REAR DOOR REPLACEMENT**

#### **NOTE**

Side panels must be removed before removing the doors.

Front and rear doors are removed by simply loosening the fastons and lifting up on the open door until the hinge pins clear the hinges. The top cover (front or rear) may have to be raised to provide vertical clearance for lifting the door. Remove the ground strap if the door is to be set aside or replaced.



9V35 A

Figure 2D-2. Blower Motor Replacement

## **SIDE PANEL REPLACEMENT**

The following procedure describes the removal and replacement of side panels. Refer to figure 2D-3.

1. Open front and rear doors.
2. Open front and rear top covers.
3. Turn quarter-turn fasteners (2) to release side panel from frame.
4. Disconnect ground strap from side panel.
5. Lift side panel upward and away from frame until hangers clear slots in frame.
6. Install side panels by reversing steps 1 through 4.

## **OPERATOR PANEL REPLACEMENT**

The following procedure describes removal and replacement of the operator panel switches and indicators.

1. Remove power from unit by placing MAIN circuit breaker to OFF.
2. Remove inside protective cover behind operator panel. See figure 2D-4.
3. Disconnect slide-on connectors from switch/indicator to be replaced. Tag wires when removing them to ensure that they are reinstalled on proper terminal. See figure 2D-5.
4. Remove switch/indicator by pushing forward through the front of the panel.

### **NOTE**

When replacing protective cover, ensure wires are located in cut-out of protective cover to prevent pinching of wires.

5. Install new switch/indicator by reversing steps 1 through 4.

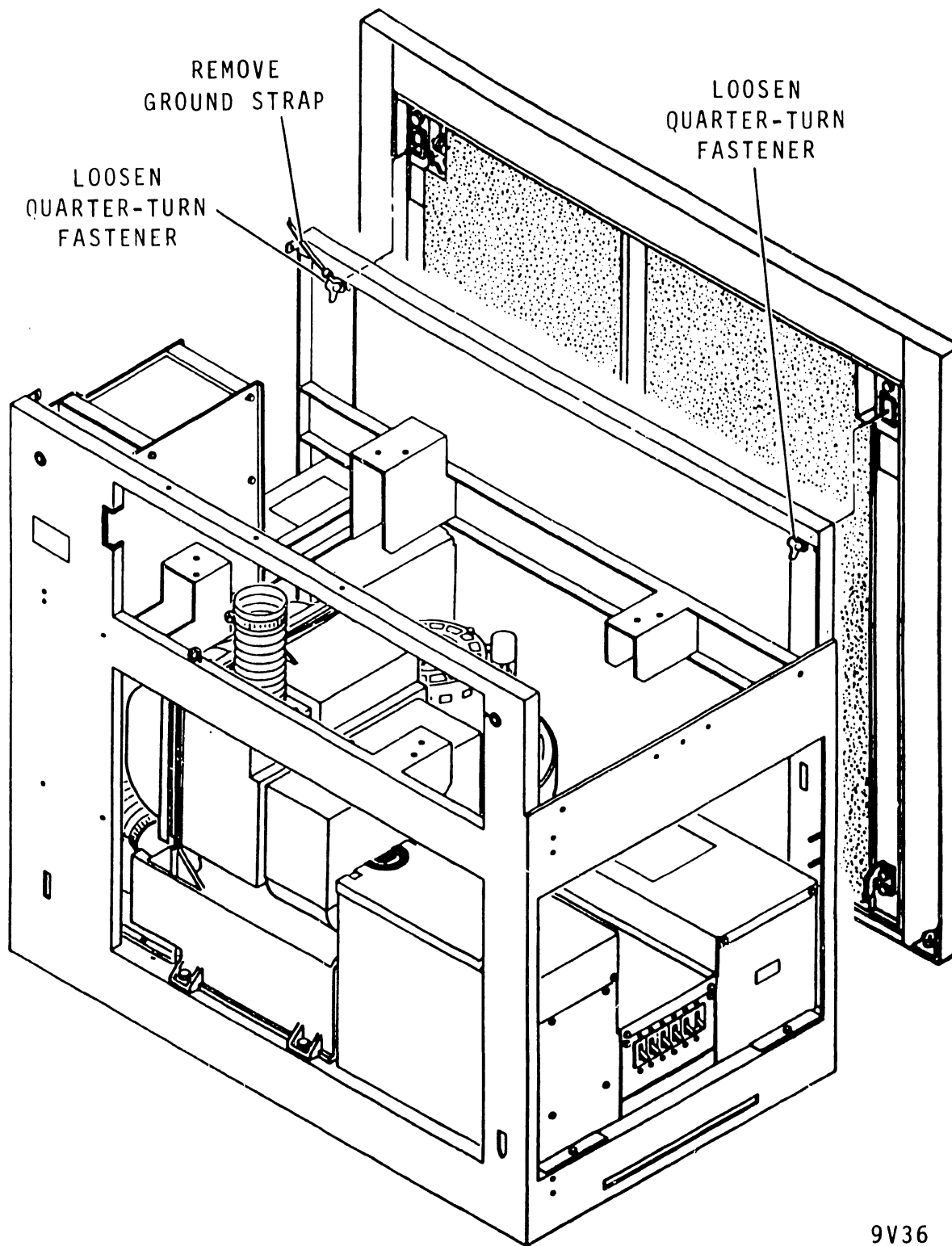
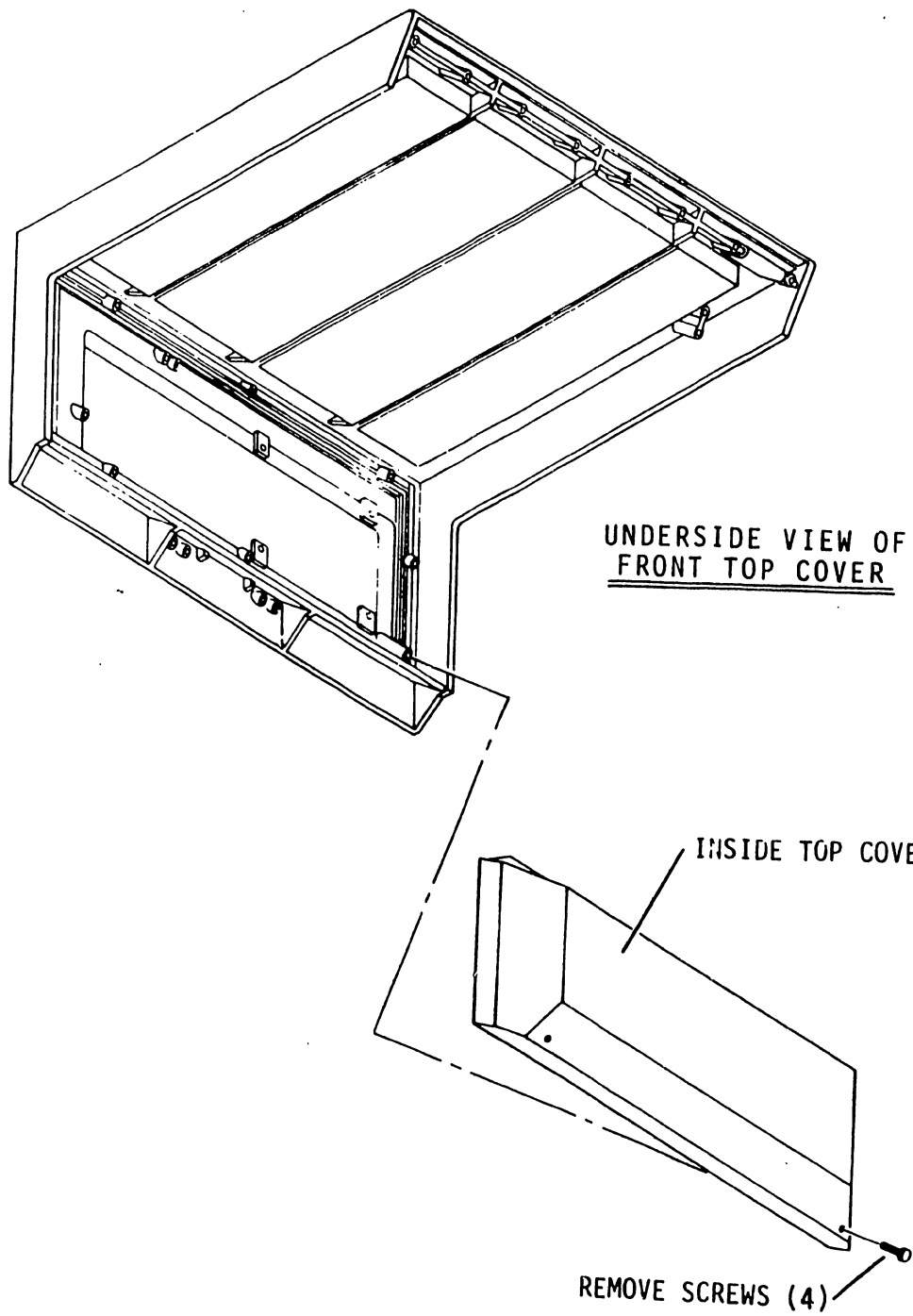


Figure 2D-3. Side Panel Replacement



9V62B

Figure 2D-4. Inside Top Cover Removal

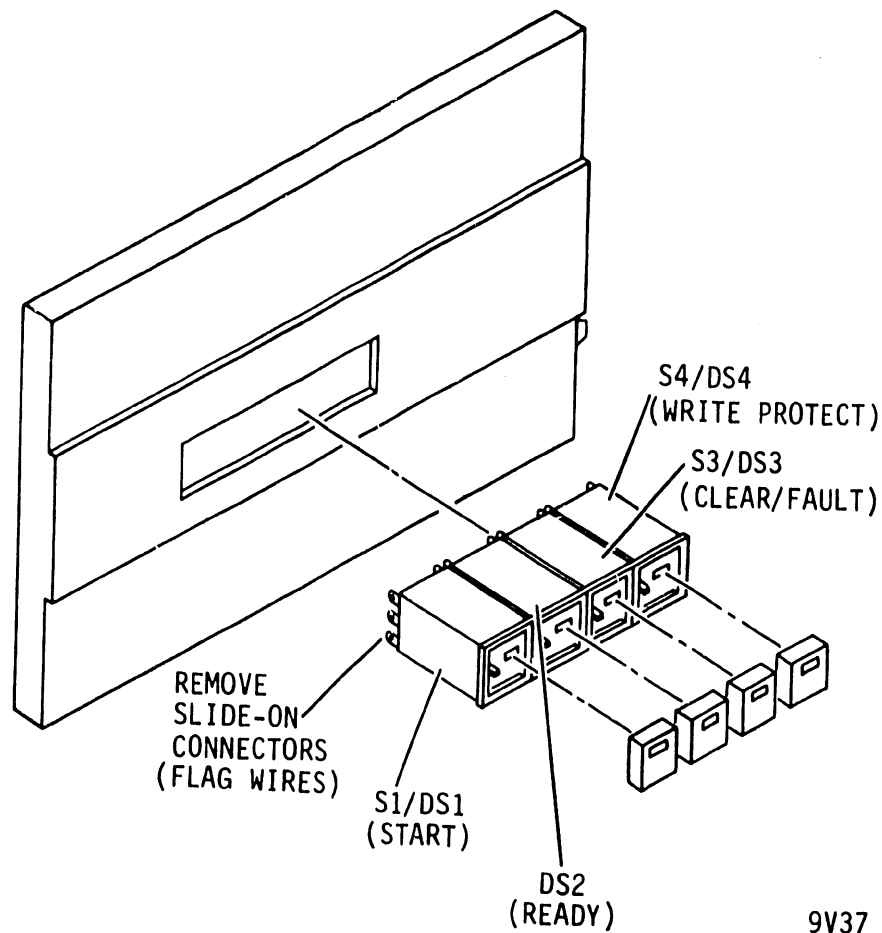


Figure 2D-5. Operator Panel Switch/Indicator Replacement

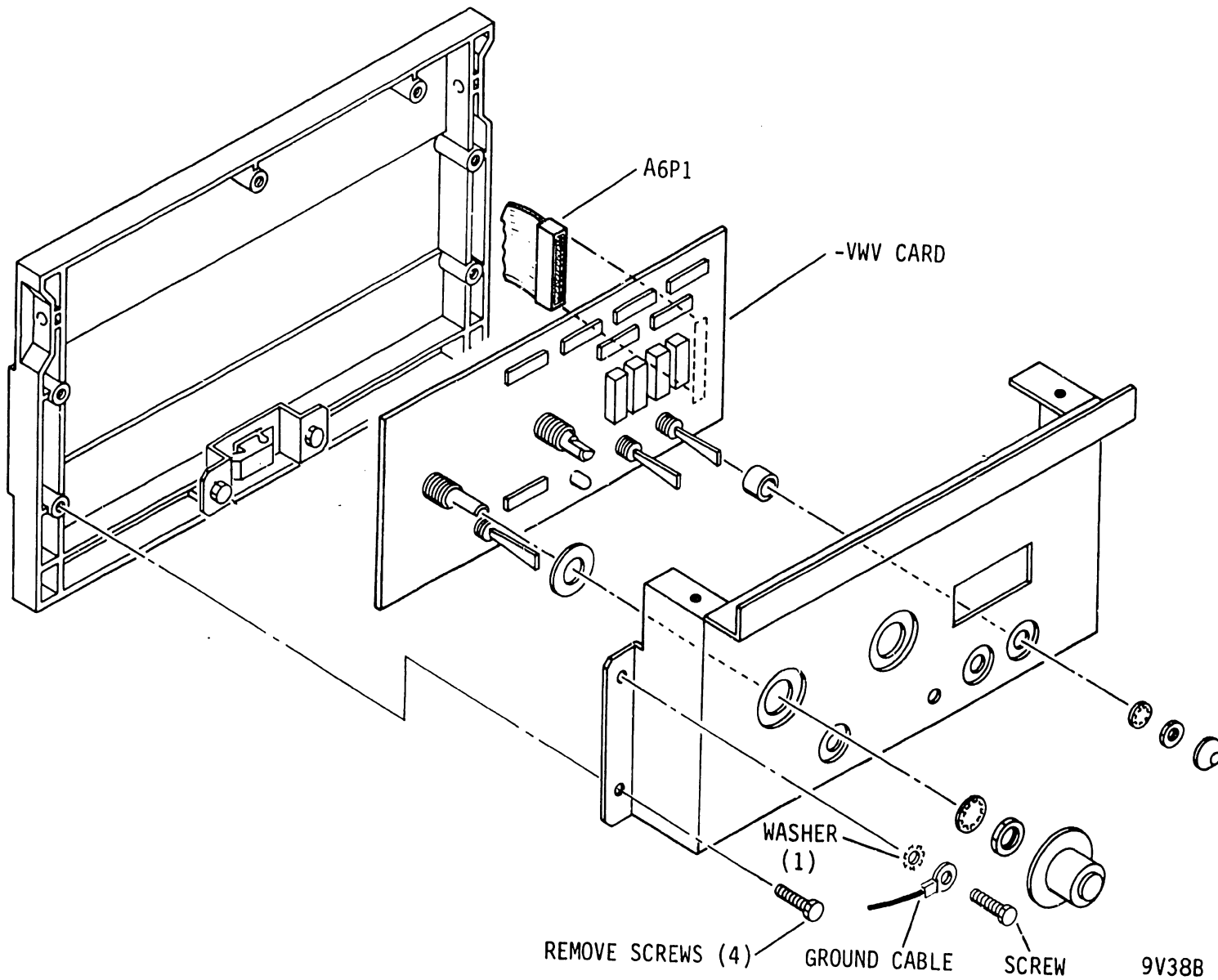
## DIAGNOSTIC PANEL REPLACEMENT

The following procedure describes the removal of the WV card in the diagnostic panel. See figure 2D-6.

1. Remove power from the unit by setting MAIN circuit breaker to OFF.
2. Open diagnostic panel cover.
3. Remove retaining nuts holding diagnostic panel switches. The rotary switch knobs must be removed to gain access to retaining nuts.



Figure 2D-6. Diagnostic Panel Replacement



4. Remove screws (4) securing the diagnostic panel cover plate to the access door.
5. Disconnect connector A6P1 attached to \_VWV card.
6. Remove \_VWV card.
7. Replace \_VWV card by reversing the above procedure.

## DC POWER SUPPLY REPLACEMENT

The dc power supply is located underneath the drive motor assembly at the front of the unit. The following procedure describes removal of the dc power supply; replacement is performed in the reverse order. See figure 2D-7.

### WARNING

The power supply weighs approximately 35 kg (78 pounds). Use care when attempting to remove unit from drive.

1. Remove left side panel.
2. Remove front door and disconnect ground strap.
3. Disconnect A1P4 from ac power supply.
4. Remove left top cover.
5. Disconnect plug A2A2P1 attached to \_YUV card in dc power supply.
6. Disconnect plugs A2P4, P5, and A2A2P2 attached to \_GDV card in dc power supply.
7. Disconnect flat cable A2A7P2 attached to \_VMV card in power supply.
8. Disconnect A2JP8 and A2JP9 attached to A9TB1.
9. Remove screws (2) securing the dc power supply to the frame and carefully slide it forward (towards front of unit). When the power supply has cleared the frame, lower it to the floor.

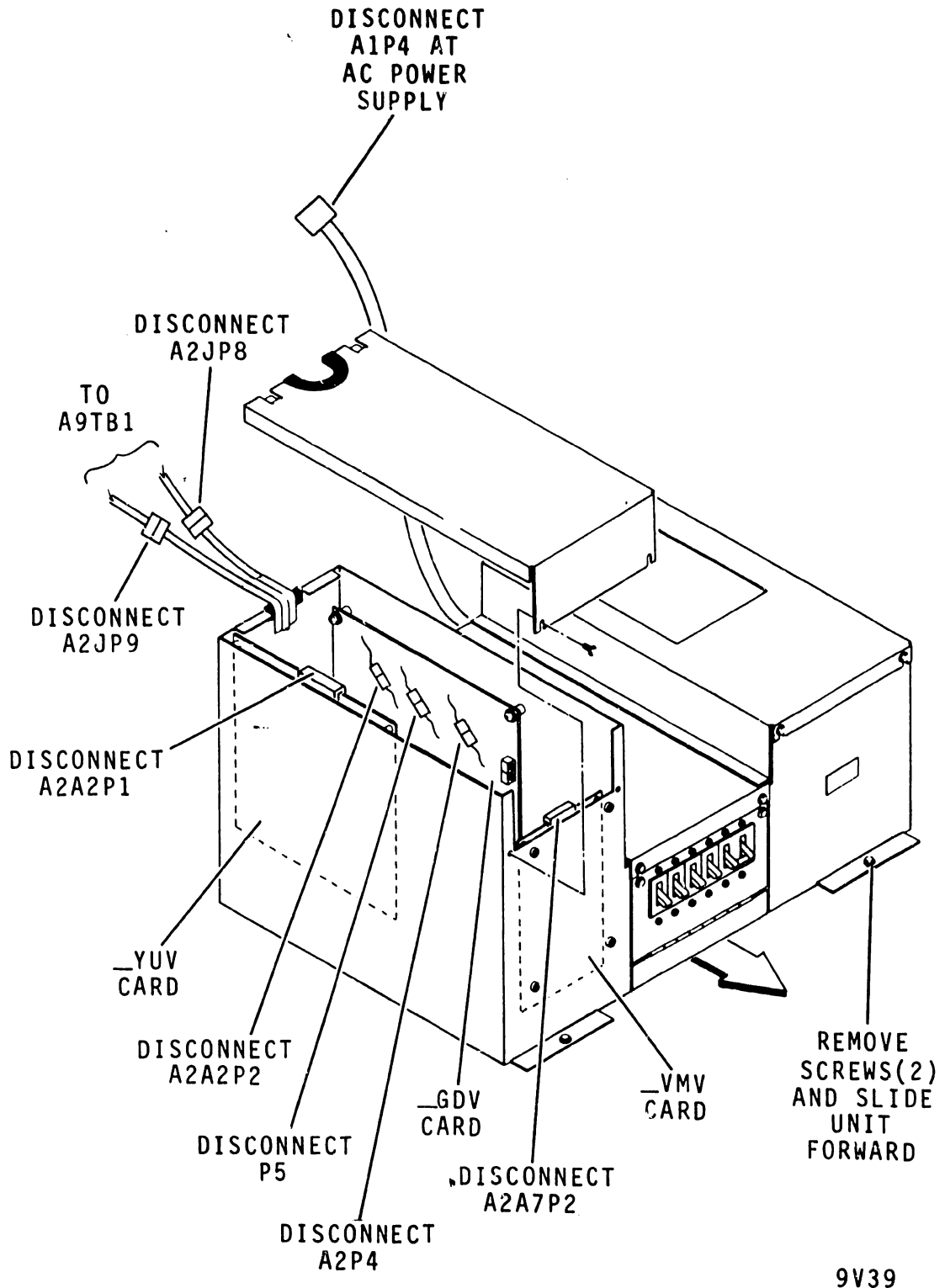


Figure 2D-7. DC Power Supply Replacement

## DRIVE MOTOR ASSEMBLY

The following procedure describes removal and replacement procedures for the drive motor pulley, drive motor brake, and the drive motor. See figure 2D-8.

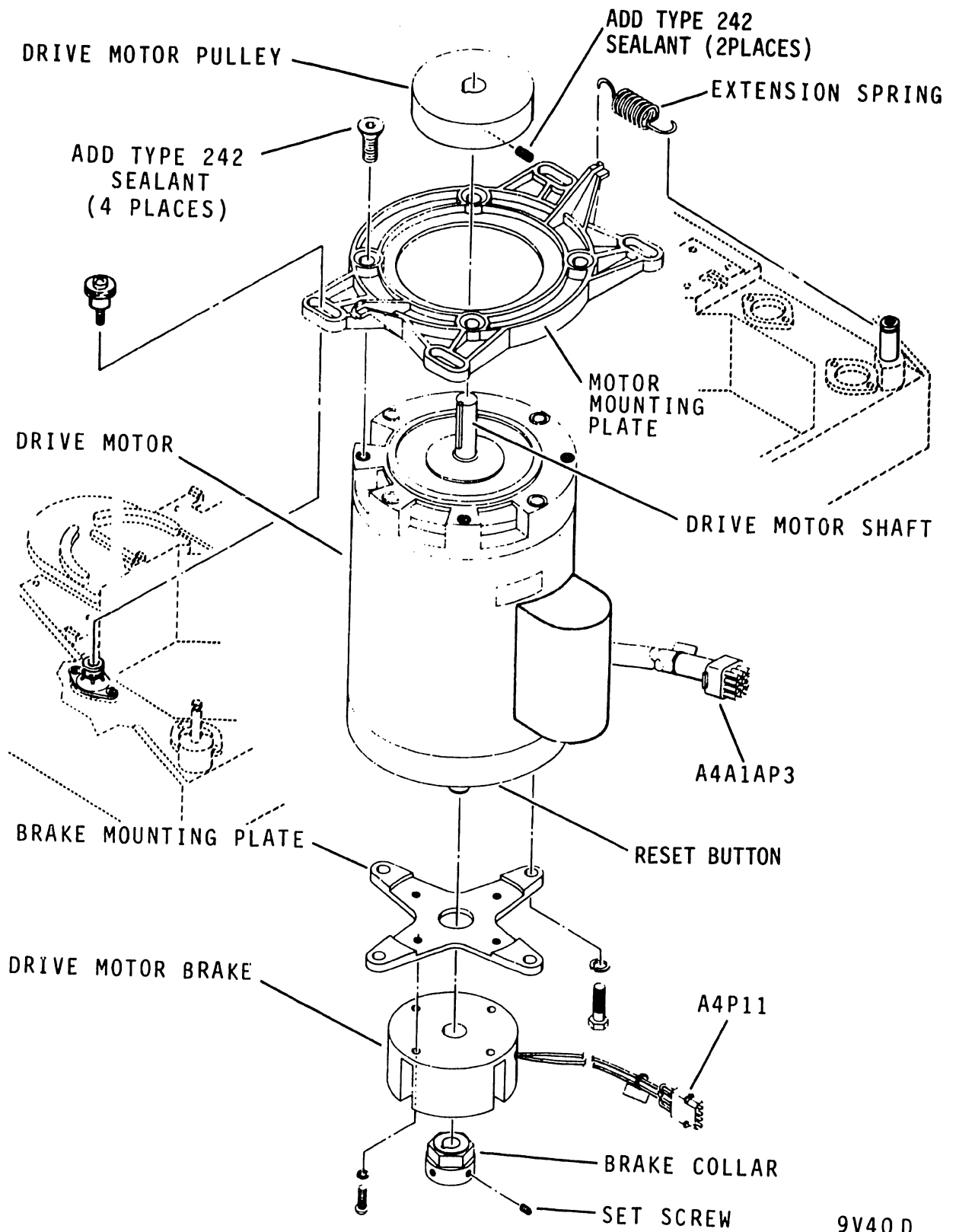
### REMOVAL PROCEDURE

1. Open front and rear doors.
2. Remove HDA (refer to HDA replacement procedure).
3. Disconnect plugs A4P11 to brake and A4A1AP3 from ac power supply.

### WARNING

The drive spindle motor assembly weighs approximately 13.6 kg (30 lb). Make certain that the motor assembly does not drop suddenly after removing the last screw.

4. Remove belt tension springs and slide motor toward the interior of the unit.
5. Grasp the motor assembly from the bottom using one hand.
6. Using the other hand, remove the screws (4) securing the motor assembly to the motor mounting plate.
7. Tip bottom of motor toward front of unit until pulley clears bottom of frame member.
8. Remove motor through front of unit.



9V40 D

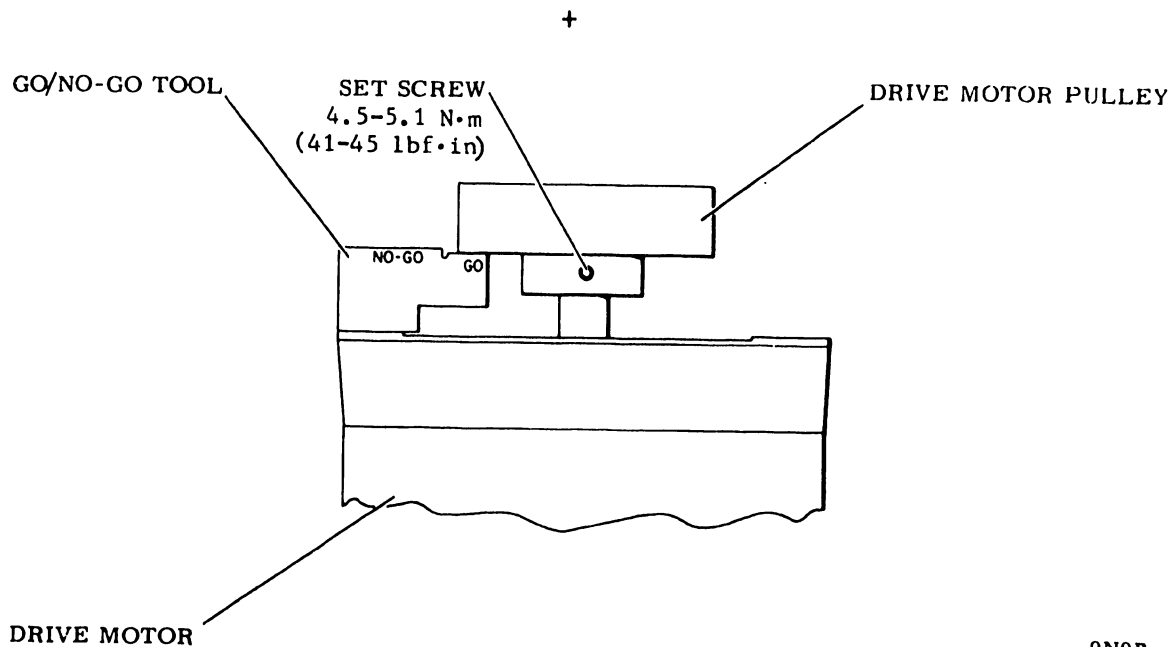
Figure 2D-8. Drive Motor Assembly Replacement

## DRIVE MOTOR PULLEY REPLACEMENT

### NOTE

This procedure describes pulley replacement after having first removed the drive motor from the unit. The pulley can, however, be removed and replaced without removing the drive motor assembly.

1. Perform steps 1 through 8 under Drive Motor Assembly Removal Procedures.
2. Loosen set screws (2) securing drive motor pulley to drive motor shaft.
3. Remove pulley.
4. Install replacement pulley, and replace key flush with face of boss, but do not tighten set screws until pulley height adjustment has been made.
5. To perform pulley height adjustment, proceed as follows:
  - a. Place Go/No-Go tool (see list of tools) on drive motor



9N9B

Figure 2D-9. Pulley Height Adjustment

as shown in figure 2D-9. Make certain not to place the tool on a rib or raised spot on the drive motor.

- b. Lower pulley until contact has been made between the pulley and the Go surface of the tool
  - c. Apply type 242 anaerobic sealant to setscrews and tighten setscrews (2) to between 4.6 - 5.1 N·M (41-45 lbf·in), making certain that one setscrew has been tightened onto the key on the drive motor shaft.
6. Reinstall the drive motor assembly by reversing steps 1 through 8 under Drive Motor Assembly Removal Procedures. When reinstalling the motor mounting screws removed in step 6 of the Removal Procedure, apply type 242 anaerobic sealant to the screws.

#### **DRIVE MOTOR BELT REPLACEMENT**

1. Perform steps 1 through 8 under Drive Motor Assembly Removal Procedure.
2. Loosen setscrews (2) securing brake collar and remove collar from drive motor shaft.
3. Loosen but do not remove screws (4) that secure brake to mounting plate.
4. Remove screws (4) securing brake to brake mounting plate and remove brake.
5. Attach replacement brake to brake mounting plate.
6. Slide brake collar onto motor shaft making sure that collar fits into mating part of brake. To allow for wear, back collar away from brake approximately 0.5 to 1.3 mm (0.02 to 0.05 in).
7. Tighten setscrews to secure collar. Tighten screws (4) securing brake to mounting plate.
8. Reinstall the drive motor assembly by reversing steps 1 through 8 under Drive Motor Assembly Removal Procedures. When reinstalling the motor mounting screws removed in step 6 of the Removal Procedure, apply type 242 anaerobic sealant to the screws.

## DRIVE MOTOR REPLACEMENT

1. Perform steps 1 through 8 under Drive Motor Assembly Removal Procedures.
2. Loosen setscrews securing drive motor pulley to drive motor shaft.
3. Remove pulley.
4. Loosen screws (4) securing brake to brake mounting plate. Loosen setscrews (2) securing brake collar and remove collar from drive motor shaft.
5. Remove screws (4) and washers (4) securing brake mounting plate to motor end bell. Leave brake attached to mounting plate.
6. Attach brake mounting plate to replacement motor, leaving mounting screws snug but not tight.
7. Slide brake collar onto replacement motor shaft making sure that collar fits into mating part of brake. To allow for wear, back collar away from brake approximately 0.5 to 1.3 mm (0.02 to 0.05 in).
8. Tighten setscrews to secure collar. Tighten screws (4) securing brake to brake mounting plate.
9. Tighten screws (4) and washers (4) securing mounting plate to motor.
10. Install snap on brake cover.
11. Install pulley, but do not tighten set screws until pulley height adjustment has been made.
12. To perform pulley height adjustment proceed as follows:
  - a. Place Go/No-Go tool (see List of Tools) on drive motor as shown in figure 2D-9. Make certain not to place the tool on a rib or raised spot on the drive motor.
  - b. Lower pulley until contact has been made between the pulley and the Go surface of the tool.
  - c. Apply type 242 anaerobic sealant to setscrews and tighten setscrews (2) to between 4.6 - 5.1 N·M (41-45 lbf·in), making certain that one setscrew has been tightened onto the key on the drive motor shaft.



13. Reinstall the drive motor assembly by reversing steps 1 through 8 under Drive Motor Assembly Removal Procedures. When reinstalling the motor mounting screws removed in step 6 of the Removal Procedure, apply type 242 anaerobic sealant to the screws.

### **DRIVE MOTOR BRAKE REPLACEMENT**

Should it become necessary to replace the drive motor belt, remove the HDA (see HDA Removal procedure) and install a new belt in place of the old one. Make certain that the smooth surface of the drive motor belt interfaces with the pulley. Replace the HDA (see HDA Replacement procedure) and check the performance of the belt as follows:

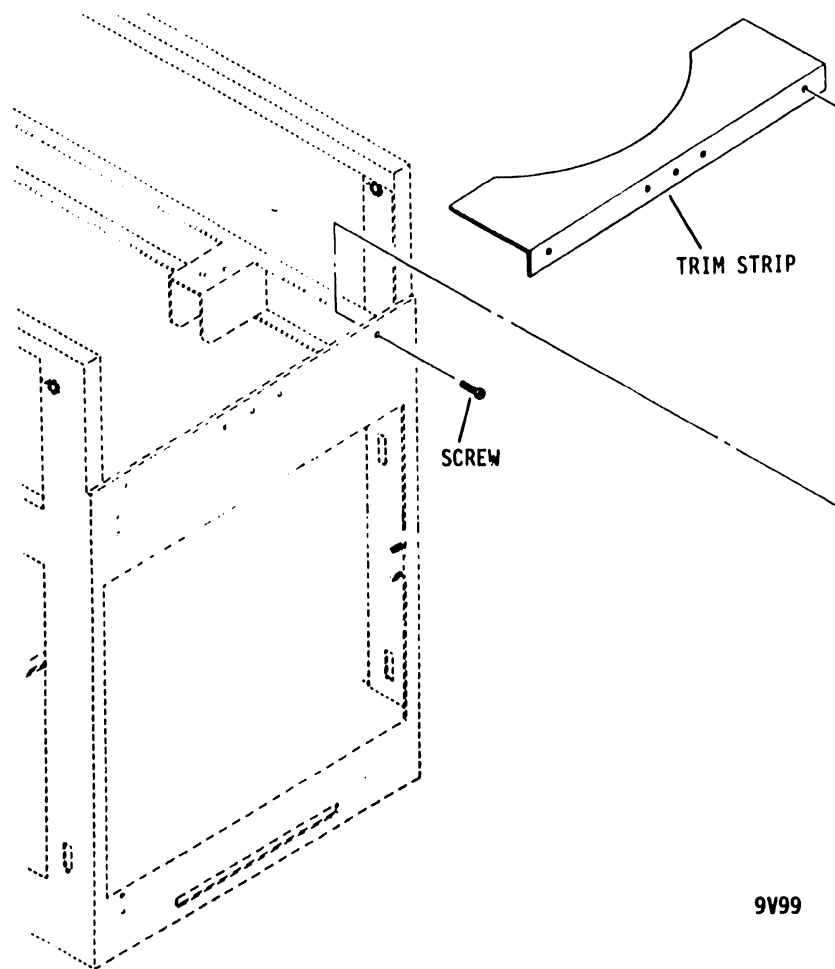
1. Apply power to the device to rotate HDA.
2. Check to be sure that the upper and lower edges of the belt do not wander beyond the upper and lower edges of the drive motor pulley.
3. Check to be sure that belt does not contact HDA cover during drive motor operation.

### **HDA REMOVAL AND REPLACEMENT**

The following procedure describes removal and replacement of the HDA.

#### **REMOVAL**

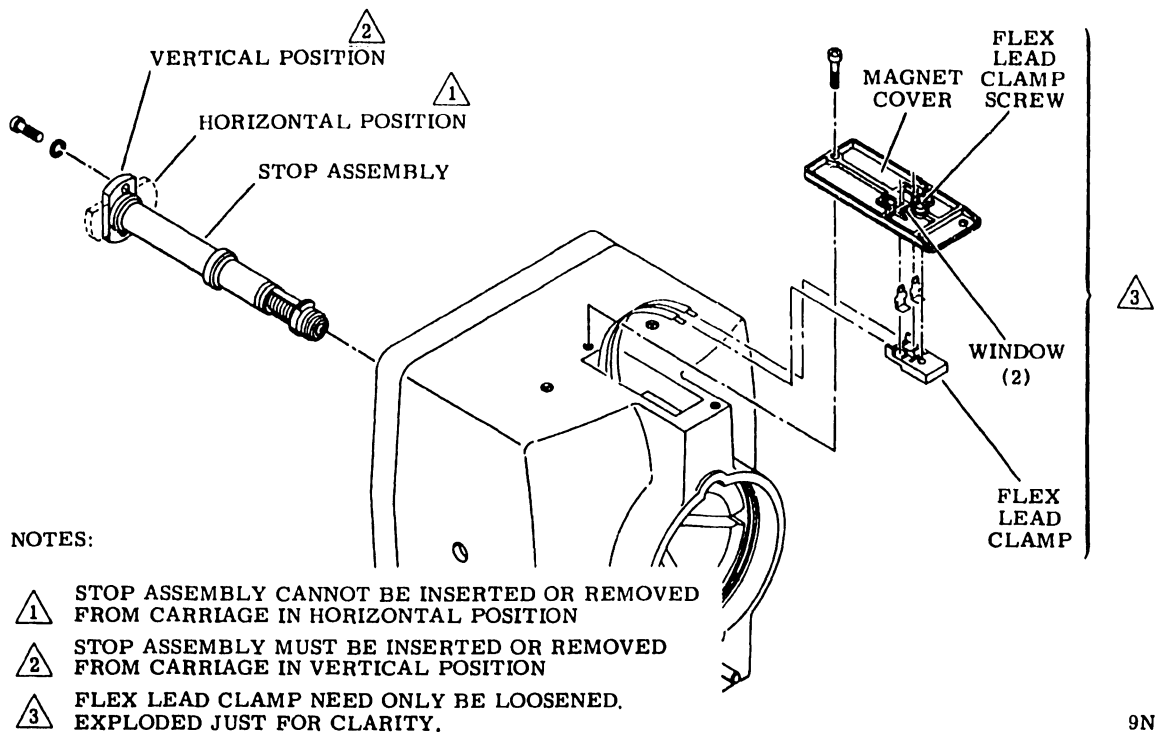
1. Remove power from unit by placing MAIN circuit breaker to OFF.
2. Open front top cover and remove trim strip as shown in figure 2D-10.
3. Loosen, but do not remove, screws (2) securing rear trim strip on rear top cover to the frame.
4. Open rear top cover.
5. Disconnect read/write cards from HDA, but do not remove them from read/write chassis.
6. Disconnect servo cable plug A7P12 from HDA.



9V99

Figure 2D-10. Trim Strip Removal

7. Referring to figure 2D-11, disconnect HDA voice coil leads as follows:
  - a. Loosen, but do not remove, voice coil flex lead clamp screw.
  - b. Remove screws securing magnet cover to magnet.
  - c. Carefully flip cover back and remove voice coil flex leads from clamp.
8. Referring to figure 2D-11, remove stop assembly as follows:

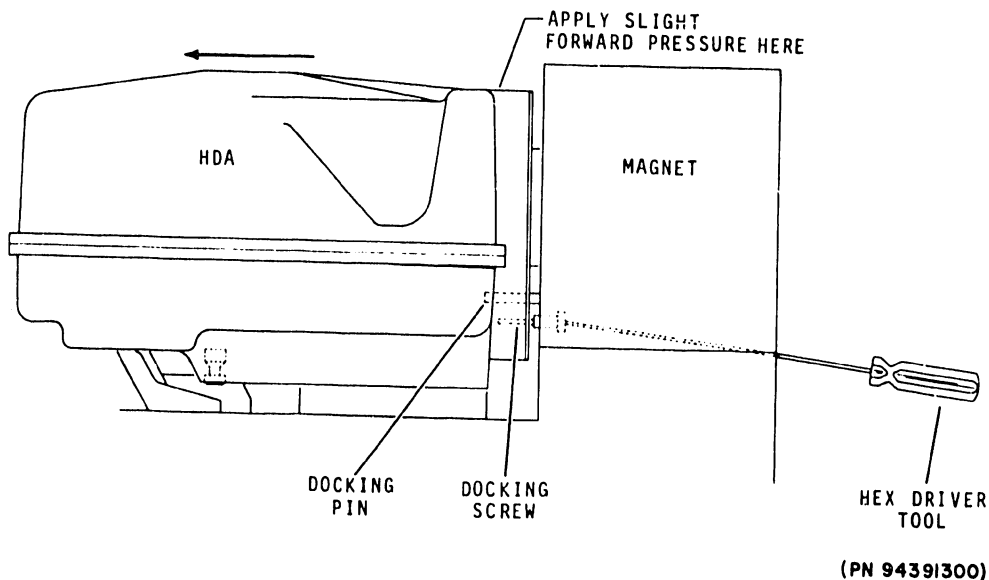


9N10

Figure 2D-11. Removal of Stop Assembly and Voice Coil Leads

- a. Remove hardware (including stop plug) securing stop assembly to magnet.
  - b. Rotate stop assembly 90 degrees in either direction (end caps in vertical position) and withdraw it from the magnet. It may be necessary to wiggle the stop assembly while removing it.
9. Turn stop assembly to the horizontal position and reinsert it into the magnet. Using the stop assembly as a tool, exert a light force to push the carriage toward spindle until carriage is all the way forward.
10. Release HDA from magnet as follows:
- a. Insert hex driver tool into channel at bottom of magnet (see figure 2D-12) until it fits into docking screw.

- b. Turn hex driver tool counterclockwise, at the same time keeping a light force on the stop assembly to maintain the carriage in its most forward position, until the HDA has moved about 10 mm (3/8 in) toward front of unit. This will ensure that the carriage lock inside the HDA has properly locked the carriage.
- c. Remove stop assembly by pulling it straight back.
- d. While continuing to rotate the hex driver tool counterclockwise, apply slight forward pressure with your free hand to the rear top of the HDA (see figure 2D-12). This will assist the drive motor extension springs in sliding the HDA forward, and will prevent damage to the docking screw and its retainer clip.



TURN HEX DRIVER TOOL COUNTERCLOCKWISE  
AND PUSH HDA AWAY FROM MAGNET.

9N11-1C

Figure 2D-12. Releasing HDA from Magnet

## CAUTION

To prevent damage to the carriage, reach behind the HDA as it comes free from the docking pin. Gently push the carriage voice coil in towards the spindle.

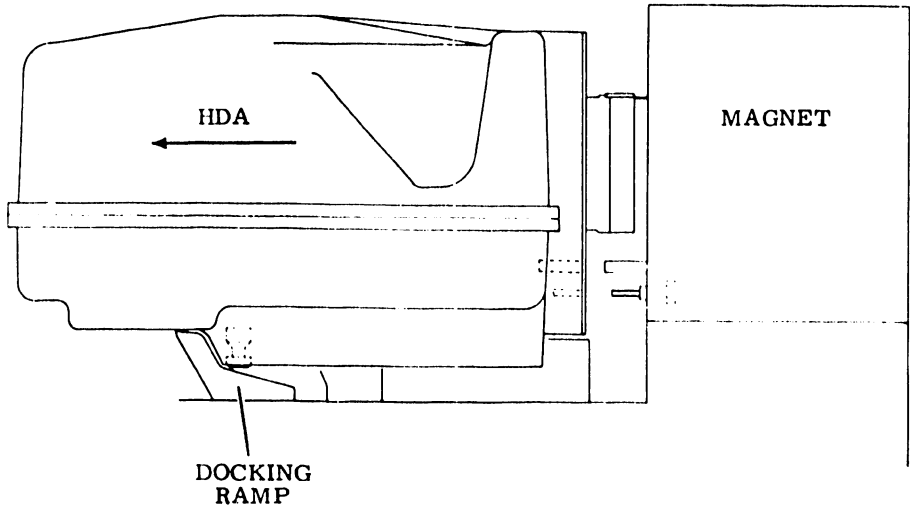
- e. Continue pushing forward on the HDA from the rear of the unit, while turning the hex driver tool, until HDA comes free of the docking pin. This occurs when the rear of the HDA drops off the pin and rests on the deck casting.
  - f. Step around to the front of the unit. Pull the HDA forward until the HDA rests against the docking ramps. See figure 2D-13.
11. Lift up on HDA and pull forward until HDA rests on docking ramps.
  12. Using gripping areas shown in figure 2D-14, carefully lift HDA out of unit.
  13. Install dust covers on top and bottom air inlet ducts if HDA will be out of unit for an extended period. Replace protective cover to HDA.

## REPLACEMENT

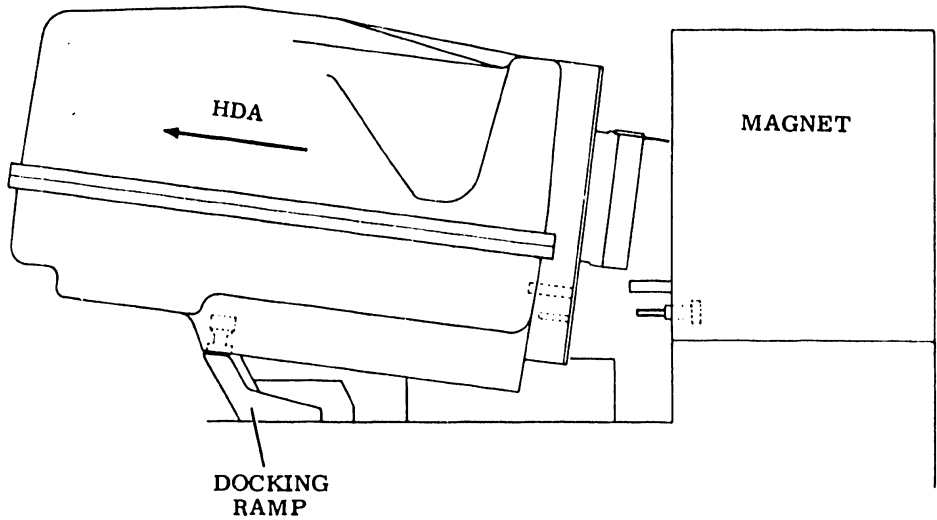
### CAUTION

Do not install a new HDA before it has been temperature-stabilized. Refer to the HDA Temperature Stabilization procedure in section 1 of this manual. Also, a label on the end of the HDA specifies which Read/Write card (YYV) or cards may not be used with that HDA. Check the card type currently in the Read/Write chassis to ensure that the card installed and the replacement HDA will be compatible.

1. Prepare unit for installation of HDA as follows:
  - a. Check alignment of module locators and docking ramps by referring to figure 2D-15. Verify that module locators are fully forward and snug against bosses on deck, that docking ramps are fully forward and snug against module locators, and that static ground spring and button are firmly in place.



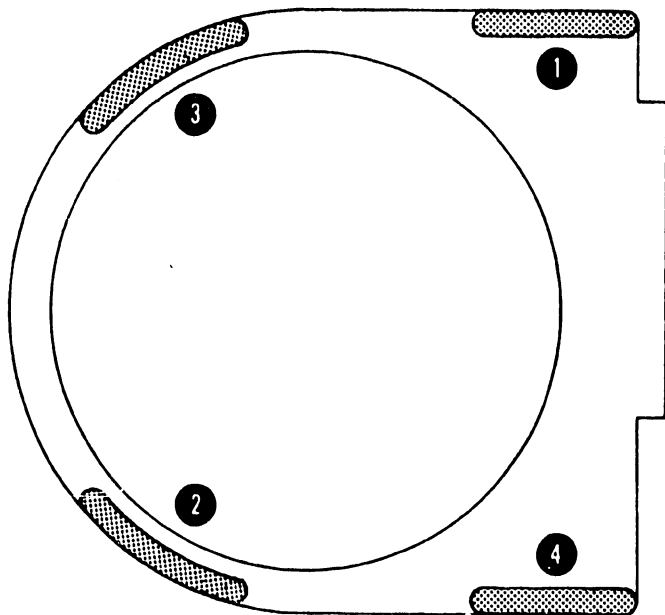
AFTER HDA HAS BEEN RELEASED FROM MAGNET,  
PULL FORWARD UNTIL IT STOPS AGAINST DOCKING RAMP



LIFT FRONT OF HDA AND PULL FORWARD UNTIL  
IT RESTS ON DOCKING RAMP, THEN LIFT OUT OF DRIVE

9N12-1

Figure 2D-13. Removing HDA from Unit



HDA TOP VIEW

GRASP EITHER AT POSITION ① AND ②  
OR ③ AND ④

9N12-2

Figure 2D-14. HDA Gripping Areas

- b. Check all mating surfaces of unit to make sure they are clean and free from damage. Pay close attention to the following unit surfaces (see figure 2D-15):
- Module Locators
  - Docking Guides
  - Docking Ramps
  - Docking Screw
  - Docking Pin
  - Air Seal Gaskets (on magnet and inlet/outlet vents)
- c. Ensure that the two Belleville (compression) washers and the C-ring are in place against the shoulder of the docking screw. (See insert in figure 2D-15).

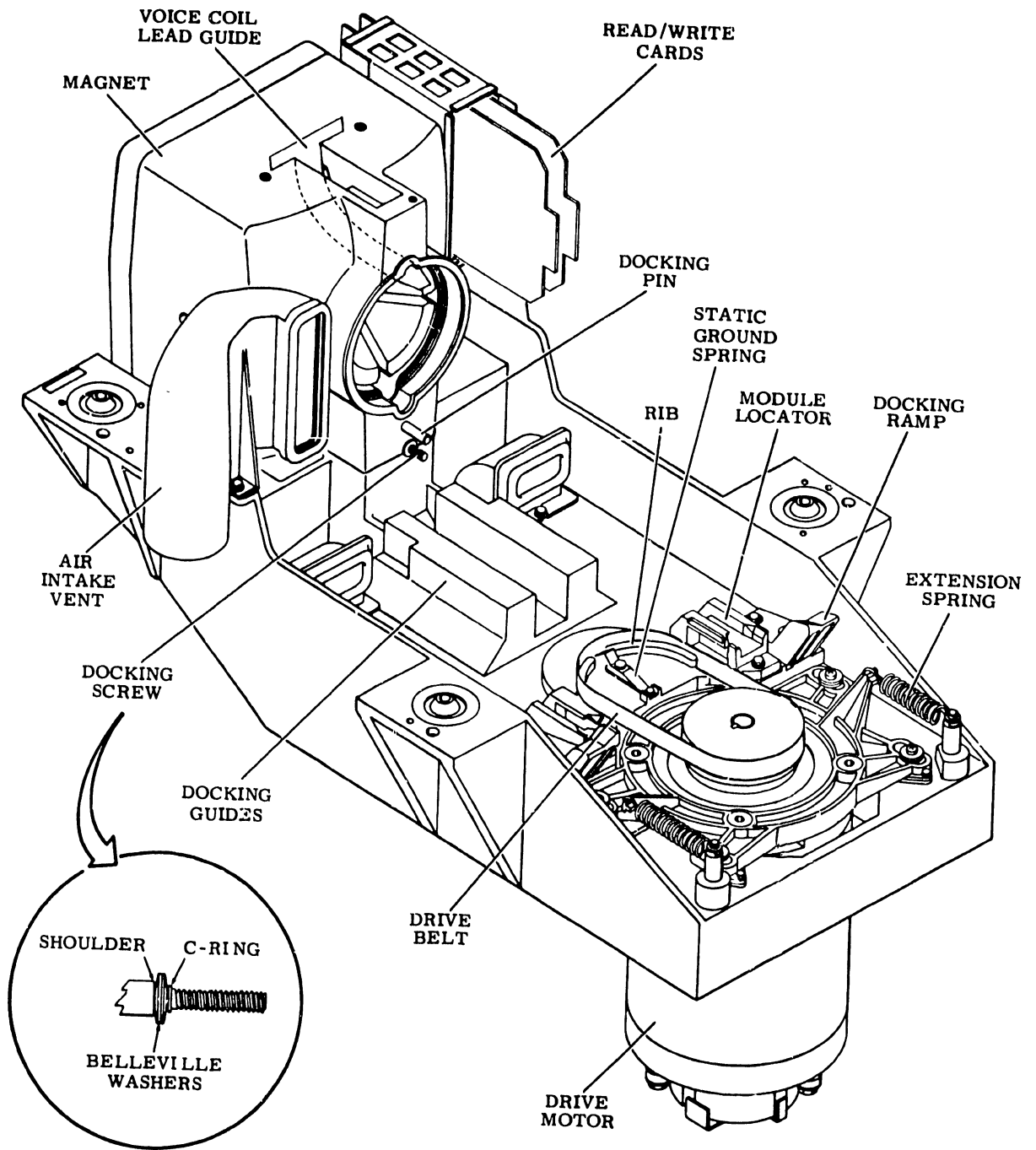
- d. Push drive motor back (towards magnet); fit belt around rib on deck and release motor so that spring tension will hold belt in place.
  - e. Insert voice coil lead guide through top and out front of magnet. When voice coil lead guide is visible through front of magnet, center guide from front of magnet.
2. Install HDA as follows:
- a. Using gripping areas shown in figure 2D-15, grasp HDA firmly and lower it onto deck so that voice coil flex leads rest on lead guide, leveler pads of HDA rest on docking ramps, and bottom channels of HDA ride docking guides (see figure 2D-16, sheet 1).

### CAUTION

Do not allow the HDA to drop from the docking ramp onto the deck.

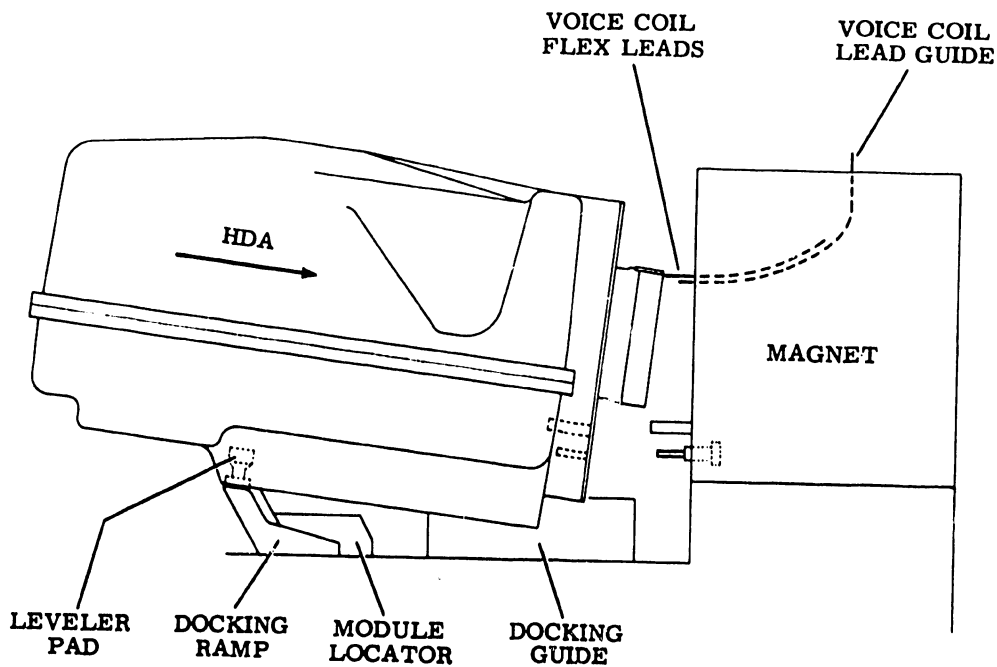
- b. Support HDA and slowly push it toward magnet. HDA should slide slowly down docking ramps, pick up drive motor belt, and rest on deck surface.
- c. Verify that HDA is centered on docking guides and leveler pads rest in module locators.
- d. Continue to push HDA toward magnet while guiding voice coil flex leads onto voice coil lead guide centered in magnet.
- e. When HDA has gone as far as it will go, docking pin from magnet assembly will align with and enter a corresponding hole in HDA (see figure 2D-16, sheet 2).
- f. Remove voice coil lead guide.
- g. With hex driver tool still seated in docking screw, secure HDA by rotating tool clockwise until HDA has been drawn against magnet. Drawing the HDA toward the magnet will force voice coil flex leads up through top of magnet.





9N13B

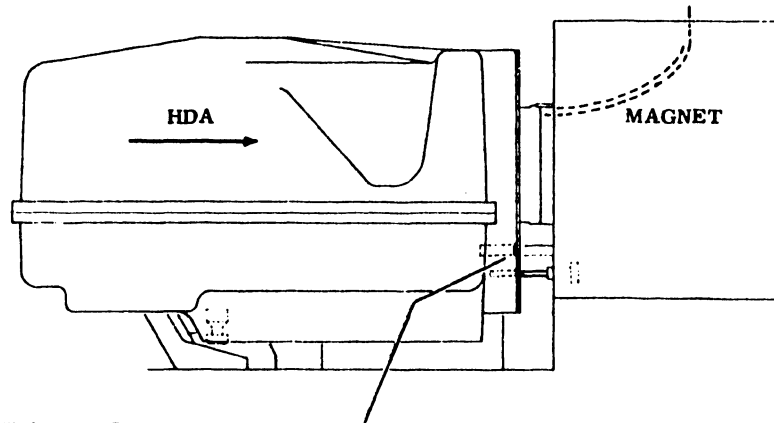
Figure 2D-15. Preparing for HDA Replacement



POSITION HDA SO THAT VOICE COIL FLEX LEADS REST ON LEAD GUIDE, LEVELER PADS ARE ON DOCKING RAMP, AND CHANNELS IN HDA BOTTOM ARE OVER DOCKING GUIDES

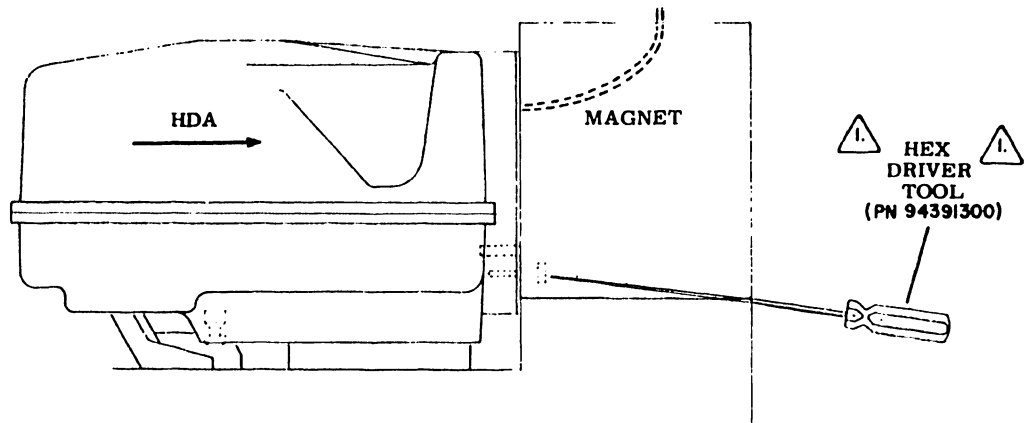
9N14-1A

Figure 2D-16. Securing HDA to Unit (Sheet 1 of 2)



DOCKING PIN STARTS TO ENTER HOLE IN HDA

SLOWLY SLIDE HDA DOWN DOCKING RAMP TO DECK.  
THEN PUSH IT AS FAR AS IT WILL GO TOWARDS MAGNET



1 FOR FINAL DOCKING, TIGHTEN DOCKING SCREW TO  
2.8-3.9 NEWTON METRES (25-35 lbf-in) USING TORQUE  
WRENCH AND DRIVER TOOL PN47481600.

ROTATE HEX DRIVER TOOL  
CLOCKWISE TO DRAW HDA AGAINST MAGNET.

9N14-2B

Figure 2D-16. Securing HDA to Unit (Sheet 2)



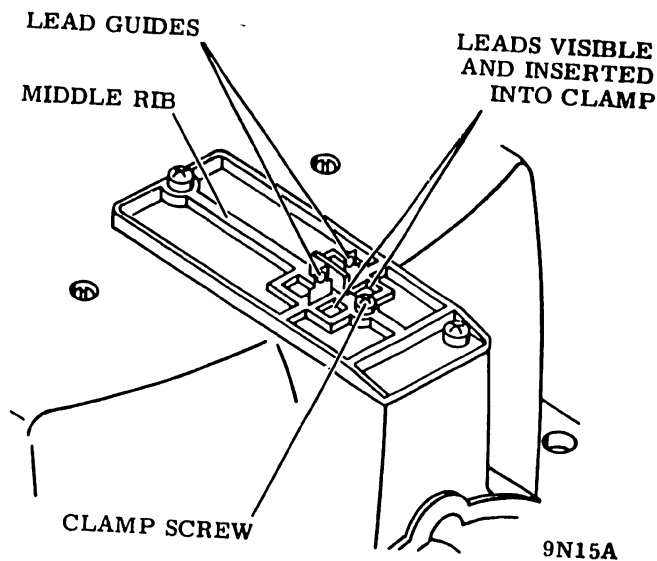


Figure 2D-17. Securing Voice Coil Leads

6. Connect read/write cards to HDA.
7. Be sure that the START switch for the HDA being replaced is in the released (out) position, then start the blower motor by applying power to the unit. (The drive motor must not turn.)
8. Allow the blower to run for one hour to stabilize the HDA temperature, then proceed to step 9.
9. Check carriage movement as follows:
  - a. Disable voice coil by removing either of the two quick-connect leads from the top of the magnet assembly.
  - b. Power up the drive motor.

NOTE

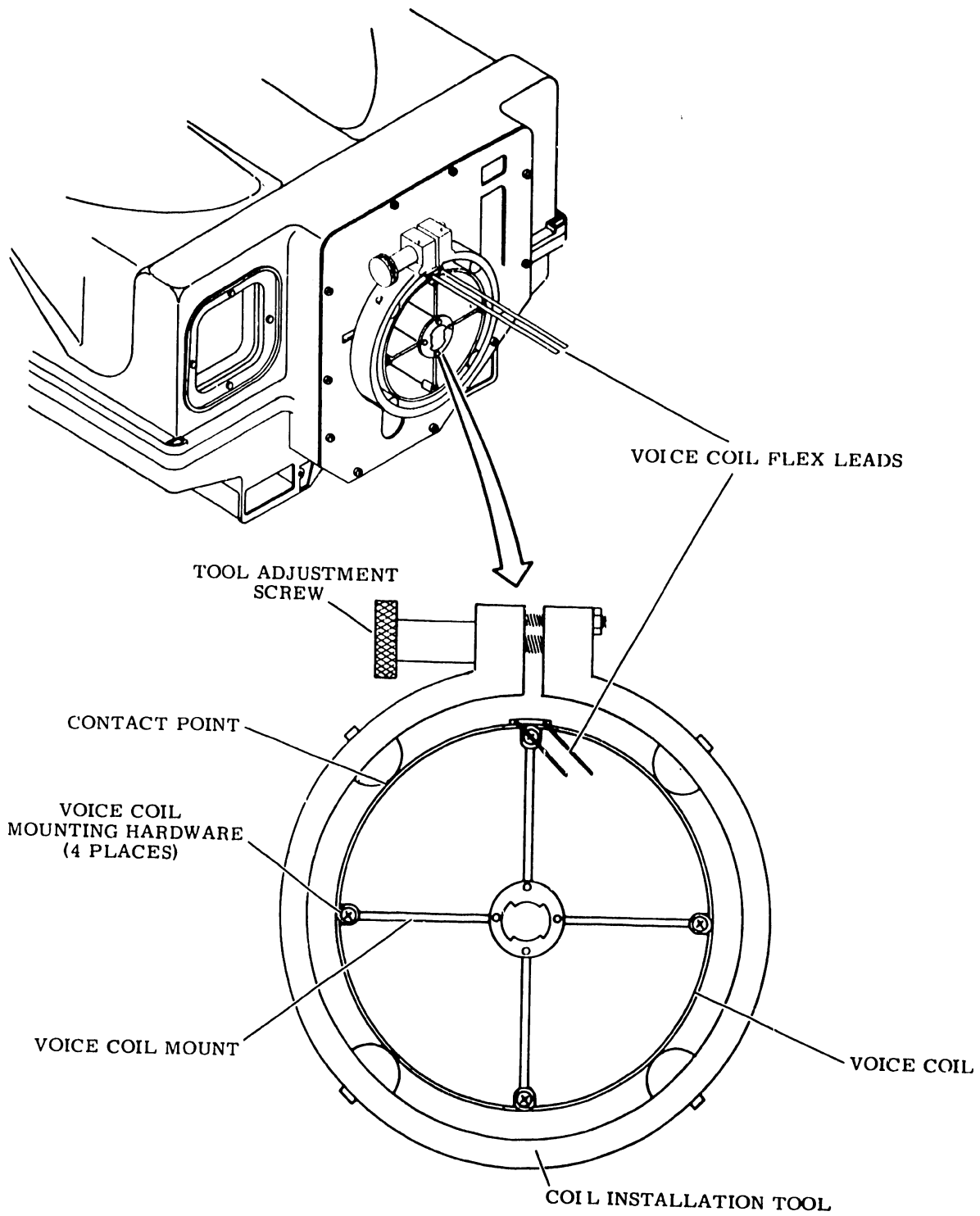
Remove plastic stop plug (S/C 02 units and above w/ 61384A ) before inserting carriage tool.

- c. Insert carriage tool through center of stop assembly and move carriage back and forth. If carriage moves smoothly (without binding or rubbing), proceed to step 14. If binding occurs, go to step 10.
10. Power down the drive motor and remove the stop assembly.
11. Examine the stop assembly to see that it is not bent, or that flaring of the rubber parts has not increased the effective diameter of the assembly.
  - If the stop assembly looks OK, reinstall it.
  - ...Or...
  - If the stop assembly appears defective, replace it.
12. With stop assembly in place, check carriage movement one more time by performing steps 9b and 9c.
13. If carriage binds with stop assembly installed, power down the unit and remove HDA to determine cause of problem. If carriage moves freely, proceed to step 14.
14. Remove carriage tool, then replace voice coil lead removed in step 9a. Insert plastic stop plug.
15. Power down the unit. Replace shroud trim. Secure rear trim strip to frame.
16. Power up the unit.
17. Power up the drive motor. Observe performance of drive belt as discussed in Drive Motor Belt Replacement procedure.
18. Perform Servo Pulse Width Check and Adjustment procedure.
19. Perform Velocity Gain Check and Adjustment procedure.

## HDA VOICE COIL REPLACEMENT

The following procedure describes the removal and replacement of the HDA voice coil.

1. Remove HDA as described in HDA Removal.
2. Referring to figure 2D-18, locate and remove voice coil mounting hardware. Do not attempt to remove voice coil. Fit voice coil flex leads through cut-out on tool.



9N16C

Figure 2D-18. HDA Voice Coil Replacement

3. Place coil installation tool around voice coil. Position tool as shown in figure 2D-18, with contact points of tool midway between fins on voice coil mount.
4. Tighten adjustment screw on tool in 1/8-turn increments until voice coil can be pulled free (with slight resistance) from voice coil mount.

#### NOTE

As voice coil is removed, check for the presence of brass shims between voice coil and voice coil mount. Note the position of shims and put them aside for use when installing new voice coil.

5. Release old voice coil from tool by loosening adjustment screw on tool.
6. Lay new voice coil on flat surface with voice coil flex leads pointing upward.
7. Carefully place coil installation tool around voice coil. Position tool so the adjustment screw on tool is adjacent to the voice coil flex leads. (See figure 2D-18).
8. Carefully tighten adjustment screw on tool in 1/8-turn increments, trying after each turn to fit voice coil over voice coil mount as described in step 9.

#### CAUTION

Do not over-tighten adjustment screw. Too much pressure on the voice coil can cause permanent damage.

9. Position voice coil so that groove at rear of mounting guide slips over top fin of voice coil mount.
10. Return shims, removed in step 4, to their original position; beginning with the topmost shim.

#### NOTE

It may be necessary to increase the pressure on the coil when replacing the shims. This can be accomplished by tightening the adjustment screw on tool in 1/8-turn increments until the shims slip between the voice coil and the voice coil mount.

11. Remove tool from coil by loosening adjustment screw.

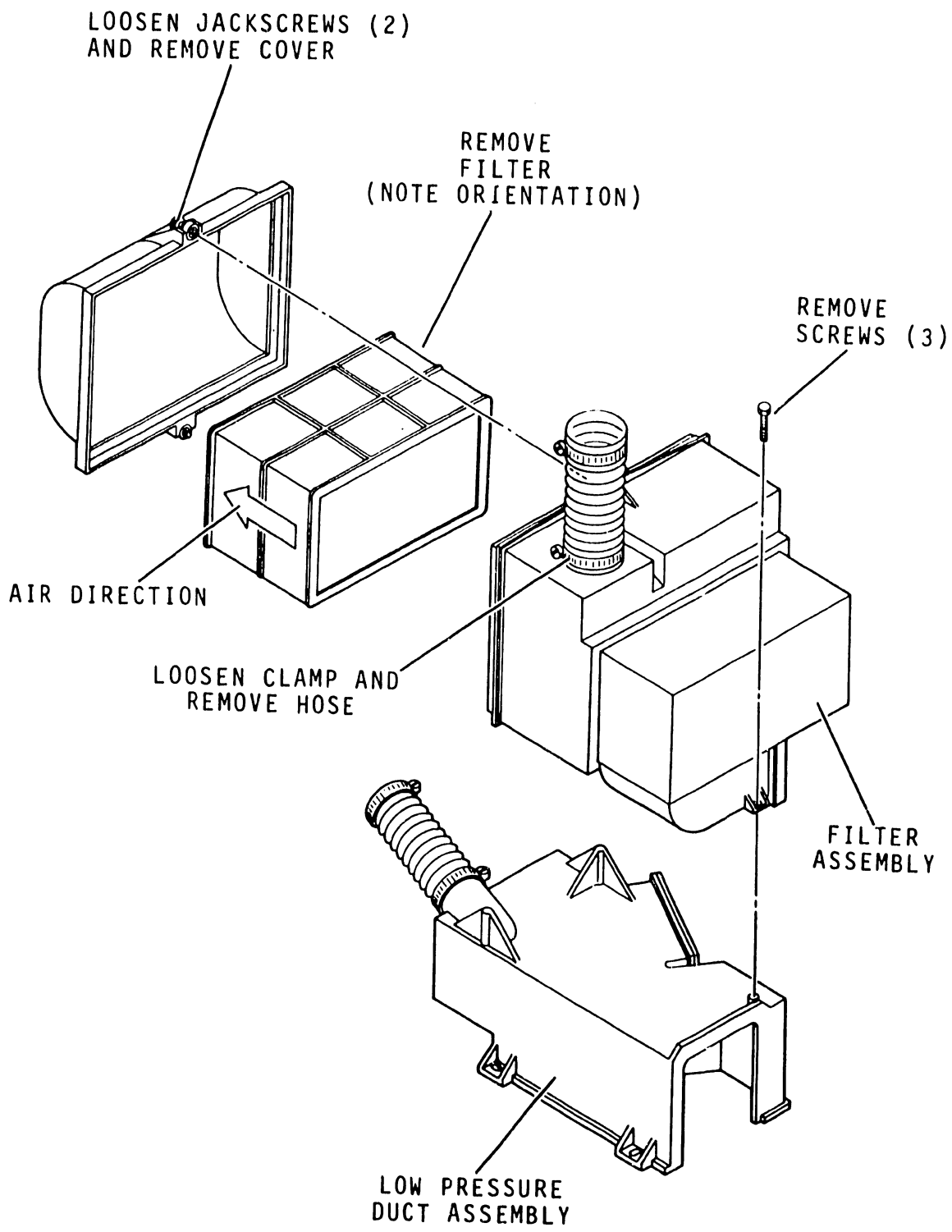


12. Apply grade C, anaerobic sealant to first few threads of voice coil mounting screws.
13. Secure voice coil mounting hardware to voice coil mount using a torque screwdriver and force of .45 to .56 N·m (4.0 to 5.0 lbf·in).
14. Replace HDA as described in HDA Replacement procedure.

## **MAGNET REPLACEMENT**

The following describes removal and replacement of the magnet assembly.

1. Remove power from the unit by placing MAIN circuit breaker to OFF.
2. Open front and rear door of unit.
3. Open front and rear top covers.
4. Remove left side panel (viewed from front of unit) to secure access to filter assembly.
5. Remove HDA from unit as described in HDA Replacement procedure.
6. Remove screws (2) securing dc power supply and slide power supply toward the front of the unit. Do not slide completely out of unit. See figure 2D-7.
7. Remove filter assembly as follows (see figure 2D-19):
  - Remove hose clamp securing HDA input hose to filter assembly
  - Remove screws (3) securing filter assembly to low pressure duct assembly.
8. Remove muffler assembly (see figure 2D-20).
9. Remove screws (3) securing magnet assembly to deck (see figure 2D-21).



9V30

Figure 2D-19. Filter Assembly Removal

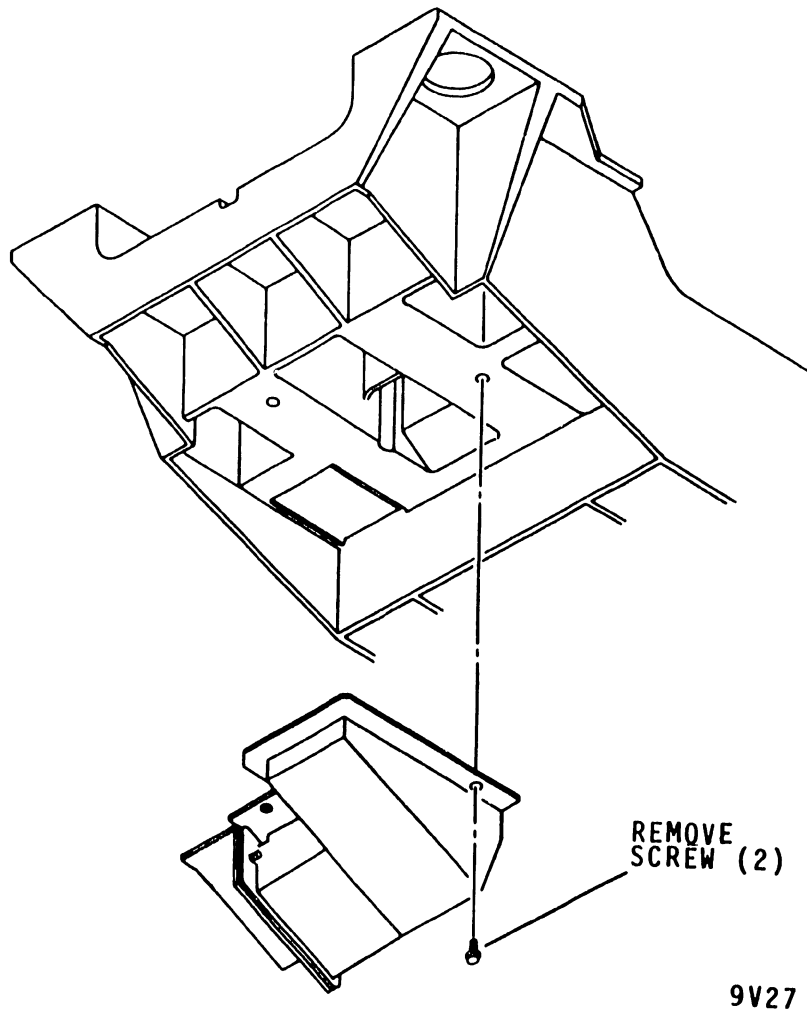


Figure 2D-20. Muffler Removal

**WARNING**

The magnet assembly weights about 43 kg (95 lb). To avoid injury, use care when lifting it from the deck.

When magnet assembly has been removed from the deck, be sure to set it on a clean, sturdy, non-metallic surface.

10. Carefully lift magnet assembly clear of deck.

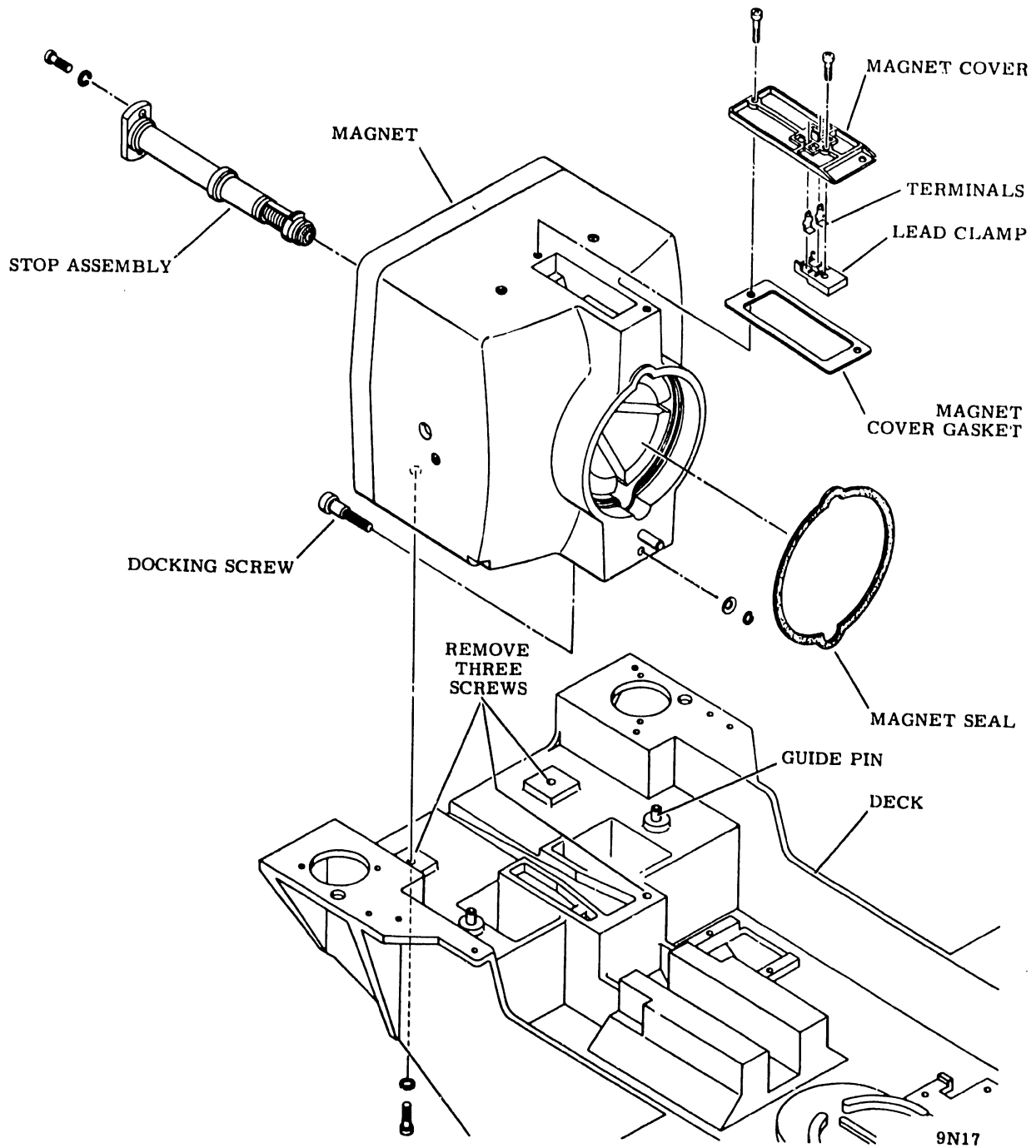


Figure 2D-21. Magnet Replacement

11. Referring to figure 2D-21, remove the following parts from the old magnet assembly, and reinstall on replacement magnet.
  - Stop Assembly and associated hardware (see HDA replacement procedures).
  - Magnet cover, gasket, lead clamp, and terminals.
  - Docking screws and associated hardware.
12. Position replacement magnet assembly on deck, pushing it forward and to the left until it comes to a halt between two guide pins.
13. Secure magnet assembly to deck using hardware previously removed in step 9.
14. Tighten the three magnet screws to a torque of 7.9 to 9.0 N·m (70 to 80 lbf·in).
15. Reinstall muffler assembly removed in step 8.
16. Reinstall filter assembly removed in step 7.
17. Reinstall dc power supply assembly partially removed in step 6.
18. Install HDA as described in HDA Replacement procedure.
19. Replace side panel removed in step 4.
20. Close rear top cover.
21. Close front and rear doors.
22. Place MAIN circuit breaker to ON.

## LOGIC CARD REPLACEMENT

### CAUTION

To prevent damage to any logic or power supply card or to the HDA, remove power from the unit before replacing any card.

When a logic card is found to be defective, it must be replaced. The following describes the proper procedure for logic card installation.

## LOGIC CHASSIS WIREWRAP REPLACEMENT

This procedure describes removal and replacement of backpanel wirewrap connections.

1. Using end of wirewrap tool with notch opposing direction of wire's wrap, slide tool over pin and carefully turn tool to unwrap wire.

### CAUTION

Do not attempt to rewrap a previously wrapped wire. Cut off old wrap and restrip wire, or replace with new wire.

2. If wire is being replaced, cut new wire to proper length and strip approximately 28 mm (1-1/8 in) of insulation from each end of wire.
3. Insert one end of wire into wirewrap tool until insulation rests against stop.
4. Slide tool over backpanel pin, leaving a small gap between bottom of post or lower wrap level and new wire.
5. Hold wire securely (allow small amount of slack to assure one turn of insulation) and twist tool to wrap wire around pin. As tool is twisted, wire wrapping around pin forces tool up and off wire.
6. When wire is completely wrapped, remove tool and inspect connection. Each connection must have one turn of insulation and six to seven turns of bare wire around pin.

## BACKPANEL WIREWRAP PIN STRAIGHTENING

Wirewrap panel pin straightening is accomplished using the pin straightener listed in maintenance tools and materials.

**3**

**PARTS**

**DATA**

---

**INTRODUCTION**

This section provides replaceable part information for all the fixed module drives (FMDs) listed in the preface of this manual.

Information in this section falls into three categories:

**Illustrated Parts Breakdown** - This breakdown provides part number information for all field replaceable items except cables and harnesses.

**Cable and Harness Part Information** - This breakdown provides part number information for all field replaceable cables, harnesses, and terminators.

**Spare Parts List** - This is a list of recommended spare parts.

**Card Interchangeability Charts** - These charts show changes (if any) to the logic card complement as a result of any Engineering Change Orders (ECOs) or Field Change Orders (FCOs) that have been installed in the equipment.

**NOTE**

Parts listed in the illustrated parts breakdown, but not in the spare parts list, may be long lead time items subject to significant delays.



**3A**

**ILLUSTRATED**

**PARTS**

**BREAKDOWN**

---

**GENERAL**

The Illustrated Parts Breakdown (IPB) provides the information needed to order field replaceable parts. This information is presented in assembly illustrations and parts lists.

The symbols used in this section are explained in table 3A-1. For an explanation of abbreviations, refer to the front of this manual.

The illustrated parts breakdown is preceded by three locators that are a quick reference for locating the illustrations and parts lists for a specific assembly.

The illustrated parts breakdown is structured as follows. Each major assembly is shown in an exploded view and assigned a figure number. More than one illustration per figure number may be required for a complex assembly. In this case, the illustrations are titled figure 3A-1 (sheet 1); figure 3A-1 (sheet 2), etc. The parts shown on the illustration are numbered. A parts list for each illustration begins on the page facing the illustration. The numbers on the figure correspond to the index numbers on the associated parts list. In some cases, the parts list will have more than one page for the corresponding sheet of a figure.

The parts list consists of four columns:

**Index Number Column** - The numbers given in this column correspond to the numbers shown on the illustration. When more than one entry is given for a particular index number, the use of each part is defined in the Notes column. Items may be listed without index numbers, and are mentioned for reference only. These items do not appear on the illustration.

**Part Number Column** - This column provides the eight digit number by which a part may be ordered. In some cases the last two digits (referred to as tab numbers) are replaced by a symbol. Table 3A-1 explains the use of those symbols.

Description Column - This column gives the name and a brief description of each part and assembly. The relationship of parts and assemblies is shown within the column by means of indentation. When an item is indented more than the previous item, it is part of the previous item.

Notes Column - This column defines multiple part number entries for a single index number. Multiple entries may be necessary to identify differences such as machine configuration (for example, whether the part is for a 50 Hz or 60 Hz unit) or to track history (for example, the part issued only on a series code 03 unit with Engineering Change Order (ECO) 49444 installed). Information that is unique to one particular equipment or application will also be noted in this column.

Color Code Chart - The color code chart (table 3A-2) is used in conjunction with the equipment configuration chart (see front of this manual). The parts list provides the eight-digit number needed to order painted parts for the units covered in this manual.

First, determine the correct color code by referring to the equipment configuration chart. Then, find that code in the color code column of table 3A-2. Following the code are the tab numbers for each painted assembly. If an entire assembly is being replaced, use the two digits listed under ASSY TAB. If just the piece part is needed use the two digits listed under PC PT TAB. The parts list contains the first six digits of each part number plus the symbol \*\* (for example 775601\*\*). The complete number is obtained by substituting the tab numbers for the symbol \*\*.

TABLE 3A-1. SYMBOLOGY

##	Spare part. See Section 3C Spare Parts List.
XX	Used to replace tab number if assembly undergoes frequent factory change. To order replacement assembly, use number found on part number label of existing assembly. If number is not available, be sure to include with your order, the machine series code and a list of all change orders installed in machine.
**	Tab numbers will appear in color code chart in table 3A-2.
CIC	Card Interchangeability Chart in Section 3D.
A1	Apply Permabond, CDC part number 95033500.
A2	Apply Permabond, CDC part number 95033902.
G1	Apply dielectric grease, CDC part number 95533601.
G2	Apply lubricant, CDC part number 95016101.
L1	Apply anaerobic sealant, Type 242, CDC part number 95125322.
L2	Apply anaerobic sealant, Type C, CDC part number 95044213.
L3	Apply anaerobic sealant, Type C, CDC part number 95125305.

TABLE 3A-2. COLOR CODE CHART

COLOR CODE	ASSEMBLY & PIECE PART TABS										COMMENTS
	FRONT DOOR		REAR DOOR		SIDE PANEL		TOP COVER 1		CONTROL PANEL 2		
	ASSY	PC	ASSY	PC	ASSY	PC	ASSY	SET	ASSY	SET	
A	01	09	01	09	01	03	01	07	13	07	3 ↓ 3
A	01	09	01	09	01	03	01	07	39	07	
B	05	47	05	48	05	48	04	11	14	10	
B	05	47	05	48	05	48	04	11	40	10	
C	06	49	06	49	06	49	05	12	16	12	
C	06	49	06	49	06	49	05	12	42	12	
D	07	50	07	50	07	51	06	13	17	13	
D	07	50	07	50	07	51	06	13	44	13	
E	08	52	08	52	08	53	07	14	18	14	
E	08	52	08	52	08	53	07	14	43	14	
F	09	55	09	55	08	17	21	17	22	17	
F	09	55	09	55	08	17	21	17	45	17	
G	10	57	10	57	10	56	09	19	23	19	
G	10	57	10	57	10	56	09	19	46	19	
H	11	58	11	58	11	58	19	30	33	30	
H	11	58	11	58	11	58	19	30	47	30	
J	12	59	13	59	13	59	19	30	35	32	
J	12	59	13	59	13	59	19	30	48	32	
K	14	60	14	60	14	61	22	33	36	33	
K	14	60	14	60	14	61	22	33	49	33	

NOTES:

1. Top Cover Set includes the front and rear top covers.
2. Control Panel Set includes the diagnostic panel cover and control panel.
3. First entry in pairing - S/C 15 & Below  
Second entry in pairing - S/C 16 & Above

# LOCATOR 1

REAR DOOR  
(FIG. 2)

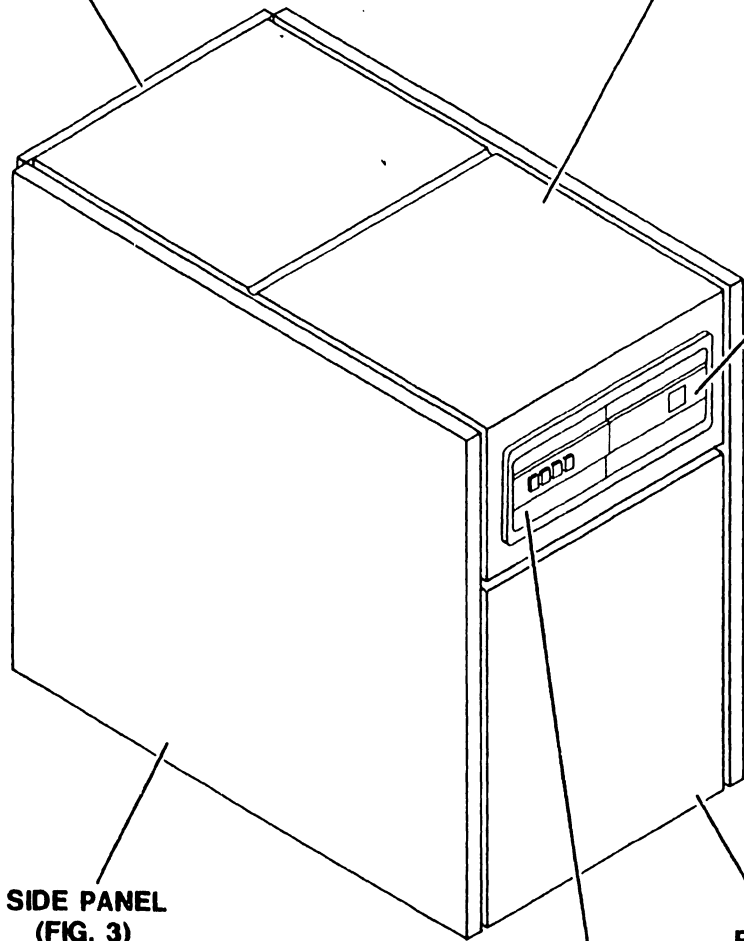
TOP COVER  
(FIG. 4)

DIAGNOSTIC  
PANEL  
(FIG. 6)

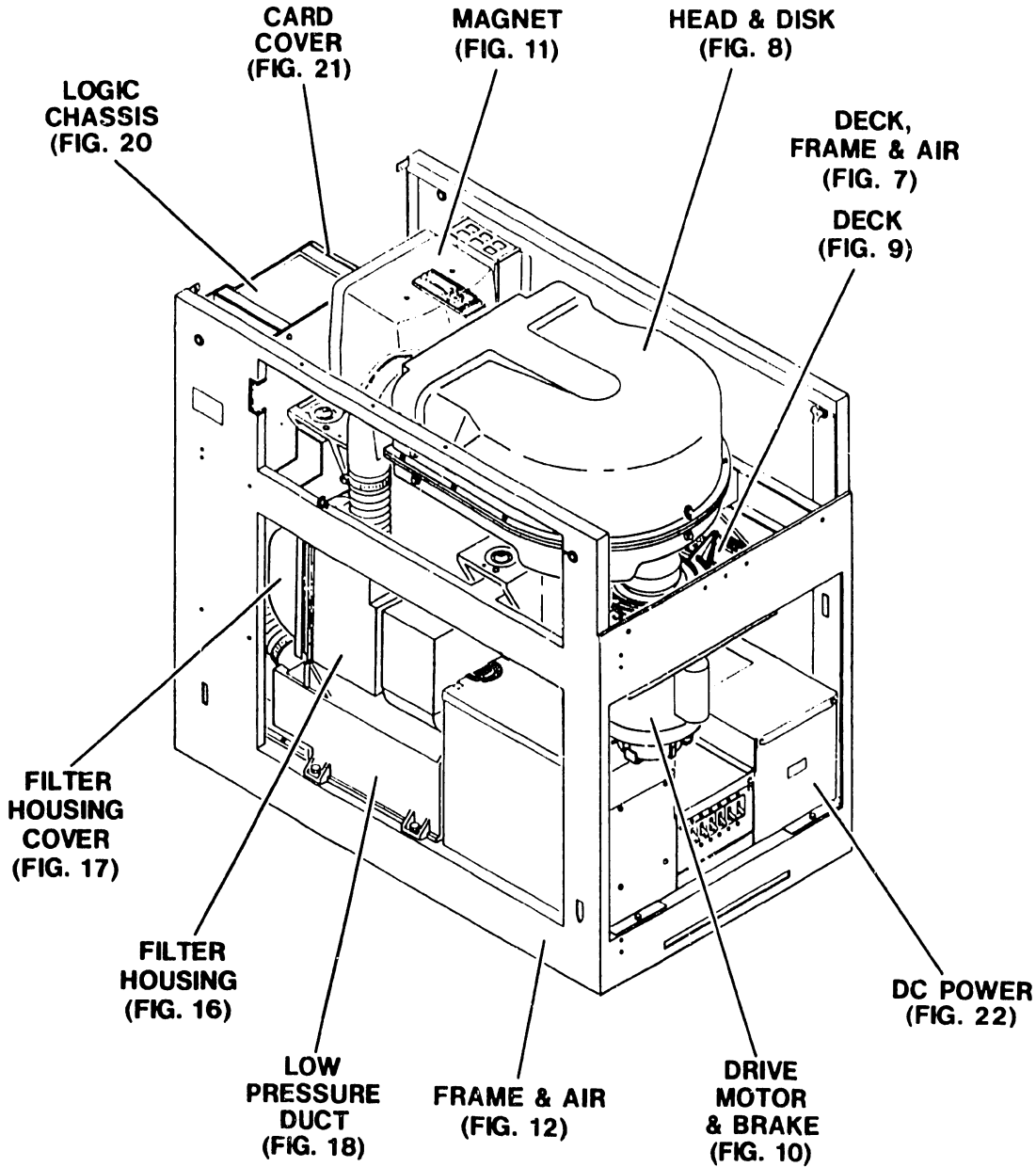
SIDE PANEL  
(FIG. 3)

CONTROL  
PANEL  
(FIG. 5)

FRONT  
DOOR  
(FIG. 1)

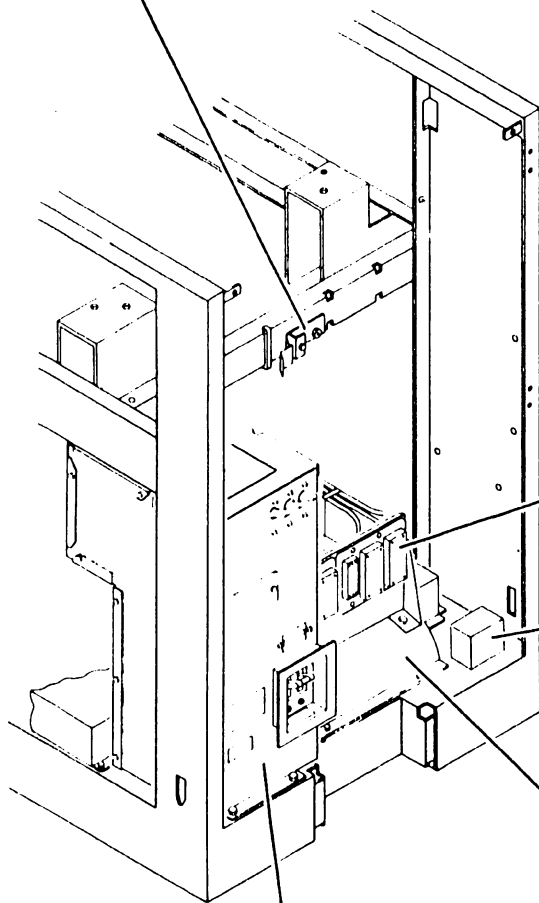


# LOCATOR 2



# LOCATOR 3

LOGIC CHASSIS LATCH  
(FIG. 15)



I/O PANEL  
(FIG. 13)

GROUNDING  
BLOCK  
(FIG. 14)

BLOWER  
PLENUM  
(FIG. 19)

AC POWER  
(FIG. 23)

AVXV COMPONENT  
(FIG. 24)



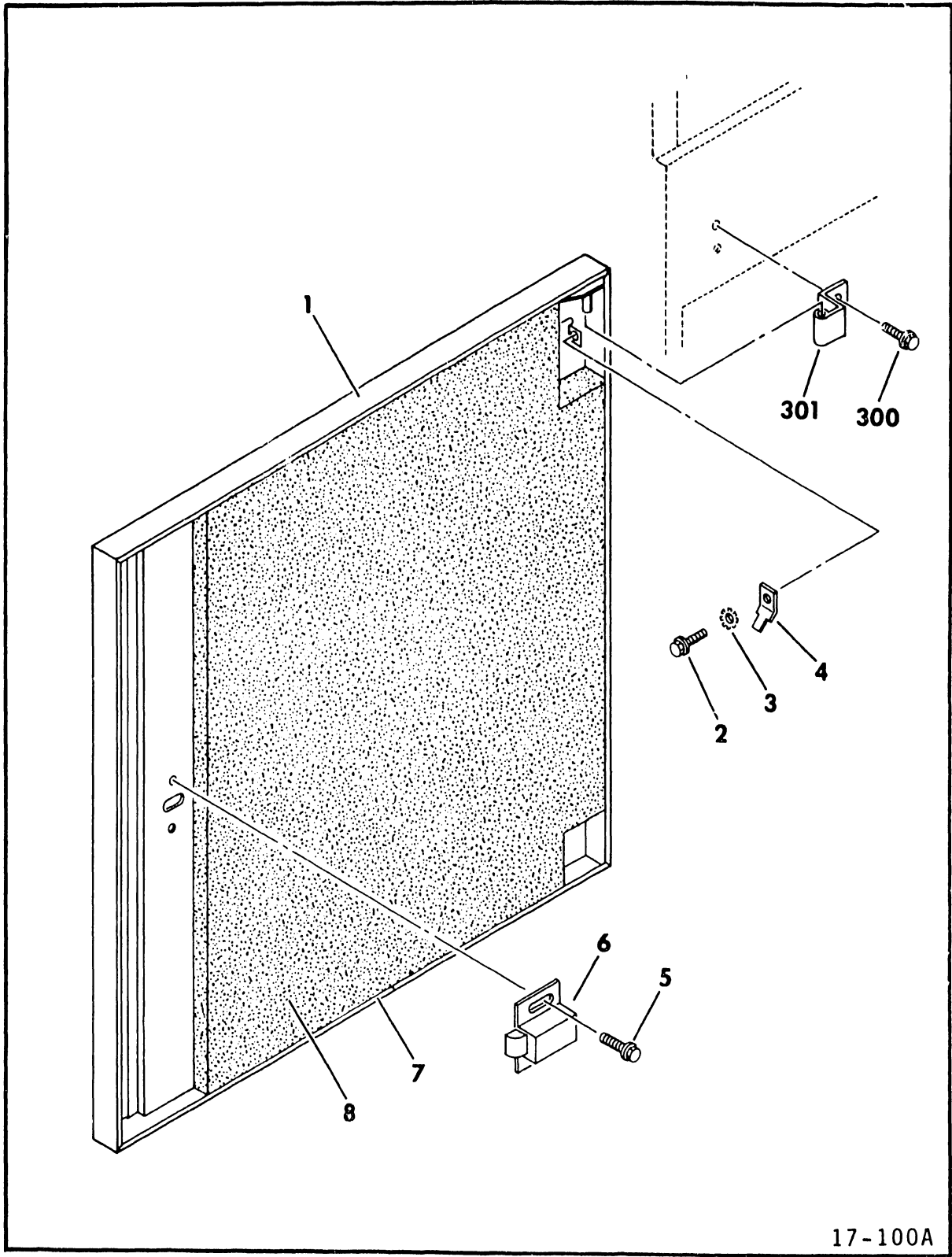


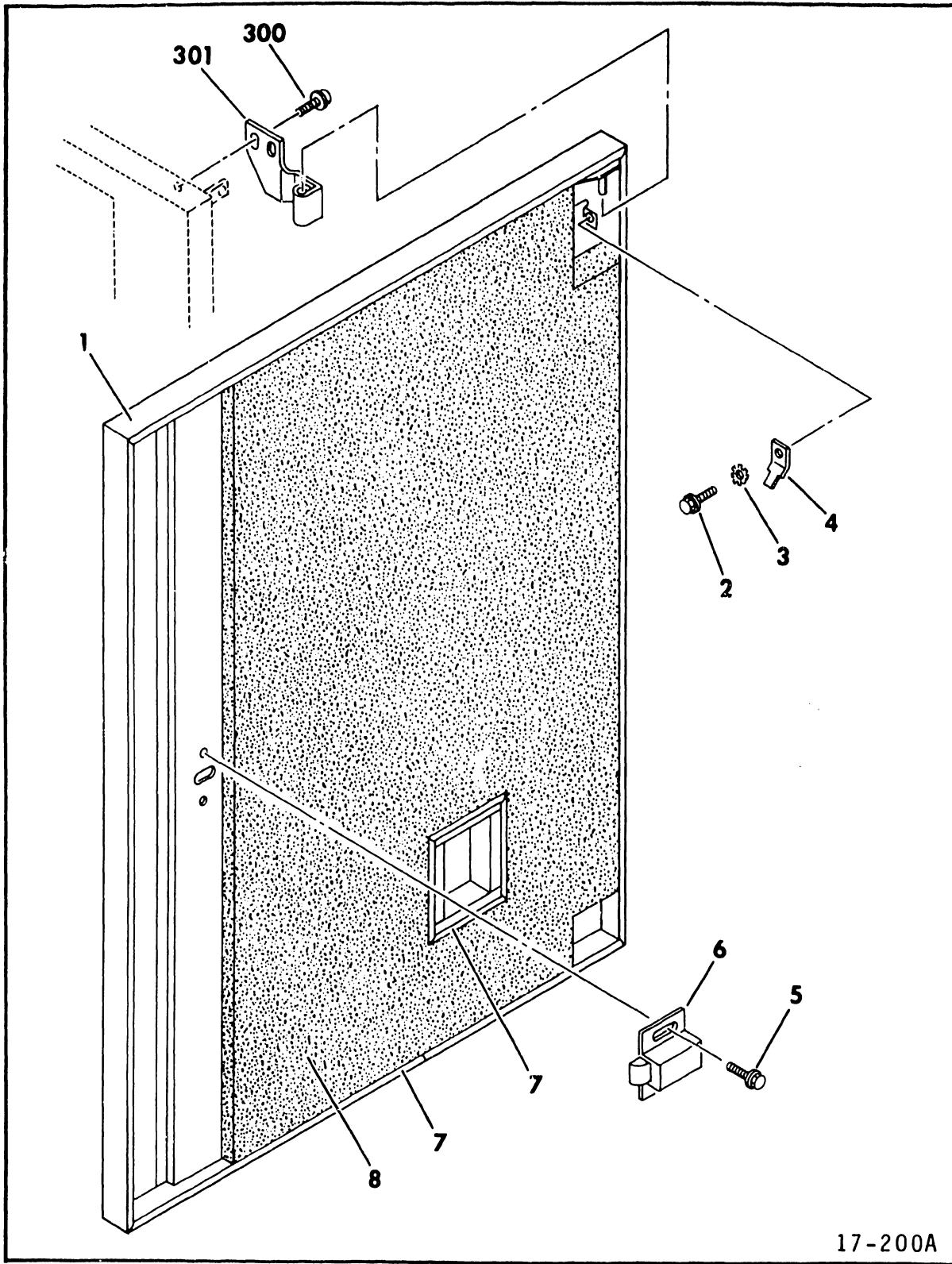
Figure 3A-1. Front Door Assembly

INDEX	PART	PART DESCRIPTION	NOTE
NO	NO		

3A-1	751422**	FRONT DOOR ASSEMBLY	
1	751431**	DOOR, Front	
2	93592196	SCREW, Hex Washer Head, 8-32 x 1/4	
3	10126402	WASHER, External Tooth Lock, 8	
4	94274105	TERMINAL, Quick Connect	
5	93592238	SCREW, Hex Washer Head, 10-32 x 3/8	
6	92008601	LATCH, Slide Bolt	
7	94377001	SEAL, Extrusion	
8	94397630	FOAM, Acoustical Panel	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
FRONT DOOR ASSEMBLY)

300	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
301	75143300	HINGE, Door Frame	



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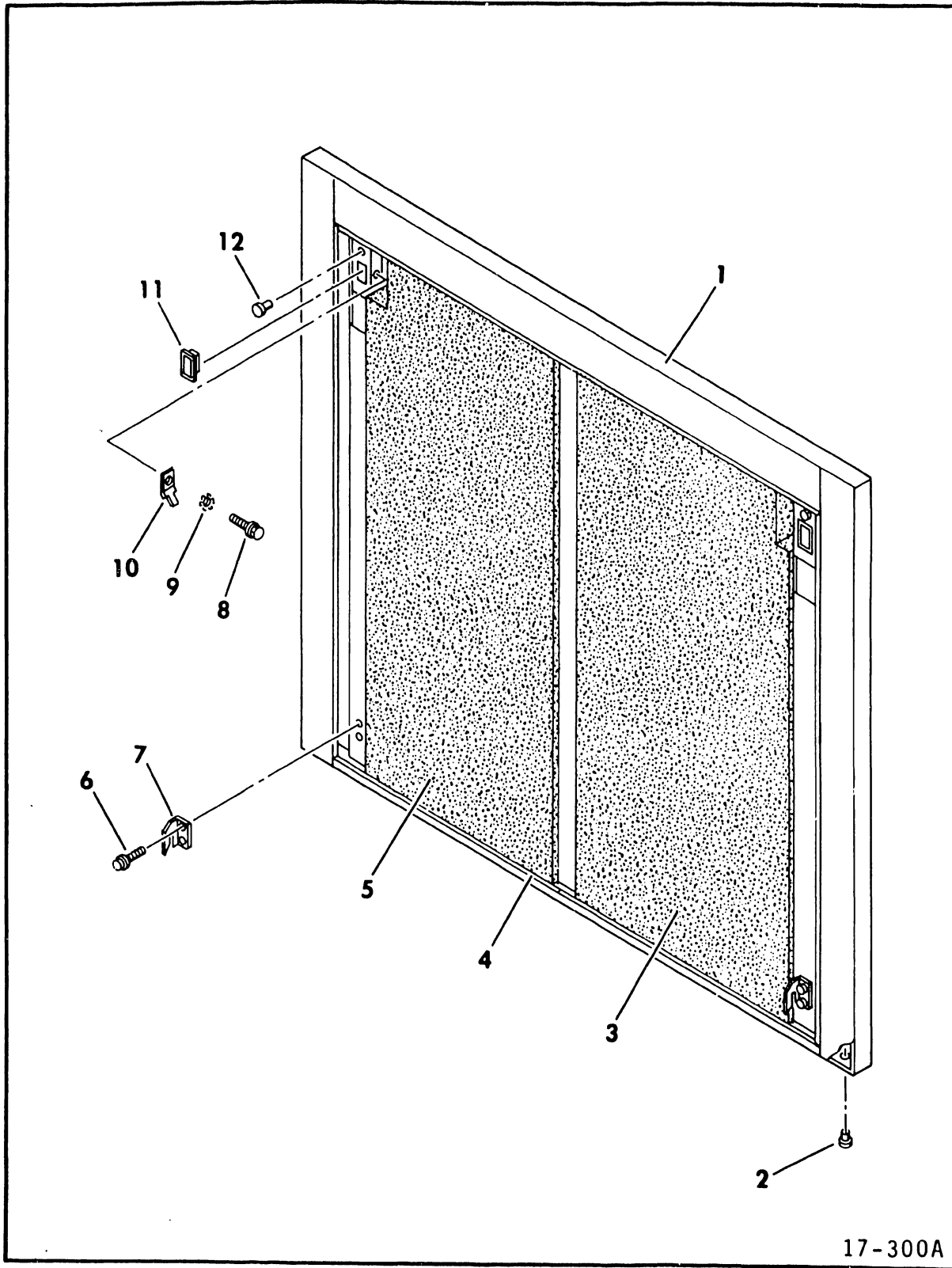
Figure 3A-2. Rear Door Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-2	751423**	REAR DOOR ASSEMBLY	
1	751432**	DOOR, Rear	
2	93592196	SCREW, Hex Washer Head, 8-32 x 1/4	
3	10126402	WASHER, External Tooth Lock, 8	
4	94274105	TERMINAL, Quick Connect	
5	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
6	92008601	LATCH, Side Bolt	
7	94377001	SEAL Extrusion	
8	94397629	FOAM, Acoustical Panel	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
REAR DOOR ASSEMBLY)

300	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
301	75143400	HINGE, Top Rear Door	



17-300A

Figure 3A-3. Side Panel Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-3	751421**	SIDE PANEL ASSEMBLY	
1	751437**	PANEL, Side	
2	93623000	BUMPER, Rubber	
3	94397631	FOAM, Acoustical Panel	
4	94377001	SEAL, Extrusion	
5	94397632	FOAM, Acoustical Panel	
6	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
7	75143800	BRACKET, Support	
8	93592196	SCREW, Hex Washer Head, 8-32 x 1/4	
9	10126402	WASHER, External Tooth Lock, 8	
10	94274105	TERMINAL, Quick Connect	
11	94303500	RECEPTACLE, Clip-in	
12	92633021	BUMPER, Grommet	

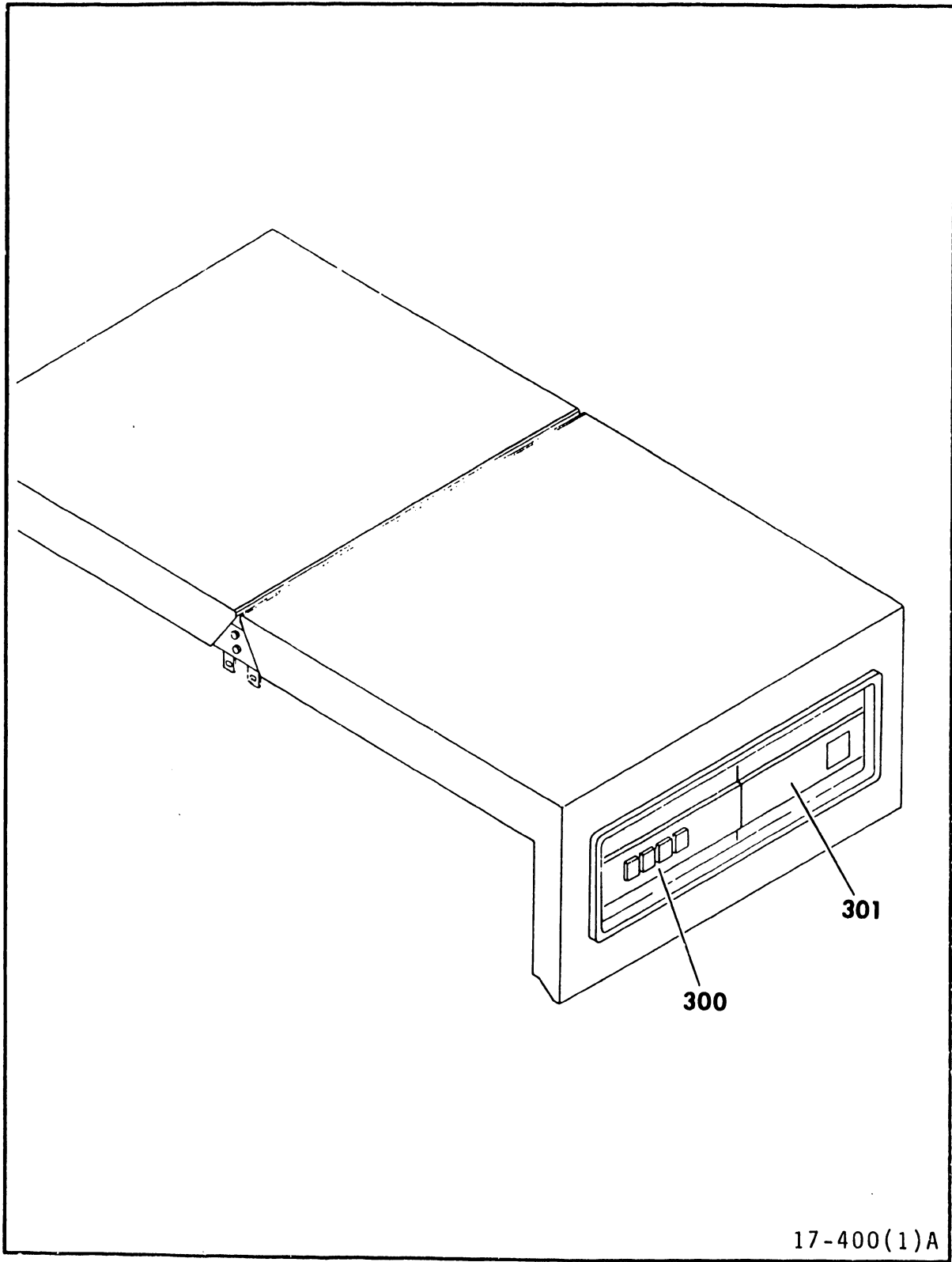


Figure 3A-4. Top Cover Assembly (Sheet 1 of 4)

INDEX	PART	PART DESCRIPTION	NOTE
NO	NO		

3A-4 920195\*\* TOP COVER ASSEMBLY (Sheet 1 of 4)

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
TOP COVER ASSEMBLY)

300	CONTROL PANEL ASSEMBLY (See Figure 3A-5)
301	DIAGNOSTIC PANEL ASSEMBLY (See Figure 3A-6)



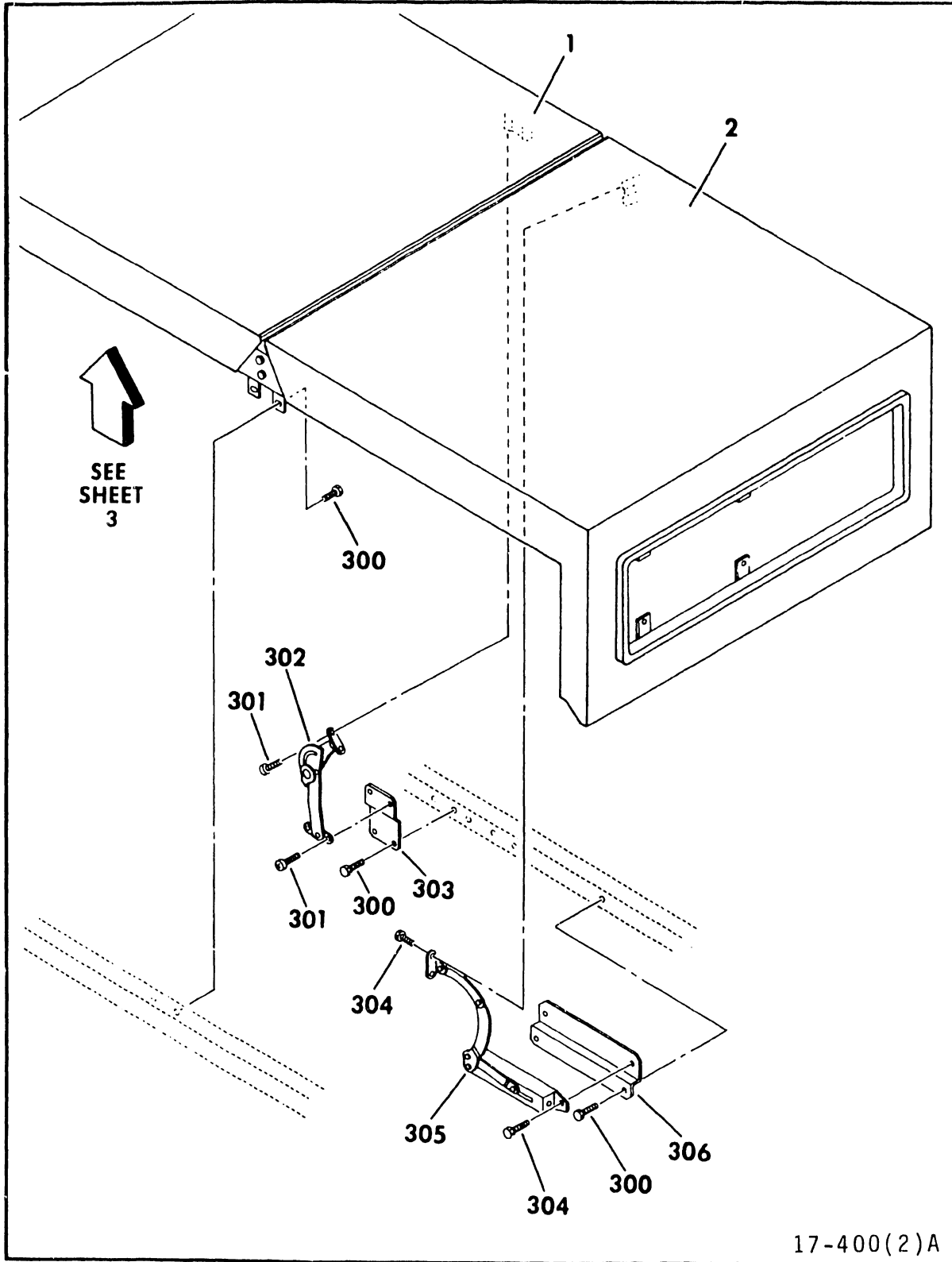


Figure 3A-4. Top Cover Assembly (Sheet 2)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-4		TOP COVER ASSEMBLY (Sheet 2)	
	920351**	TOP COVER SET	
1		COVER, Rear Top	
2		COVER, Front Top	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
TOP COVER ASSEMBLY)

300	93592200	SCREW, Hex Head Washer, 8-32 x 3/8	
301	94358900	SCREW, Flat Head, 6-32 x 1/4	
302	94401501	SUPPORT, Lid	Right Side
302	94401500	SUPPORT, Lid	Left Side
303	75154200	BRACKET, Rear Cover Support	
304	93592196	SCREW, Hex Washer Head, 8-32 x 1/4	
305	94401401	SUPPORT, Lid	Right Side
305	94401400	SUPPORT, Lid	Left Side
306	75154800	BRACKET, Front Cover Support	

NOTE:

The following parts are  
used on the left side lid  
support, only. S/C 05 and  
Abv, W/ 61735A.

94237703	TRIM, Black Safety
10126402	WASHER, External Tooth Lock, 8
94369576	CABLE, Ground

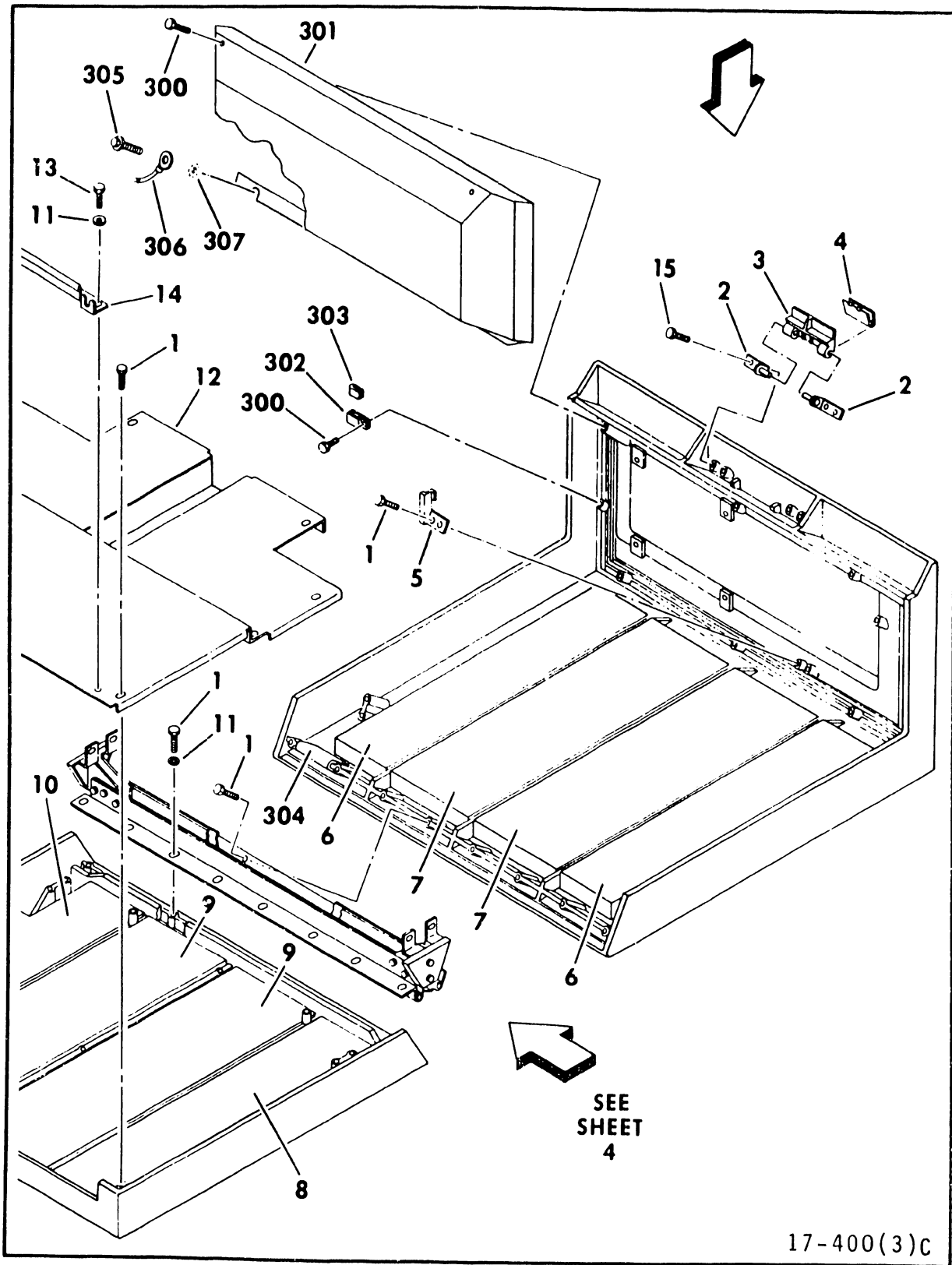


Figure 3A-4. Top Cover Assembly (Sheet 3)

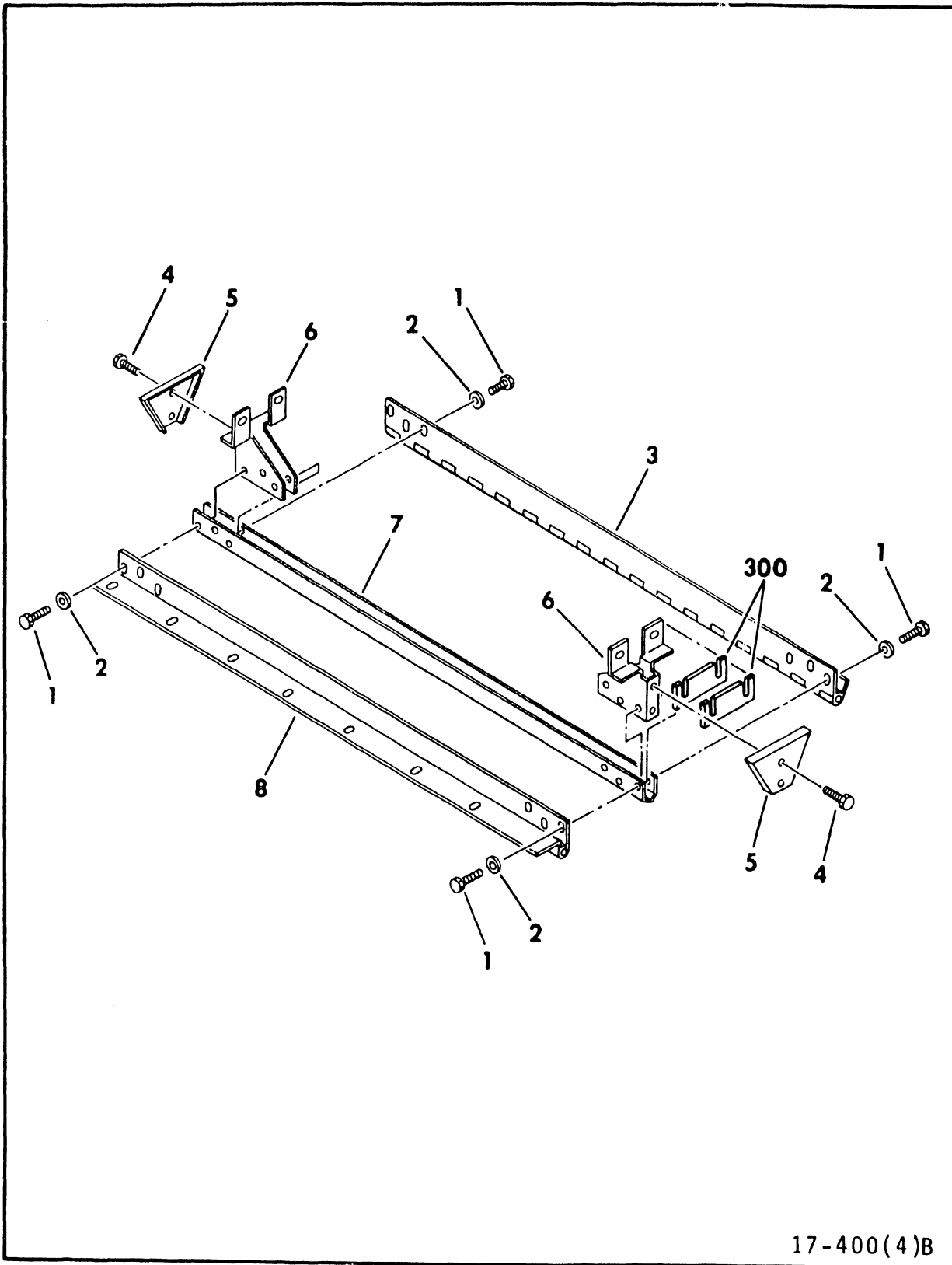
INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-4 TOP COVER ASSEMBLY (Sheet 3)

1	94376925	SCREW, Hex Washer Head, 8-16 x 1/2	
2	75151800	BRACKET, Latch Hinge	
3	75152200	LATCH, Top Cover	
4	75152300	SPRING, Top Cover Latch	
5	75150900	STRIKE, Diagnostic Latch	
6	94397634	FOAM, Acoustical Panel	
7	94397633	FOAM, Acoustical Panel	
8	94397635	FOAM, Acoustical Panel	
9	94397637	FOAM, Acoustical Panel	
10	94397636	FOAM, Acoustical Panel	
11	10125605	WASHER, Plain, 6	
12	75153900	LINER, Rear Cover	
13	10125016	SCREW, Hex Head Machine, 6-32 x 3/8	
14	75151600	TRIM, Rear Cover	
15	94376924	SCREW, Thread Forming Hex Washer Head, 8-16 x 3/8	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
TOP COVER ASSEMBLY)

300	94376917	SCREW, Hex Washer Head, 6-19 x 3/8	
301	75152900	COVER, Inside Top	
302	92602021	CLAMP, Black Nylon Cable	
303	94276600	FOAM, Tape	
304	00845501	GROMMET, Caterpillar	
305	94376925	SCREW, Hex Washer Head, 8-16 x 1/2	S/C 05 & Abv, W/ 61735A
306	94369576	CABLE, Ground	S/C 05 & Abv, W/ 61735A
307	10126402	WASHER, External Tooth Lock, 8	S/C 05 & Abv, W/61735A



17-400(4)B

Figure 3A-4. Top Cover Assembly (Sheet 4)

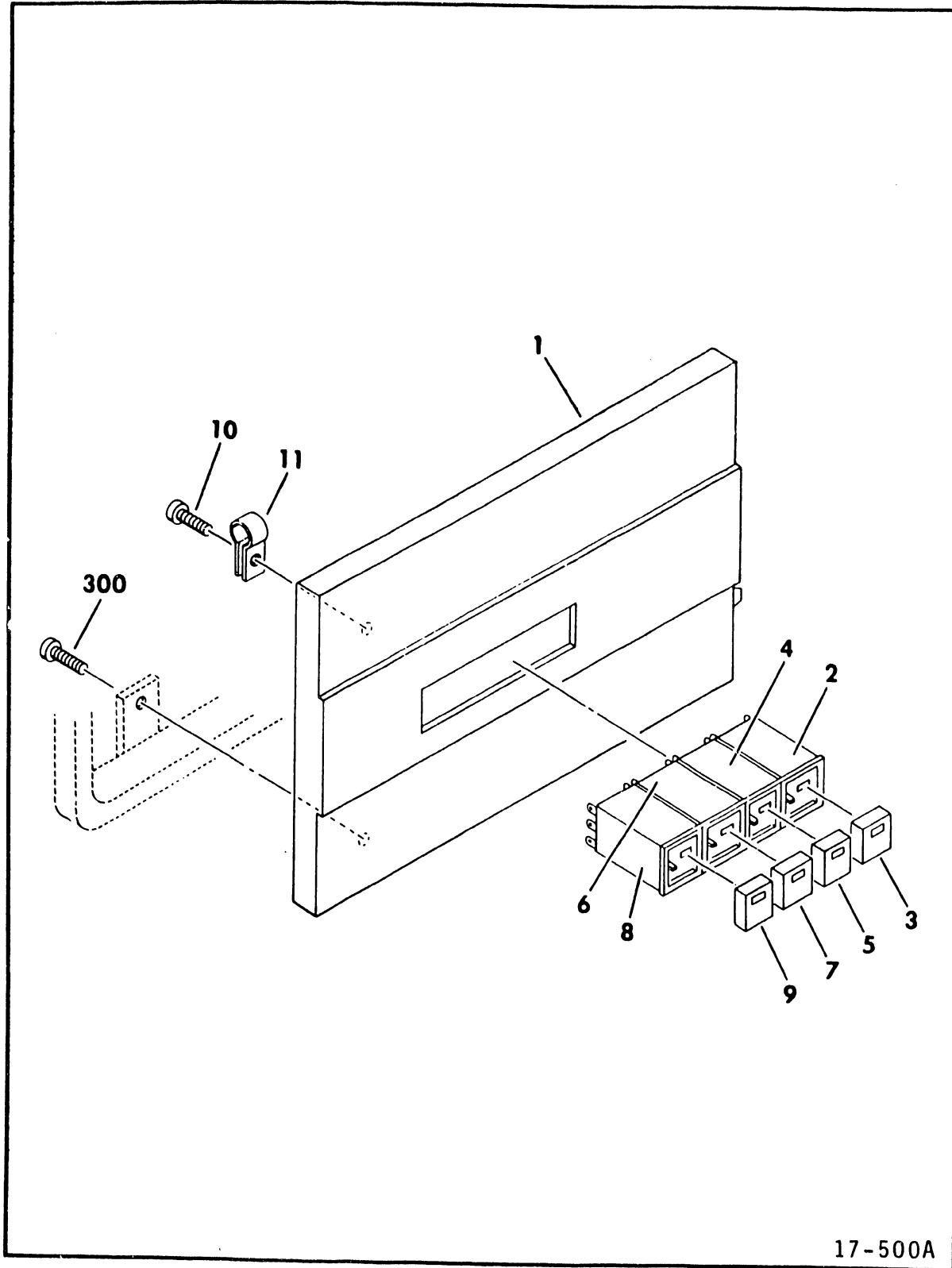
INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-4 TOP COVER ASSEMBLY (Sheet 4)

1	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
2	10125607	WASHER, Plain, 10	
3	75151700	HINGE, Front Cover	
4	93592158	SCREW, Hex Washer Head, 6-32 x 1/4	
5	75151500	CAP, Hinge	S/C 13 & Blw, W/O 02161F
5	83292380	CAP, Hinge	S/C 13 & Abv, W/ 02161F
6	75151401	BRACKET, Top Cover Hinge	
7	75151300	STRIP, Top Cover Hinge	
8	75150900	STRIKE, Diagnostic Latch	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
TOP COVER ASSEMBLY)

300 94376724 PLATE, Nut



17-500A

Figure 3A-5. Control Panel Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-5	474978**	CONTROL PANEL ASSEMBLY (A5)	
1	920391**	DIAGNOSTIC & CONTROL PANEL SET	Set includes control panel and diagnostic panel
2	94394014	SWITCH, Push Button (A5A4)	S/C 13 & Blw, W/O 02161F
2	94394033	SWITCH, Push Button (A5A4)	S/C 13 & Abv, W/ 02161F
3	##	LENS (WRITE PROTECT)	
4	94394008	SWITCH, Push Button (A5A3)	S/C 07 & Blw
4	94394000	SWITCH, Push Button (A5A3)	S/C 08 - 13, W/O 02161F
4	94394028	SWITCH, Push Button (A5A3)	S/C 13 & Abv, W/ 02161F
5	##	LENS (READY)	
6	94394100	INDICATOR, Illuminated (A5DS2)	S/C 13 & Blw, W/O 02161F
6	94394113	INDICATOR, Illuminated (A5DS2)	S/C 13 & Abv, W/ 02161F
7	##	LENS (FAULT/CLEAR)	
8	94394015	SWITCH, Push Button (A5S1)	S/C 13 & Blw, W/O 02161F
8	94394035	SWITCH, Push Button (A5S1)	S/C 13 & Abv, W/ 02161F
9	##	LENS (START)	
10	94376917	SCREW, Hex Washer Head, 6-19 x 3/8	
11	92602002	CLAMP, Nylon Cable	
(ITEMS LISTED BELOW THIS NOTE ARE NOT PART OF THE CONTROL PANEL ASSEMBLY)			
300	94376919	SCREW, Hex Washer Head, 6-19 x 5/8	



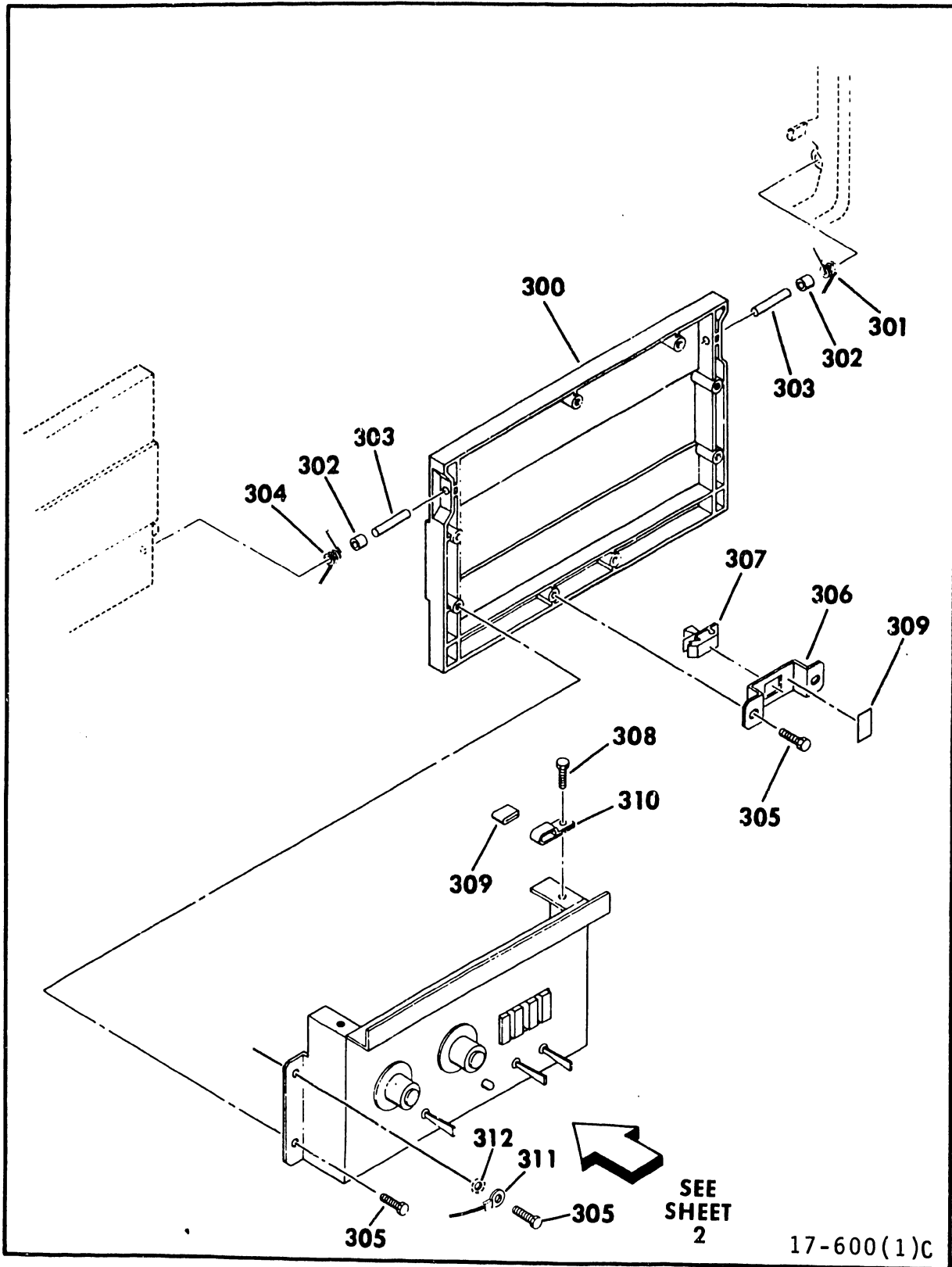


Figure 3A-6. Diagnostic Panel Assembly (Sheet 1 of 2)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-6 75142800 DIAGNOSTIC PANEL ASSEMBLY  
(A6) (Sheet 1 of 2)

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
DIAGNOSTIC PANEL ASSEMBLY)

300	920391**	DIAGNOSTIC & CONTROL PANEL SET	Set includes control panel and diagnostic panel
301	47482301	SPRING, Torsion	Right Side
302	93109583	SPACER, Standoff	
303	92226046	PIN, Dowel	
304	47482300	SPRING, Torsion	Left Side
305	94376917	SCREW, Hex Washer Head, 6-19 x 3/8	
306	75151900	BRACKET, Cover Latch	
307	92013301	CATCH, Side	
308	94358900	SCREW, Flat Head, 6-32 x 1/4	
309	94276614	FOAM, Tape	
310	92602021	CLAMP, Black Nylon Cable	
311	94281467	CABLE, Ground	S/C 05 & Abv, W/ 61735A
312	10126401	WASHER, External Tooth Lock, 6	S/C 05 & Abv, W/ 61735A

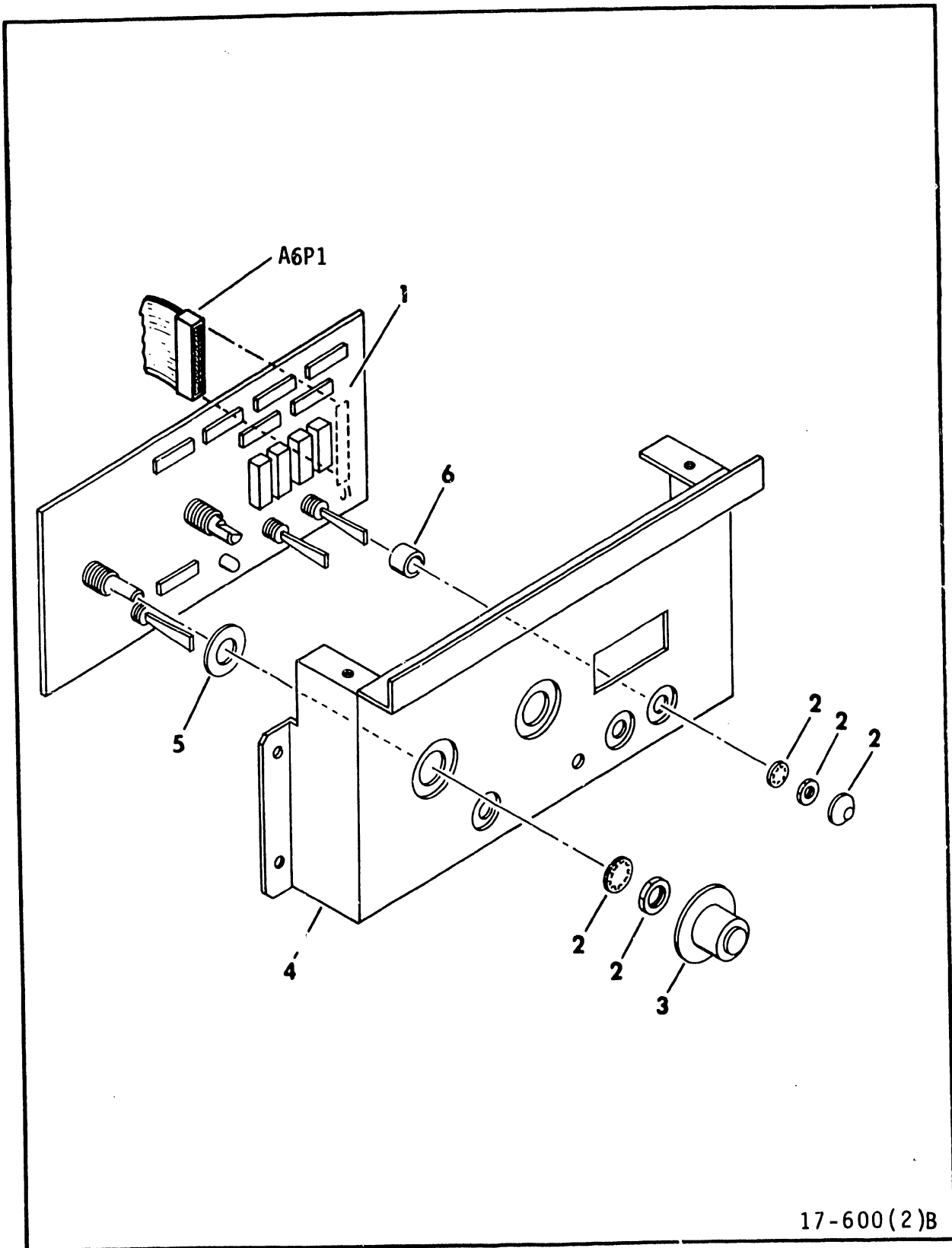


Figure 3A-6. Diagnostic Panel Assembly (Sheet 2)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-6

DIAGNOSTIC PANEL ASSEMBLY  
(Sheet 2)

1	CIC	- VWV COMPONENT ASSEMBLY (A6)	Supplied as a part of VWV Component Assembly
2		- HARDWARE, Attaching	
3	93152007	KNOB, Skirted	
4	75153400	PANEL, Diagnostic	
5	93564029	WASHER, Nylon	
6	75253500	SPACER, Switch	

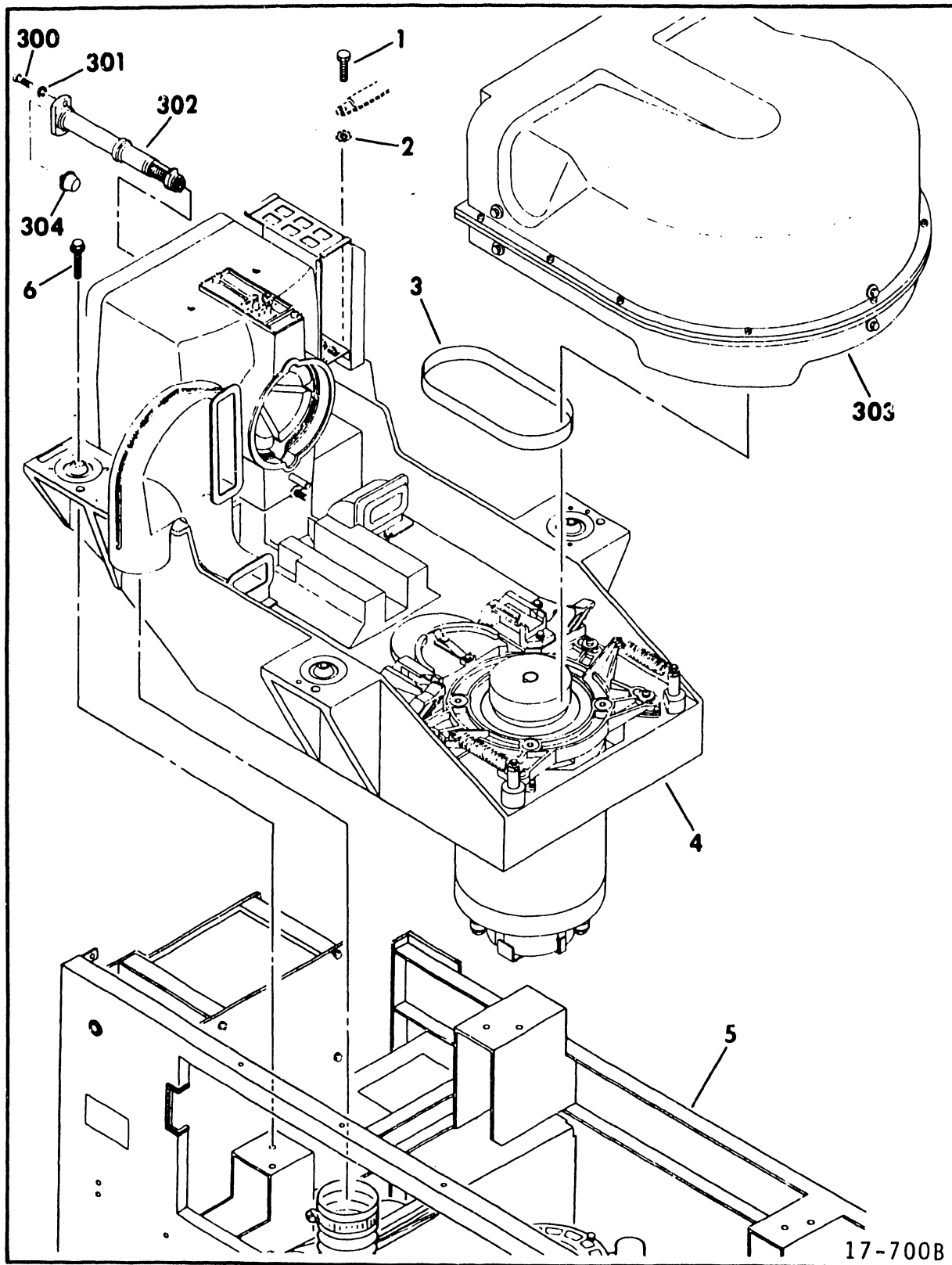


Figure 3A-7. Deck, Frame & Air Assembly

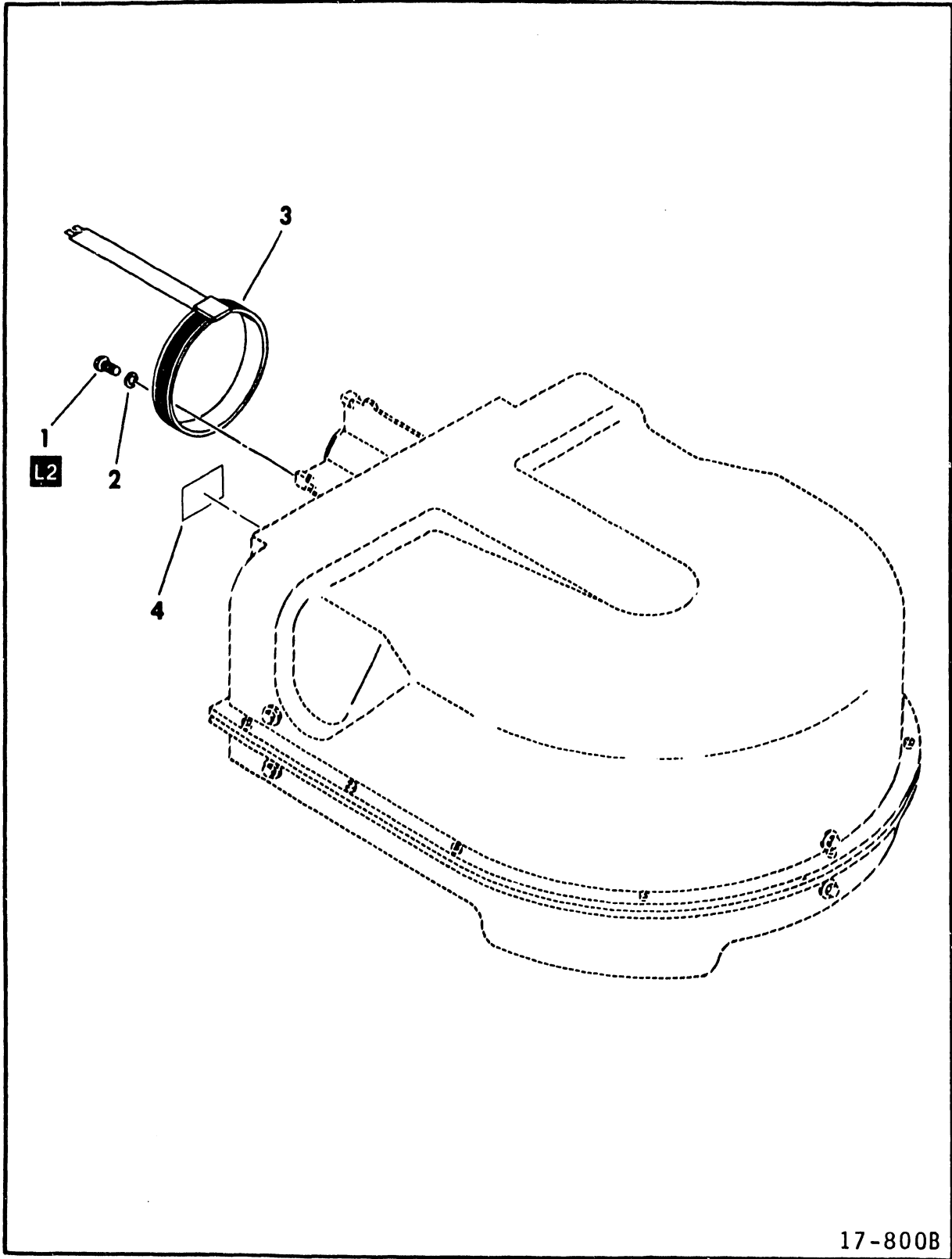
INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-7		DECK, FRAME & AIR ASSEMBLY	
1	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
2	10126403	WASHER, External Tooth Lock, 10	
3	##	BELT, Drive	
4		DECK ASSEMBLY (A7) (See Figure 3A-9)	
5		FRAME & AIR ASSEMBLY (See Figure 3A-12)	
6	93592366	SCREW, Hex Washer Head, 5/16 x 1-1/2	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
DECK, FRAME & AIR ASSEMBLY)

300	10127133	SCREW, Pan Head Machine, 10-24 x 3/8	
301	10125805	WASHER, Spring Lock, 10	
302	77792003	STOP ASSEMBLY	
303		HEAD & DISK ASSEMBLY (See Figure 3A-8)	
304	94353214	PLUGS & CAPS	

S/C 02 and Abv,  
W/ 61384A



17-800B

Figure 3A-8. Head & Disk Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-8	47150620	HEAD & DISK ASSEMBLY	Packaged, Non-Fixed Heads
3A-8	47150621	HEAD & DISK ASSEMBLY	
3A-8	47150636	HEAD & DISK ASSEMBLY	Packaged, Fixed Heads BZ7E1-W/Y, Only
1	92780082	SCREW, Slotted, 4-40 x 1/4	
2	77796400	WASHER, Voice Coil	
3	##	COIL ASSEMBLY	
4	47155300	LABEL, _YYV Card Information	Fixed Head Units Only



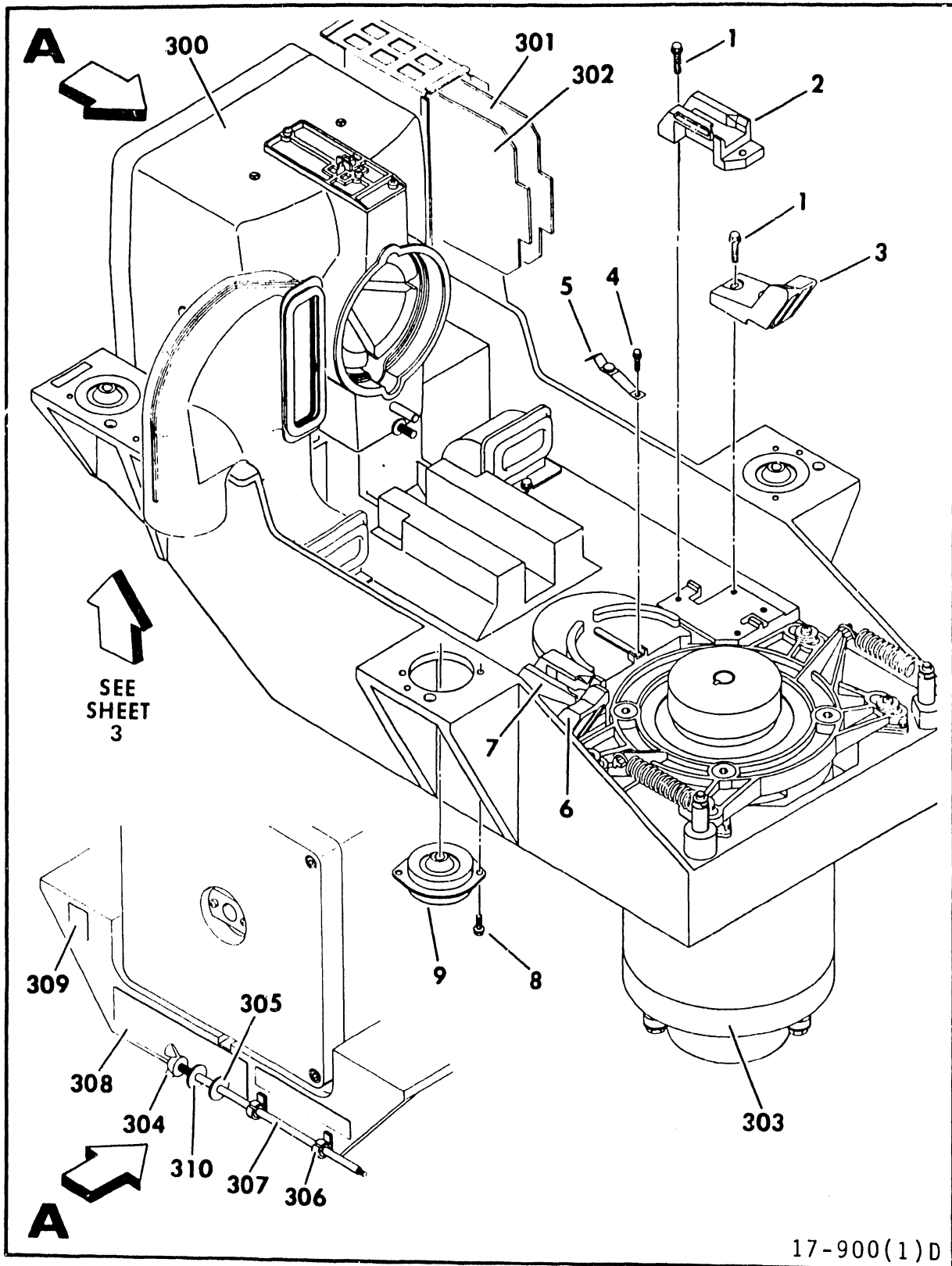


Figure 3A-9. Deck Assembly (Sheet 1 of 2)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-9		DECK ASSEMBLY (A7) (Sheet 1 of 3)	
1	93592242	SCREW, Hex Washer Head, 10-24 x 5/8	
2	77798000	LOCATOR, Right Module	
3	77801200	GUIDE, Right Docking	
4	93592082	SCREW, Hex Washer Head, 4-40 x 1/4	
5	75152700	STATIC GROUND ASSEMBLY	
6	77801201	GUIDE, Left Docking	
7	77798100	LOCATOR, Left Module	
8	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
9	92674001	MOUNT, Vibration	
		(ITEMS LISTED BELOW THIS NOTE ARE NOT PART OF THE DECK ASSEMBLY)	
300		MAGNET ASSEMBLY(See Figure 3A-11)	
301	CIC	_YYV COMPONENT ASSEMBLY	
302	CIC	_YMV COMPONENT ASSEMBLY	
303		DRIVE MOTOR AND BRAKE ASSEMBLY (See Figure 3A-10)	
304	93034002	NUT, Wing	
305	94047007	WASHER, Special	
306	92014605	CLIP, Cable	
307	47345300	ROD, Lock	
308	94391532	LABEL, Carriage Caution	
309	94391514	LABEL, R/W Card Designation	
310	94335006	WASHER, Rubber	

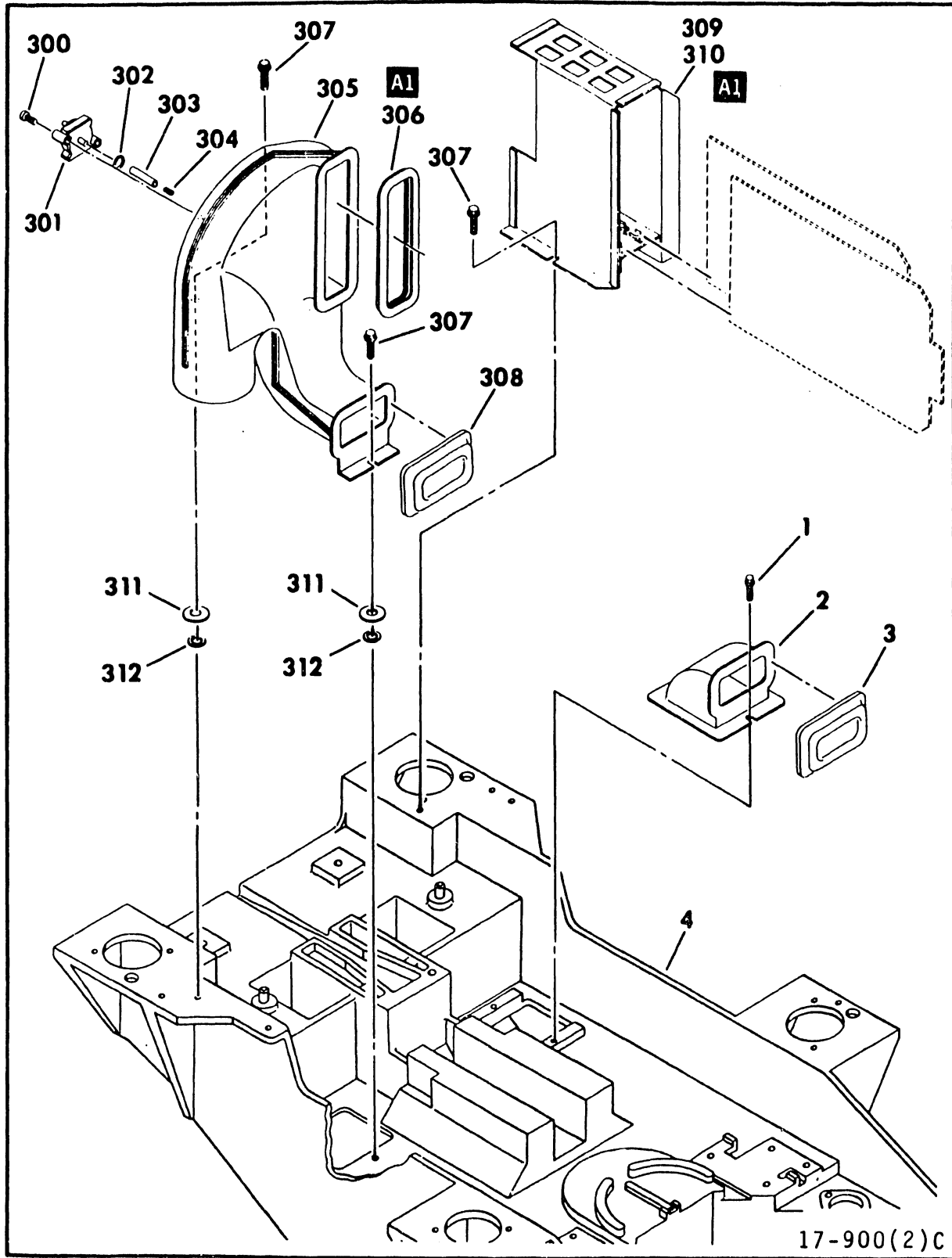


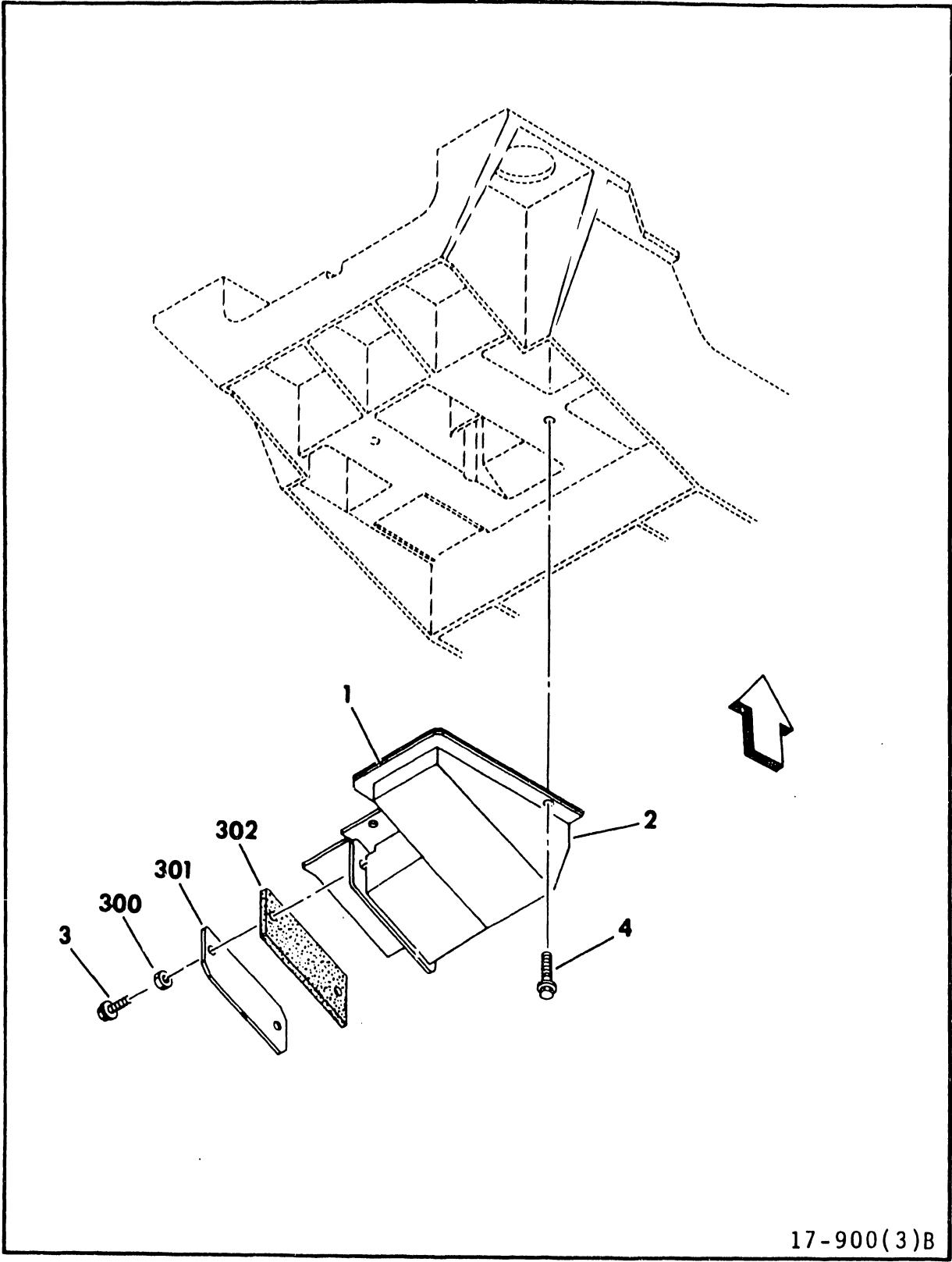
Figure 3A-9. Deck Assembly (Sheet 2)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-9		DECK ASSEMBLY (A7) (Sheet 2)	
1	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
2	77805101	DUCT, Air Outlet	
3	77808000	SEAL, Air Outlet	
4	474034XX	DECK, Main	S/C 02 & Blw, W/O 59991A
4	474051XX	DECK, Main	S/C 02 W/ 59991A; S/C 03 - 12, W/O 02337C
4	728763XX	DECK, Main	S/C 13 & Abv, W/ 02337C

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
DECK ASSEMBLY)

300	94376913	SCREW, Hex Washer Head, 4-20 x 3/4	
301	##	SWITCH, Pressure Sensor	
302	92074145	O-RING	
303	94228203	TUBING, Flexible Plastic	
304	93071246	SCREW, Set Socket Head 6-32 x 1/4	
305	75138300	DUCT, Air Inlet	
306	75154100	SEAL, Air Inlet	
307	93592240	SCREW, Hex Washer Head, 10-24 x 1/2	
308	77808000	SEAL, Air Module	
309	47400600	CIRCUIT CARD CHASSIS ASSEMBLY	
310	00845501	RUBBER, Channel	
311	94047007	WASHER, Special	
312		CABLE, Ground (See Figure 3A-14 for part number)	
313	10126403	WASHER, External Tooth Lock, 10	



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Figure 3A-9. Deck Assembly (Sheet 3)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-9		DECK ASSEMBLY (A7) (Sheet 3)	
1	95051502	FOAM, Tape	
2	47426800	MUFFLER ASSEMBLY	S/C 02 W/O 61230A & Blw
2	47426801	MUFFLER ASSEMBLY	S/C 02 W/ 61230A & Abv
3	93592162	SCREW, Hex Washer Head 6-32 x 3/8	S/C 02 W/O 61230A & Blw
4	93592238	Hex Washer Head 10-24 x 3/8	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
DECK ASSEMBLY)

300	10125105	NUT, Hex, 6-32	S/C 02 W/O 61230A & Blw
301	77577000	PLATE, Muffler Cover	S/C 02 W/O 61230A & Blw
302	76579105	GASKET, Air Seal	S/C 02 W/O 61230A & Blw

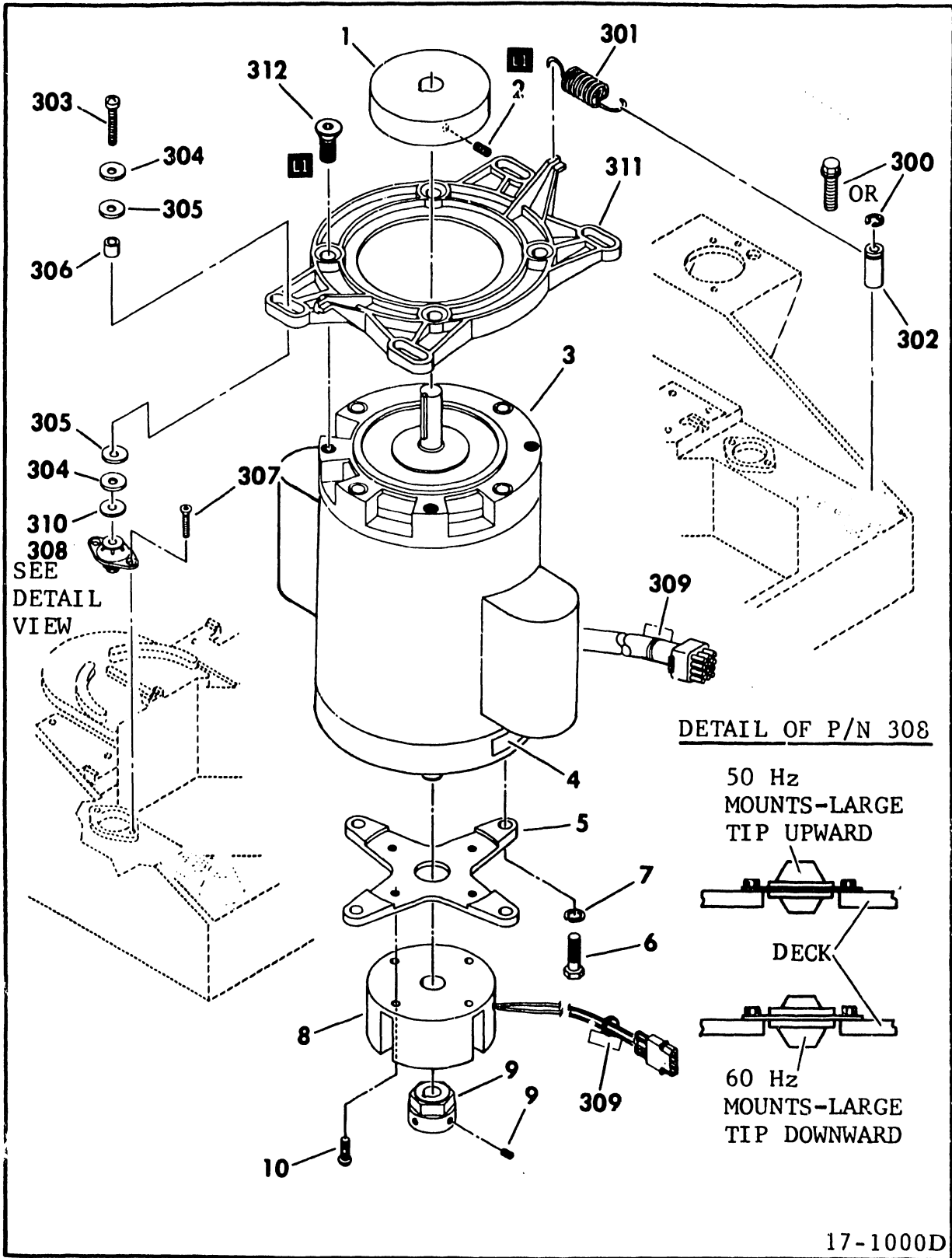


Figure 3A-10. Drive Motor And Brake Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-10	75142901	DRIVE MOTOR & BRAKE ASSEMBLY	60 Hz;S/C 05 & Blw,W/O 61529A
3A-10	75142903	DRIVE MOTOR & BRAKE ASSEMBLY	60 Hz;S/C 05 & Abv,W/ 61529A
3A-10	75142902	DRIVE MOTOR & BRAKE ASSEMBLY	50 Hz
1	76549102	PULLEY, Drive Motor	60 Hz
1	76549106	PULLEY, Drive Motor	50 Hz
2	93071408	SCREW, Self Locking Set, 3/4 x 1/4-20	
3	##	DRIVE MOTOR ASSEMBLY	60 Hz
3	##	DRIVE MOTOR ASSEMBLY	50 Hz
4	94391529	LABEL, Brake Caution	
5	77798200	PLATE, Brake Mounting	
6	10126530	SCREW, Hex Head Machine, 3/8-16 x 1	
7	10125808	WASHER, Spring Lock, #3/8	
8	##	BRAKE AND CABLE ASSEMBLY	
9		COLLAR, Brake	Supplied as Part of Brake & Cable Assembly
10	93660079	SCREW, Phillips, 8-32 x 1/2	
(ITEMS LISTED BELOW THIS NOTE ARE NOT PART OF THE DRIVE MOTOR & BRAKE ASSEMBLY)			
300	92033038	RING, Retaining	S/C 13 & Blw, W/O 02337C
300	93592324	SCREW, Self tapping Hex Washer Head, 1/4-20 x 1	S/C 13 & Abv, W/ 02337C
301	77807900	SPRING, Extension, Motor	
302	77857800	SLEEVE, Spring	S/C 13 & Blw, W/O 02337C
302	72875460	SLEEVE, Spring	S/C 13 & Abv, W/ 02337C
303	10127147	SCREW, Phillips, 10-32 x 1	
304	94047007	WASHER, Back Up	
305	75174201	WASHER, Delrin	
306	73671301	BUSHING, Slide	
307	93592200	SCREW, Self-Tapping, 8-32 x 3/8	
308	94243003	MOUNT, Shock	60 Hz, Only
308	94243005	MOUNT, Shock	50 Hz, Only
309	94277409	MARKER, Cable	
310	10125607	WASHER, Flat, #10	Front Mounts only, 60 Hz units only
310	94047052	WASHER, Special	Rear Mounts only
311	77857500	PLATE, Motor Mounting	
312	10126053	SCREW, Hex Socket Head 3/8-16 x 1-1/4	



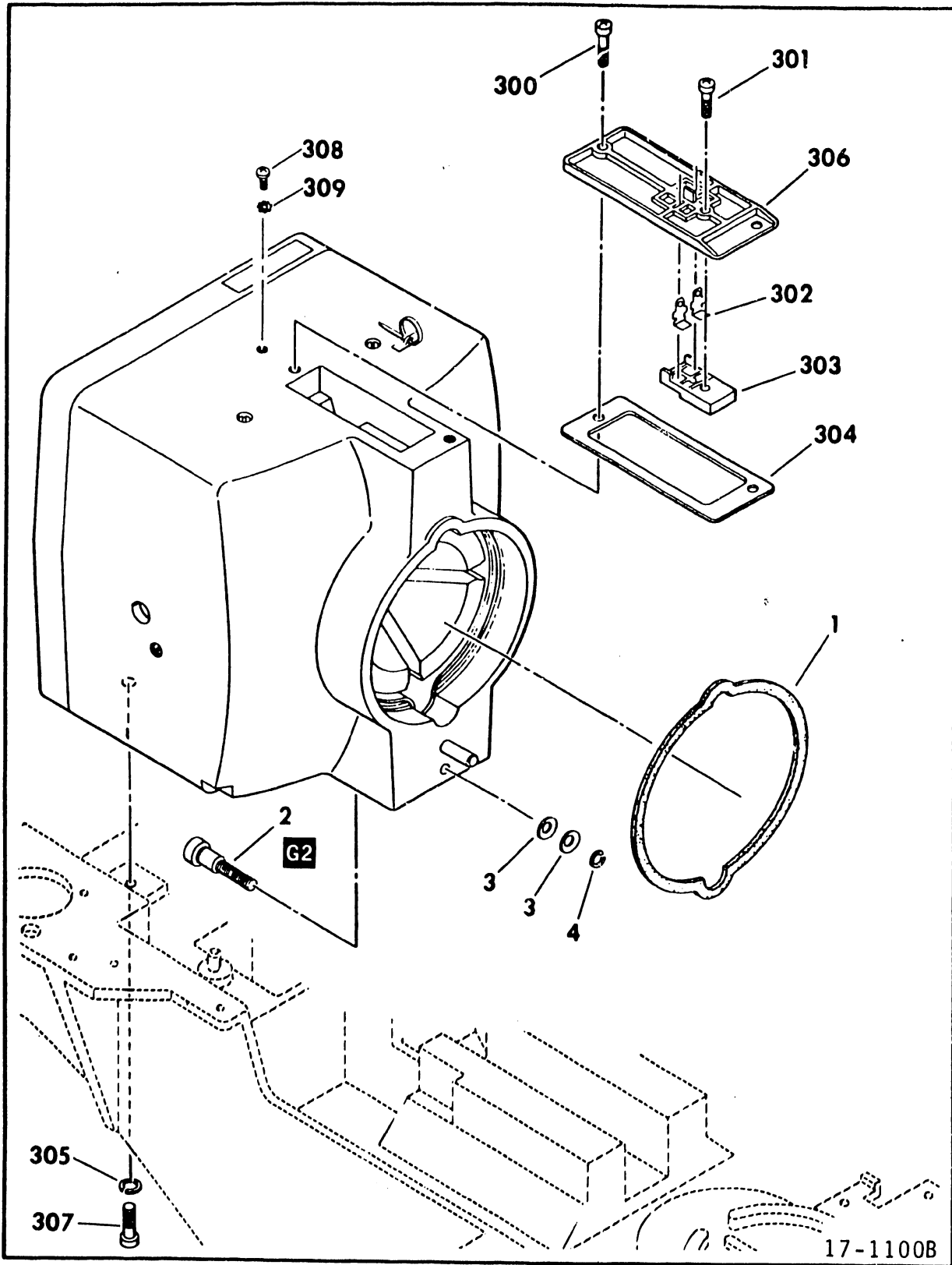


Figure 3A-11. Magnet Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-11	75155001	MAGNET ASSEMBLY	
1	77795501	SEAL, Magnet	
2	47400800	SCREW, Cap, Socket Head	
3	93651030	WASHER, Belleville, Locking	
4	92033004	RING, Retaining	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
MAGNET ASSEMBLY)

300	10127143	SCREW, Pan Head Machine, 10-32 x 1/2	
301	10127114	SCREW, Pan Head Machine, 6-43 x 1/2	
302	76563200	TERMINAL, Quick Connect	
303	76561900	CLAMP, Lead	
304	77796000	GASKET, Magnet Cover	
305	10125806	WASHER, Spring Lock, 1/4	
306	77795100	COVER, Magnet	
307	92807321	SCREW, Cap, 1/4-28 x 3/4	
308	10127141	SCREW, Pan Head Machine, 10-32 x 5/16	
309	10126403	WASHER, External Tooth Lock, 10	

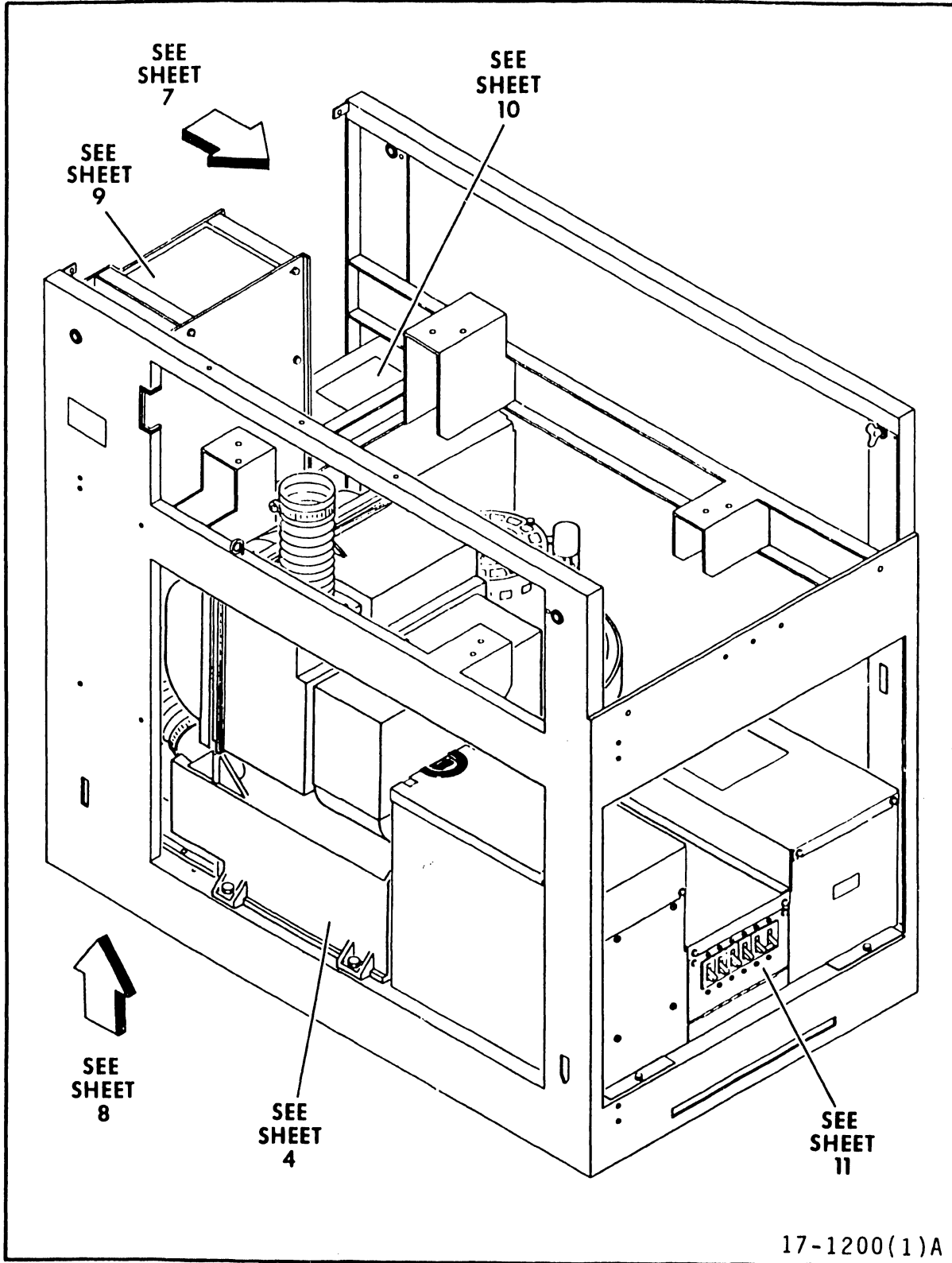


Figure 3A-12. Frame & Air Assembly (Sheet 1 of 11)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12

FRAME & AIR ASSEMBLY  
(Sheet 1 of 11)

This is a  
locator for  
the major as-  
semblies in the  
Frame & Air  
Assembly

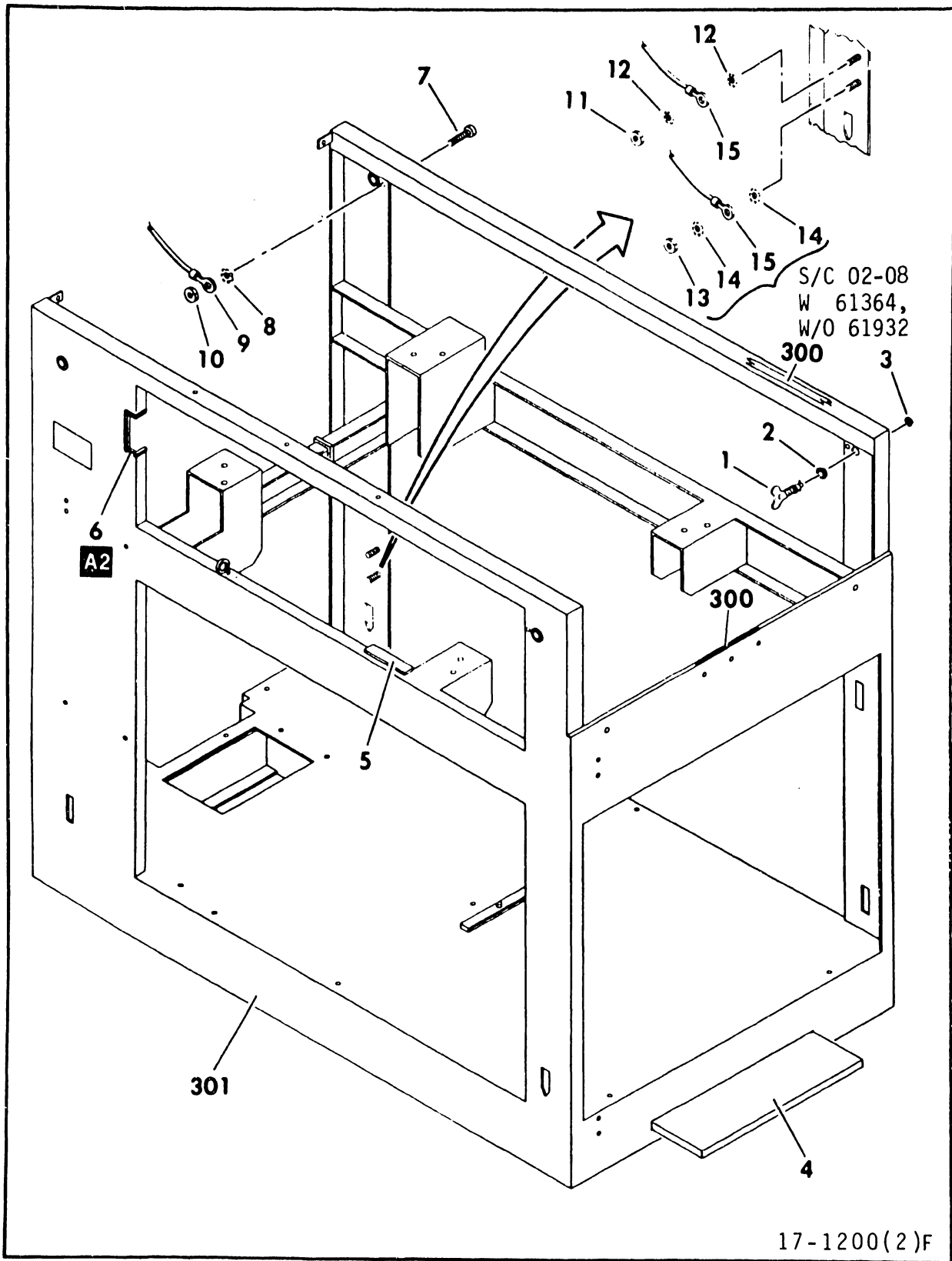


Figure 3A-12. Frame & Air Assembly (Sheet 2)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12		FRAME & AIR ASSEMBLY (Sheet 2)	
1	93573016	STUD ASSEMBLY	
2	93571005	GROMMET	
3	93944002	WASHER, Retaining	
4	##	FILTER, Aluminum	
5	94237703	TRIM, Black Safety	
6	00845503	GROMMET, Caterpillar	
7	10127131	SCREW, Pan Head Machine 10-24 x 3/8	
8	10126403	WASHER, External Tooth Lock, 10	
9	94281419	CABLE, Ground	
10	10125107	NUT, Hex, 10-24	
11	10125106	NUT, Hex, 8-32	S/C 02 W/ 61364 & Abv
12	10126402	WASHER, External Tooth Lock, 8	S/C 02 W/ 61364 & Above
13	76526100	NUT, Hex, 10-32	S/C 02 W/ 61364 & Abv
14	10126403	WASHER, External Tooth Lock, 10	S/C 02 W/ 61364 & Abv
15		JUMPER, Ground (See AC Power Supply Assembly, Figure 3A-23	S/C 02 W/ 61364
& Abv		Sheet 4 for part number)	
		(ITEMS LISTED BELOW THIS NOTE ARE NOT PART OF THE FRAME & AIR ASSEMBLY)	
300	94276614	FOAM, Tape	
301	75142400	FRAME, Main	S/C 13 & Blw, W/O 02161F
301	75142403	FRAME, Main	S/C 13 & Abv, W/ 02161F

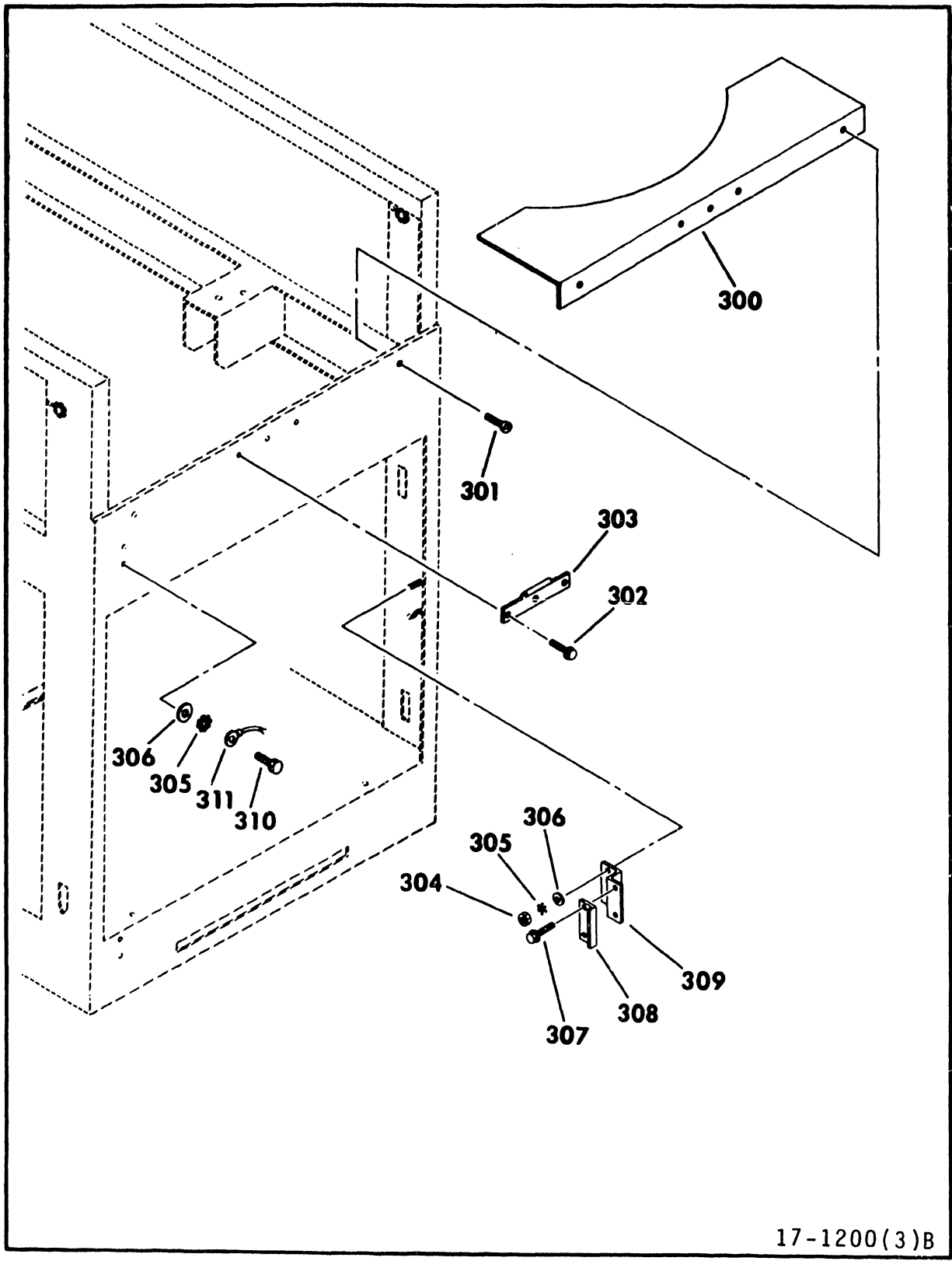


Figure 3A-12. Frame & Air Assembly (Sheet 3)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12

FRAME & AIR ASSEMBLY (Sheet 3)

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
FRAME & AIR ASSEMBLY)

300	75155200	STRIP, Trim	
301	10127131	SCREW, Pan Head Machine, 10-24 x 3/8	
302	93592238	SCREW, Hex Washer Head 10-24 x 3/8	
303	75152000	STRIKE, Top Cover Latch	
304	10125107	NUT, Hex, 10-24	
305	10126403	WASHER, External Tooth Lock, 10	
306	10125607	WASHER, Plain, 10	
307	93592200	SCREW, Hex Washer Head, 8-32 x 3/8	
308	75143500	STRIKE, Rear Door Latch	
309	75143600	BRACKET, Strike Mounting	
310	93592240	SCREW, Hex Washer Head, 10-24 x 1/2	
311	94281419	CABLE, Ground	



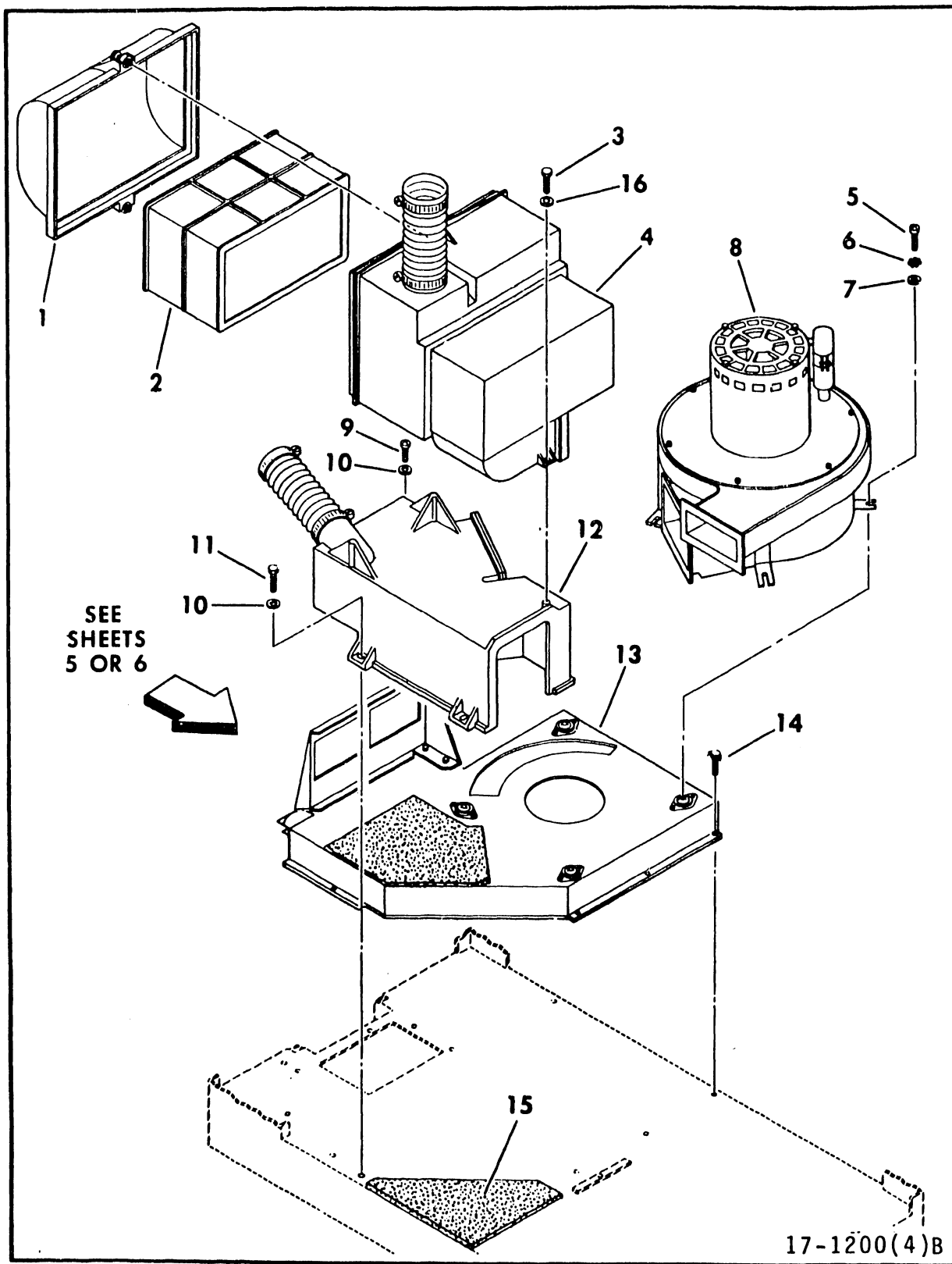


Figure 3A-12. Frame and Air Assembly (Sheet 4)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-12		FRAME & AIR ASSEMBLY (Sheet 4)	
1		FILTER HOUSING COVER ASSEMBLY (See Figure 3A-17)	
2	##	FILTER, Air	
3	94376925	SCREW, Hex Washer Head, 8-16 x 1/2	
4		FILTER HOUSING ASSEMBLY (See Figure 3A-16)	
5	10127143	SCREW, Pan Head Machine, 10-32 x 1/2	
6	10126403	WASHER, External Tooth Lock, 10	
7	10125607	WASHER, Plain, 10	
8	##	BLOWER & CABLE ASSEMBLY	
9	94376935	SCREW, Hex Washer Head, 10-14 x 3/4	
10	94047052	WASHER, Special	
11	93592242	SCREW, Hex Washer Head, 10-24 x 5/8	
12		LOW PRESSURE DUCT ASSEMBLY (See Figure 3A-18)	
13		BLOWER PLENUM ASSEMBLY (See Figure 3A-19)	
14	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	S/C 14 & Blw, W/O 02489
14	93592244	SCREW, Hex Washer Head 10-24 x 3/4	S/C 14 & Abv, W/ 02489
15	94397638	FOAM, Acoustical Panel	
16	10125606	WASHER, Flat, 8	

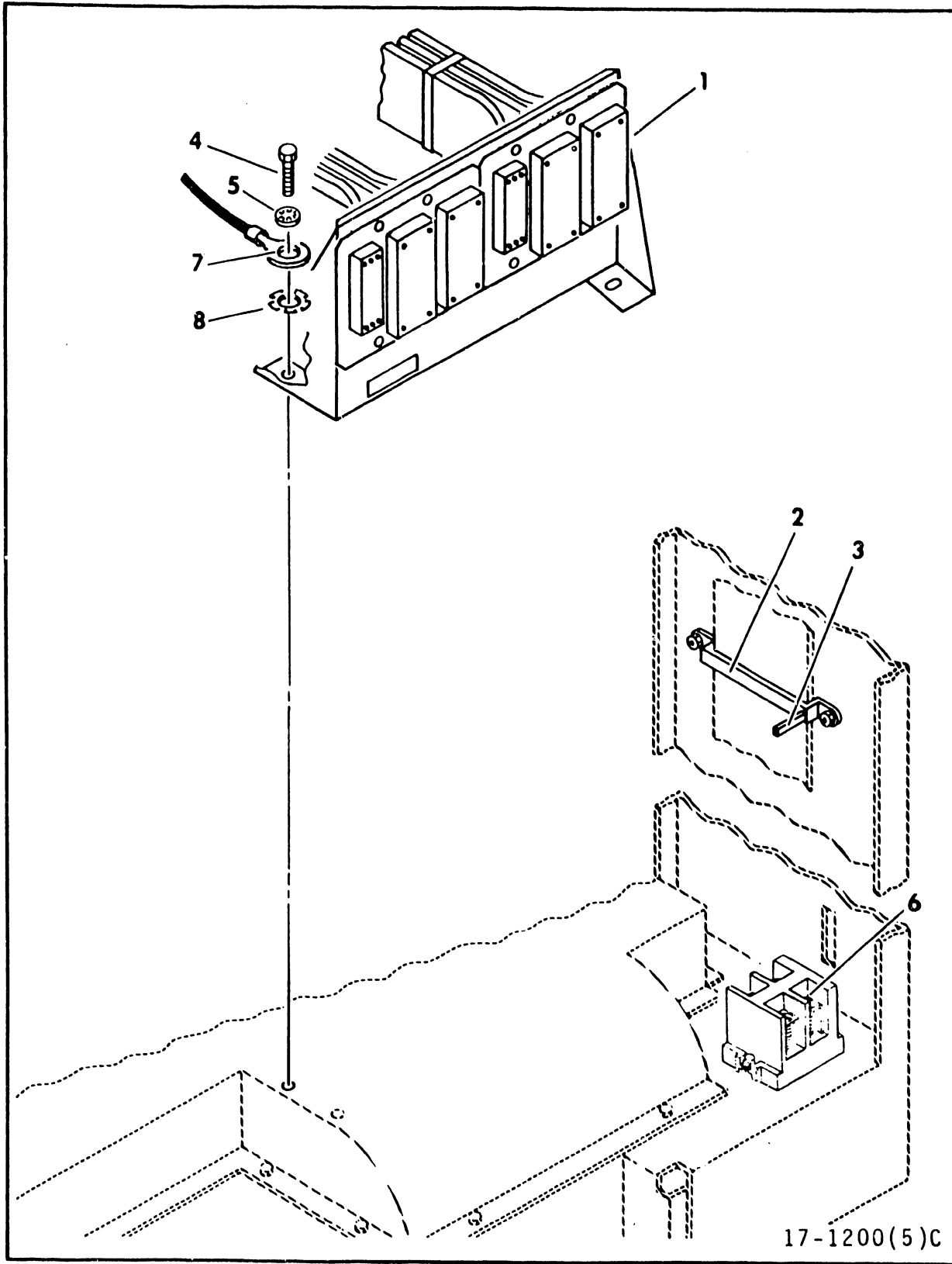
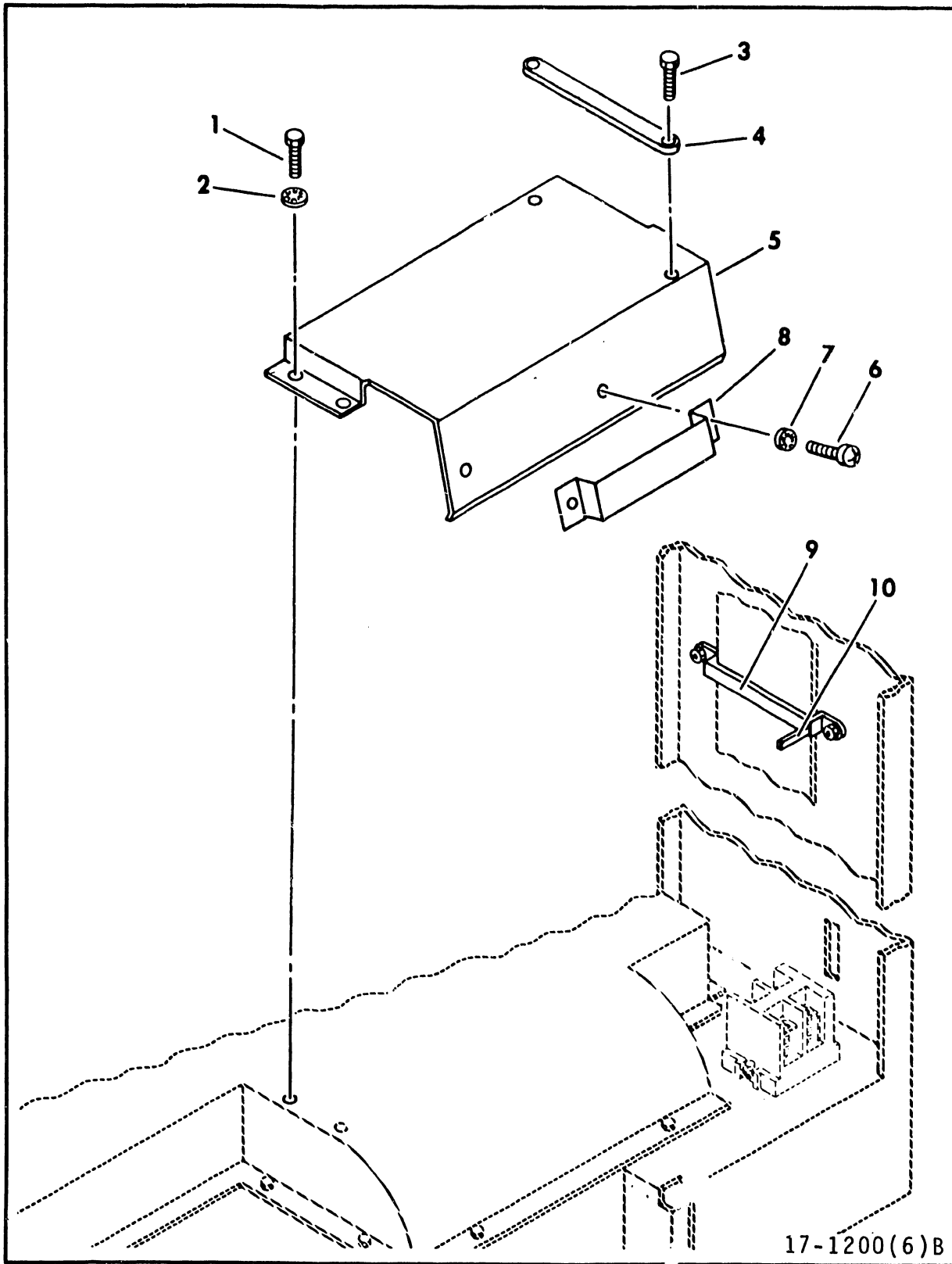


Figure 3A-12. Frame & Air Assembly(Sheet 5)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12		FRAME & AIR ASSEMBLY (Sheet 5)	Round Cable
1		I/O CABLE & BRACKET ASSEMBLY (See Figure 3A-13)	
2	94386402	MOUNT, Cable	
3	94277422	STRAP, Cable Tie	
4	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	S/C 14 & Blw, W/O 02489
4	94376933	SCREW, Hex Washer Head, 10-14 x 1/2	S/C 14 & Abv, W/ 02489
5	10126105	WASHER, Internal Tooth Lock, 10	S/C 14 & Blw, W/O 02489
6		GROUNDING BLOCK ASSEMBLY (See Figure 3A-14)	
7	94281427	CABLE, Ground	S/C 14 & Abv, W/ 02489
8	10126403	WASHER, External Tooth Lock, 10	S/C 14 & Abv, W/ 02489



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Figure 3A-12. Frame & Air Assembly (Sheet 6)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12		FRAME & AIR ASSEMBLY (Sheet 6)	Flat Cable, S/C 08 & Below
1	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
2	10126105	WASHER, Internal Tooth Lock, 10	
3	93592198	SCREW, Hex Washer Head, 8-32 x 5/16	
4	94386407	MOUNT, Cable	
5	75155500	BRACKET, I/O Flat Cable	
6	10127123	SCREW, Pan Head Machine, 8-32 x 1/2	
7	10126104	WASHER, Internal Tooth Lock, 8	
8	75155600	CLAMP, Cable	
9	94386402	MOUNT, Cable	
10	94277422	STRAP, Cable Tie	

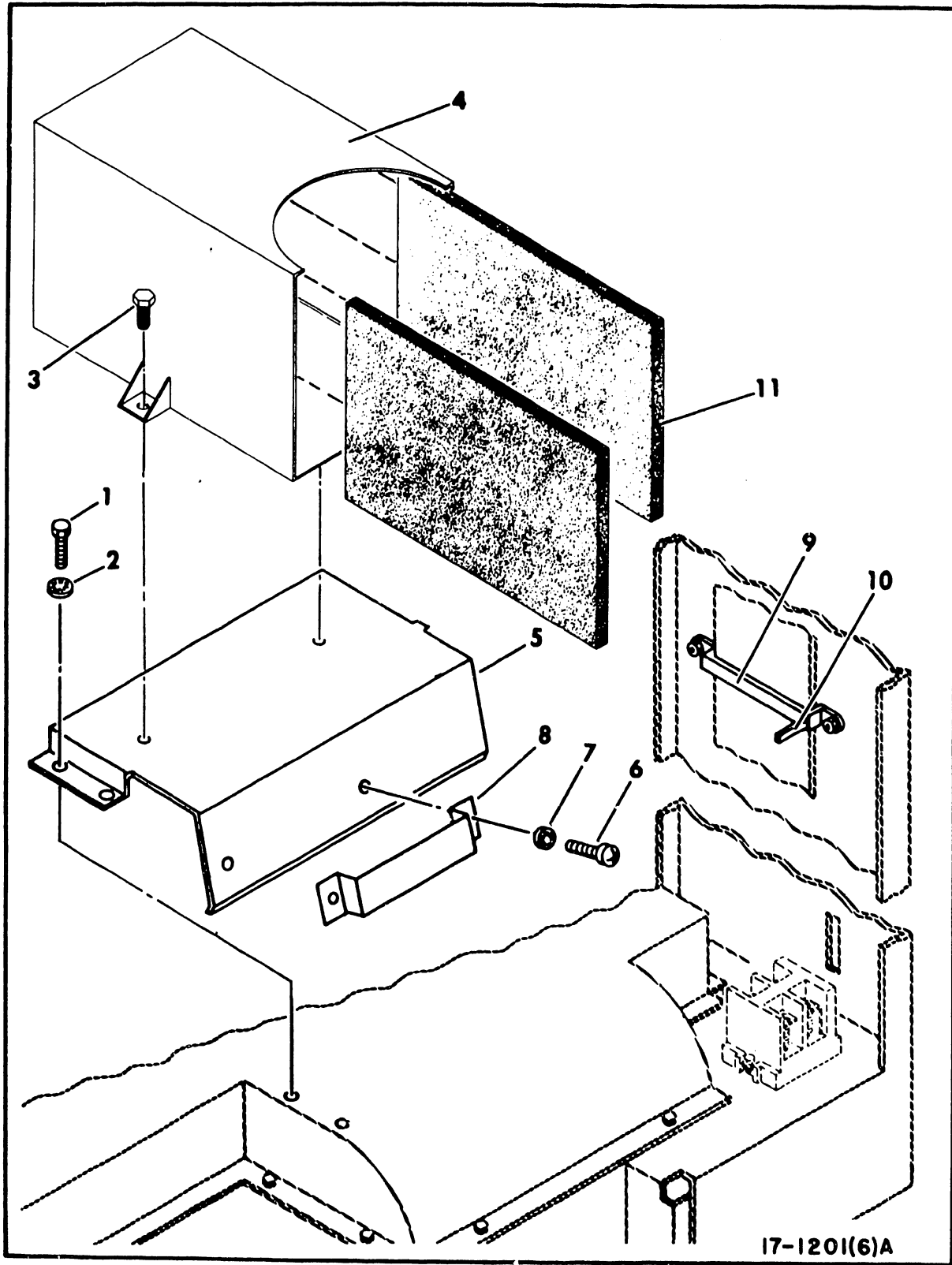


Figure 3A-12. Frame & Air Assembly (Sheet 7)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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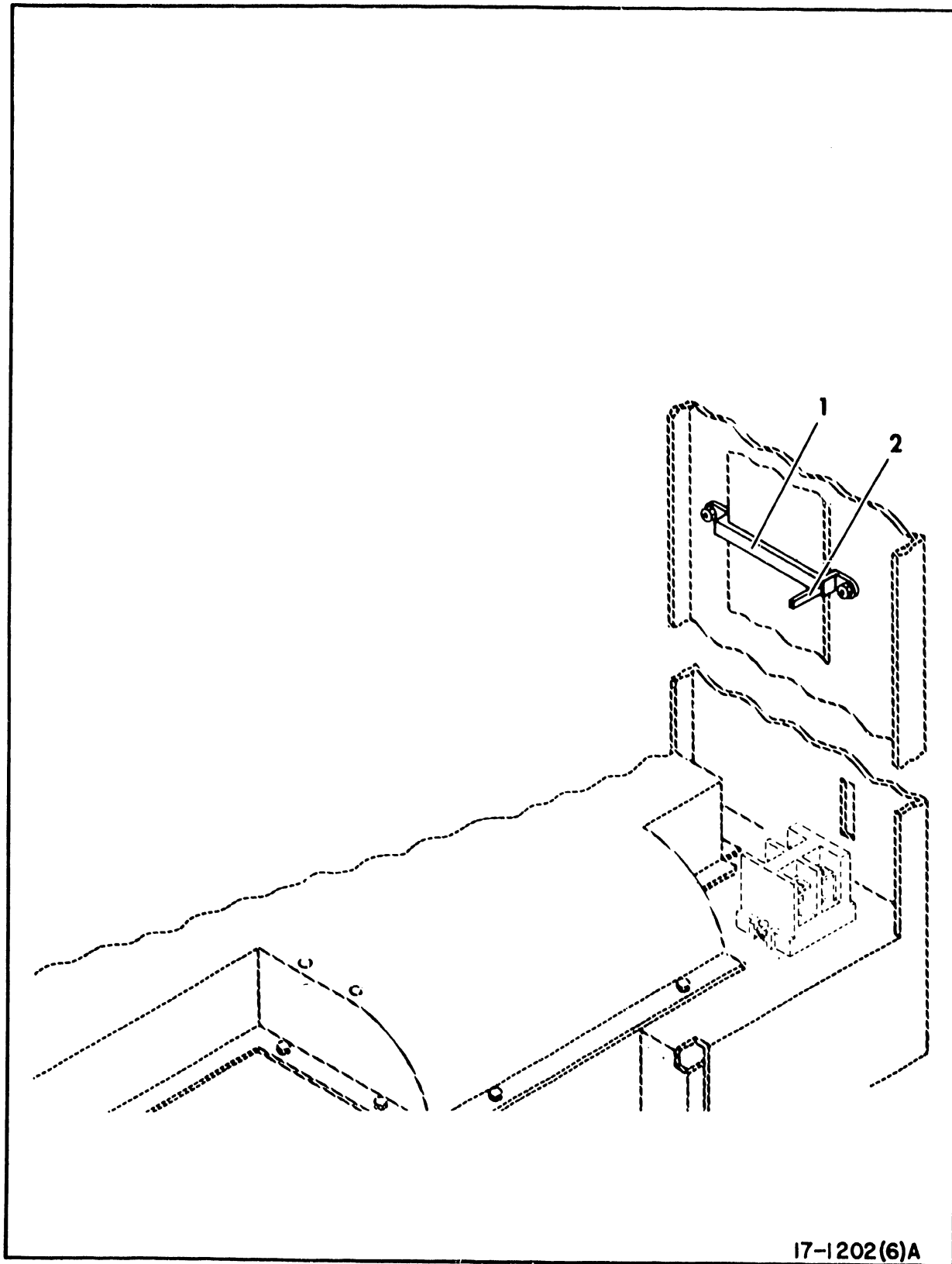
3A-12

FRAME & AIR ASSEMBLY  
(Sheet 7)

Flat Cable,  
S/C 09 - 13, S/C 14  
W/O 02489

1	93592238	SCREW, Hex Washer Head, 10-24 x 3/8
2	10126105	WASHER, Internal Tooth Lock, 10
3	93592162	SCREW, Hex Washer Head, 6-32 x 1/4
4	72874600	BOX, I/O Cable
5	75155500	BRACKET, I/O Flat Cable
6	10127123	SCREW, Pan Head Machine, 8-32 x 1/2
7	10126104	WASHER, Internal Tooth Lock, 8
8	75155600	CLAMP, Cable
9	94386402	MOUNT, Cable
10	94277422	STRAP, Cable Tie
11	94397669	FOAM, Panel

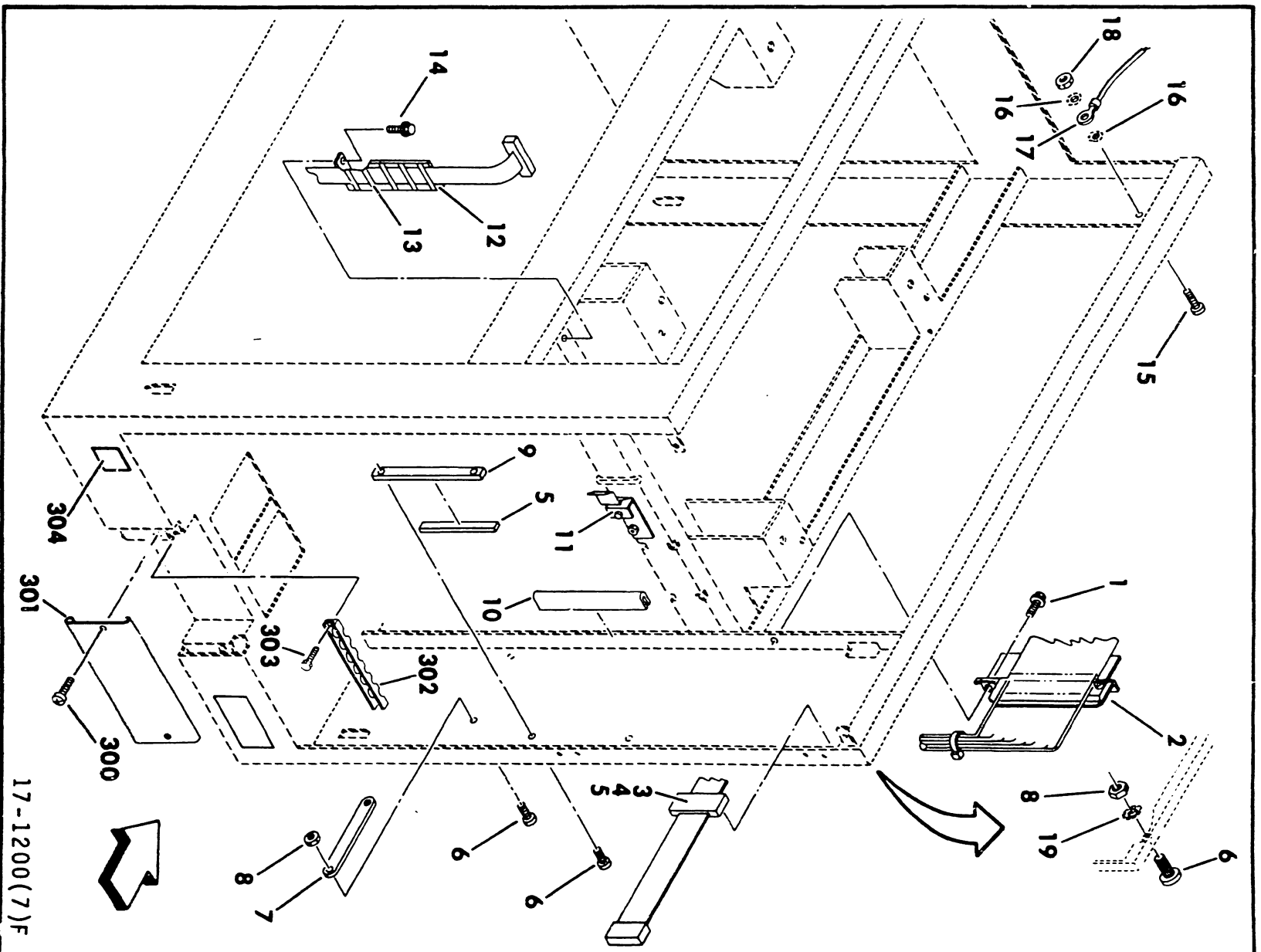




17-1202(6)A

Figure 3-12. Frame & Air Assembly (Sheet 7.1)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3-12		FRAME & AIR ASSEMBLY (Sheet 7.1)	Flat Cable S/C 14 & Abv, W/ 02489
	1 94386402	MOUNT, Cable	
	2 94277422	STRAP, Cable Tie	



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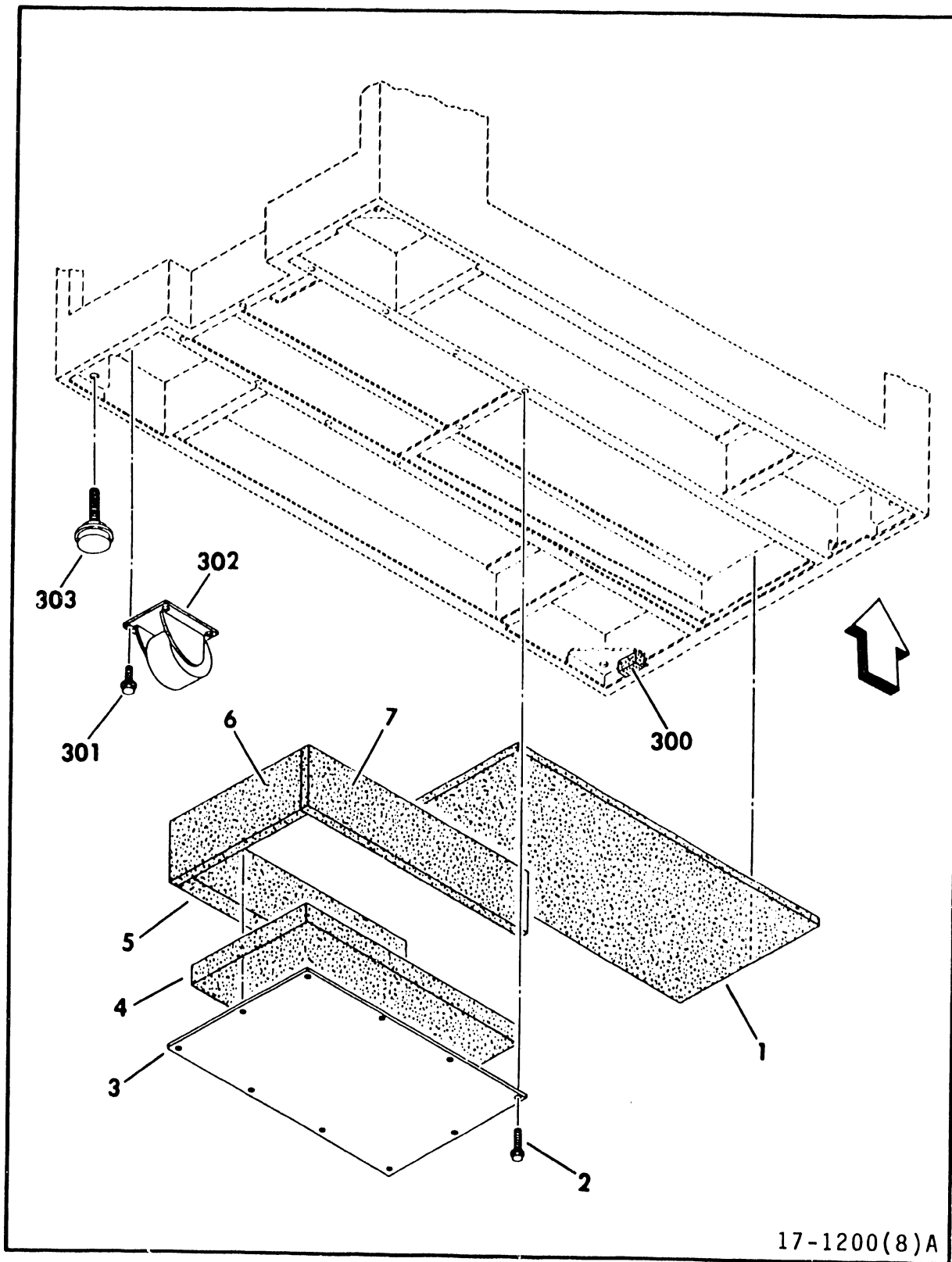
Figure 3A-12. Frame & Air Assembly (Sheet 8)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12		FRAME & AIR ASSEMBLY (Sheet 8)	
1	93592200	SCREW, Hex Washer Head, 8-32 x 3/8	
2	75155400	TERMINAL BLOCK ASSEMBLY	S/C 14 & Blw
2	75155401	TERMINAL BLOCK ASSEMBLY	S/C 15 & Abv
3	92014500	CLAMP, Cable	
4	94276602	FOAM, Tape	
5	94276600	FOAM, Tape	
6	10127122	SCREW, Pan Head Machine, 8-32 x 3/8	
7	94386407	MOUNT, Cable	
8	10125106	NUT, Hex, 8-32	
9	94376719	PLATE, Nut	
10	94237703	TRIM, Black Safety	
11		LOGIC CHASSIS LATCH ASSEMBLY (See Figure 3A-15)	
12	47413900	BRACKET, R/W Cable	
13	94277411	STRAP, Cable Tie	
14	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
15	10127131	SCREW, Pan Head Machine, 10-24 x 3/8	
16	10126403	WASHER, External Tooth Lock, 10	
17	94281419	CABLE, Ground	
18	10125107	NUT, Hex, 10-24	
19	10126402	WASHER, External Tooth Lock, 8	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
FRAME AND AIR ASSEMBLY)

300	10127131	SCREW, Pan Head Machine, 10-24 x 3/8	
301	75152600	COVER, I/O Frame	
302	73050900	CLAMP, CABLE	
303	93592210	SCREW, Hex Washer Head, 8-32 x 1	
304	21987645	LABEL, FCC Compliance	60 Hz units; S/C 04 & Abv, W/ 61723



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Figure 3A-12. Frame & Air Assembly (Sheet 9)

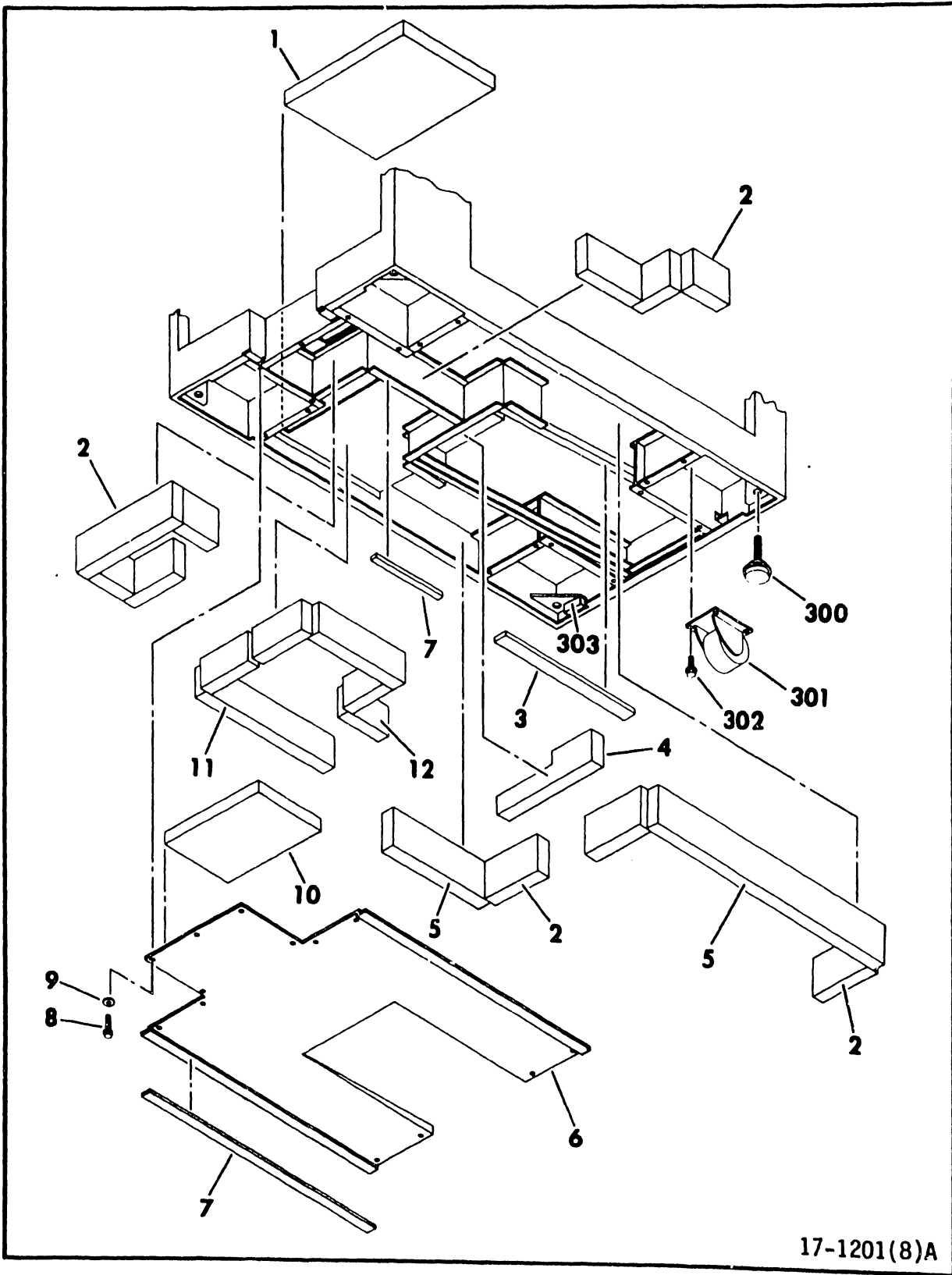
INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12                      FRAME & AIR ASSEMBLY (Sheet 9) S/C 04 & Blw,  
W/O 61325B

1	94397641	FOAM, Acoustic Panel
2	93592200	SCREW, Hex Washer Head, 8-32 x 3/8
3	75136700	COVER, Frame
4	94397644	FOAM, Acoustic Panel
5	94397642	FOAM, Acoustic Panel
6	94397645	FOAM, Acoustic Panel
7	94397643	FOAM, Acoustic Panel

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
FRAME AND AIR ASSEMBLY)

300	94276603	FOAM, Tape
301	93592354	SCREW, Hex Washer Head, 5/16-18 x 1/2
302	92703005	CASTER
303	93697022	LEVELER



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Figure 3A-12. Frame & Air Assembly(Sheet 10)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12

FRAME & AIR ASSEMBLY  
(Sheet 10)

S/C 04 & Abv,  
W/ 61325B

1	94397665	FOAM, Acoustic Panel
2	94397661	FOAM, Acoustical Panel
3	94276600	TAPE, Foam
4	94397667	FOAM, Acoustical Panel
5	94397662	FOAM, Acoustical Panel
6	47489700	COVER, Bottom Frame
7	95051503	TAPE, Foam
8	93592200	SCREW, Self-Tapping Hex Washer Head, 8-32 x 3/8
9	10125606	WASHER, Plain, 8
10	94397666	FOAM, Acoustical Panel
11	94397663	FOAM, Acoustical Panel
12	94397664	FOAM, Acoustical Panel

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
FRAME AND AIR ASSEMBLY)

300	93697022	LEVELER
301	92703005	CASTER
302	93592354	SCREW, Hex Washer Head, 5/16-18 x 1/2
303	94276603	FOAM, Tape



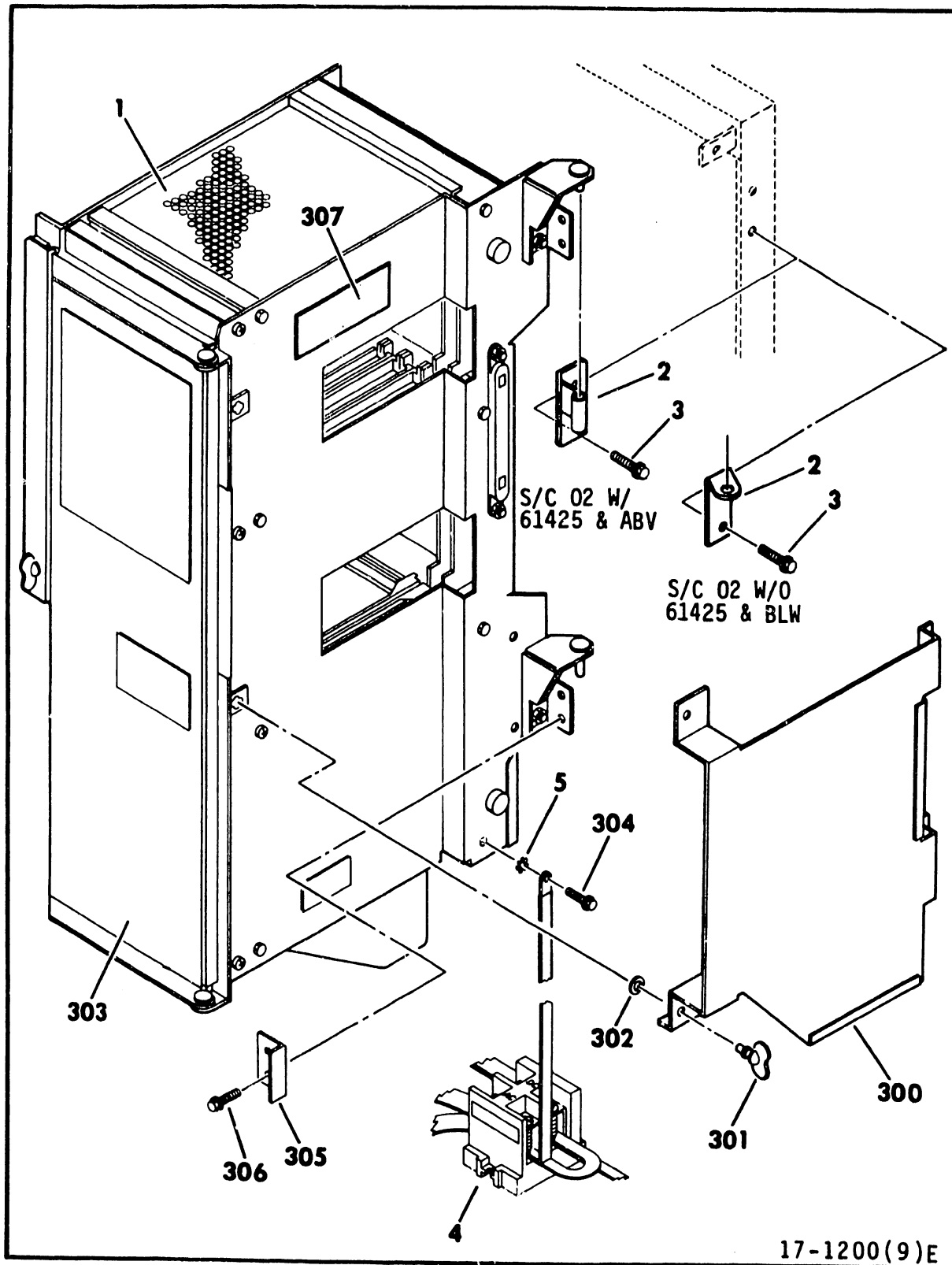


Figure 3A-12. Frame & Air Assembly(Sheet 11)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12		FRAME AND AIR ASSEMBLY (Sheet 11)	
1		LOGIC CHASSIS ASSEMBLY (A3) (See Figure 3A-20)	
2	76549900	HINGE, Logic Chassis	S/C 02 and Blw, W/O 61425
2	47492100	HINGE, Logic Chassis	S/C 02 & Abv, W/ 61425
3	93592198	SCREW, Hex Washer Head, 6-32 x 5/16	
4		GROUNDING BLOCK ASSEMBLY (See Figure 3A-14)	
5	10126403	WASHER, External Tooth Lock, 10	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
FRAME AND AIR ASSEMBLY)

300	75159100	BRACKET, Protective	
301	10127152	SCREW, Pan Head, Machine 1/4-20 x 3/8	S/C 01
301	94317703	FASTENER, Wing Type	S/C 02 & Abv
302	92033038	RETAINER, Split Ring	S/C 01
302	94317903	RETAINER, Split Ring	S/C 02 & Abv
303		CARD COVER ASSEMBLY (See Figure 3A-21)	
304	93592200	SCREW, Hex Washer Head, 8-32 x 3/8	
305	75143500	STRIKE, Rear Door Latch	S/C 01
305	75143501	STRIKE, Rear Door Latch	S/C 02 & Abv
306	93592196	SCREW, Hex Washer Head, 8-32 x 1/4	
307	72959300	LABEL, Field Change Order	

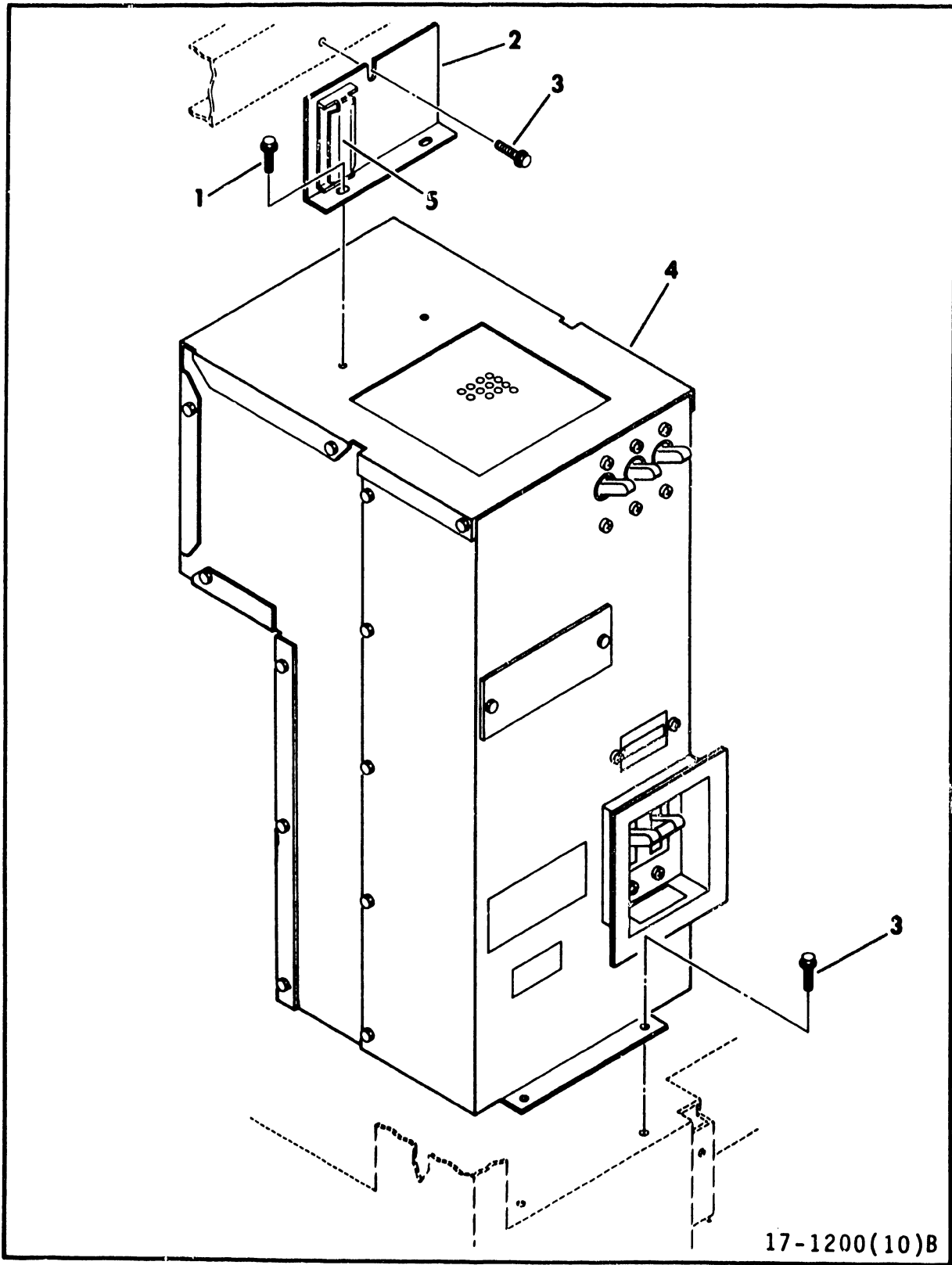


Figure 3A-12. Frame & Air Assembly (Sheet 12)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12		FRAME & AIR ASSEMBLY (Sheet 12)	
1	93592198	SCREW, Hex Washer Head, 8-32 x 5/16	
2	75151200	BRACKET, AC Power Supply Mounting	
3	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
4		AC POWER SUPPLY ASSEMBLY (A1) (See Figure 3A-23)	
5	92014500	CLAMP, Flat Cable	

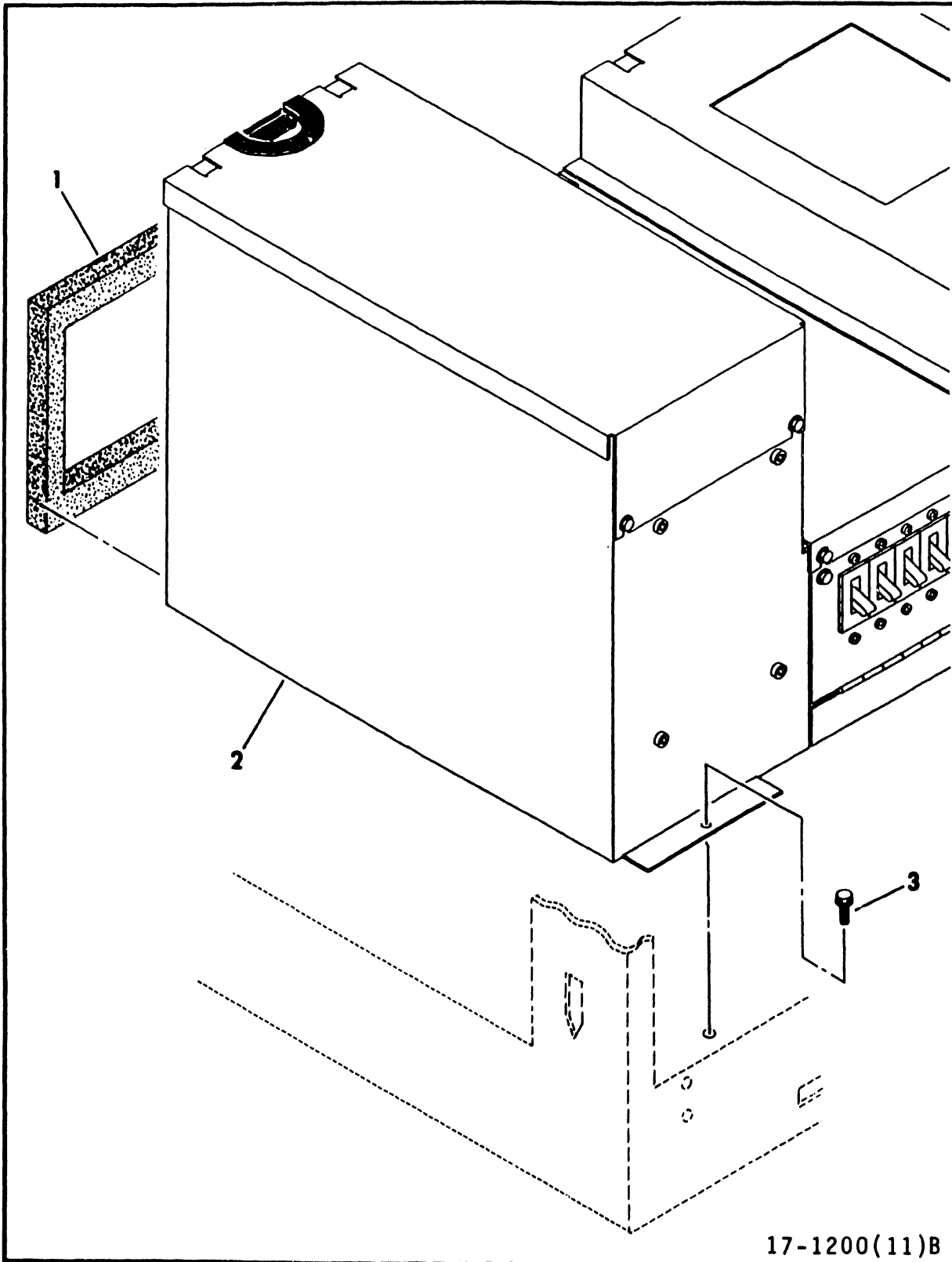
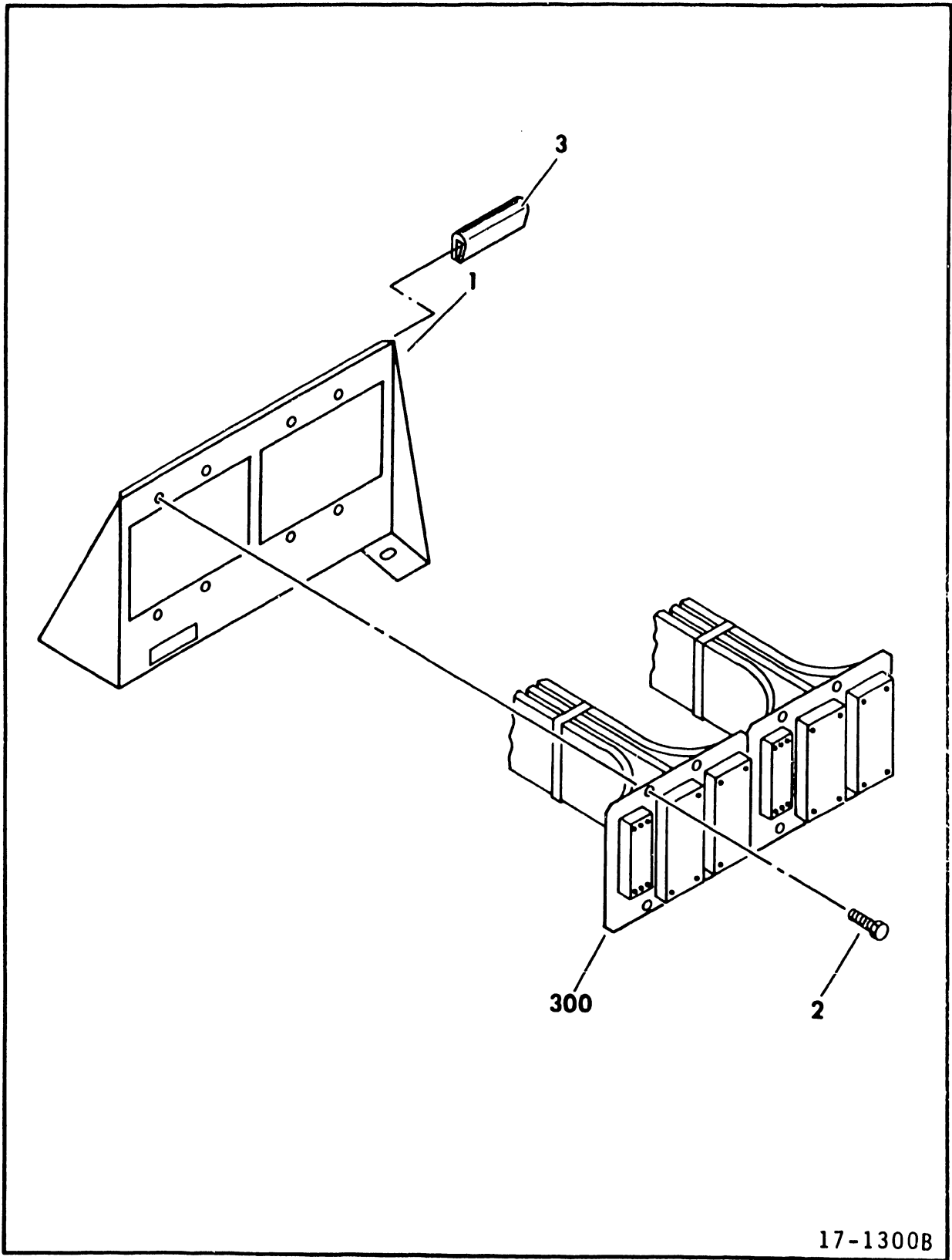


Figure 3A-12. Frame and Air Assembly (Sheet 13)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-12		FRAME & AIR ASSEMBLY (Sheet 13)	
1	76579103	GASKET, Air Seal	
2		DC POWER SUPPLY ASSEMBLY (A2) (See Figure 3A-22)	
3	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	



17-1300B

Figure 3A-13. I/O Cable Bracket Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-13	47424700	I/O CABLE BRACKET ASSEMBLY	
1	75154600	BRACKET, I/O Cable	
2	93502158	SCREW, Hex Washer Head, 6-32 x 1/4	
3	94060003	CHANNEL, Rubber	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
I/O CABLE BRACKET ASSEMBLY)

300	82355600	PLATE, I/O Panel	
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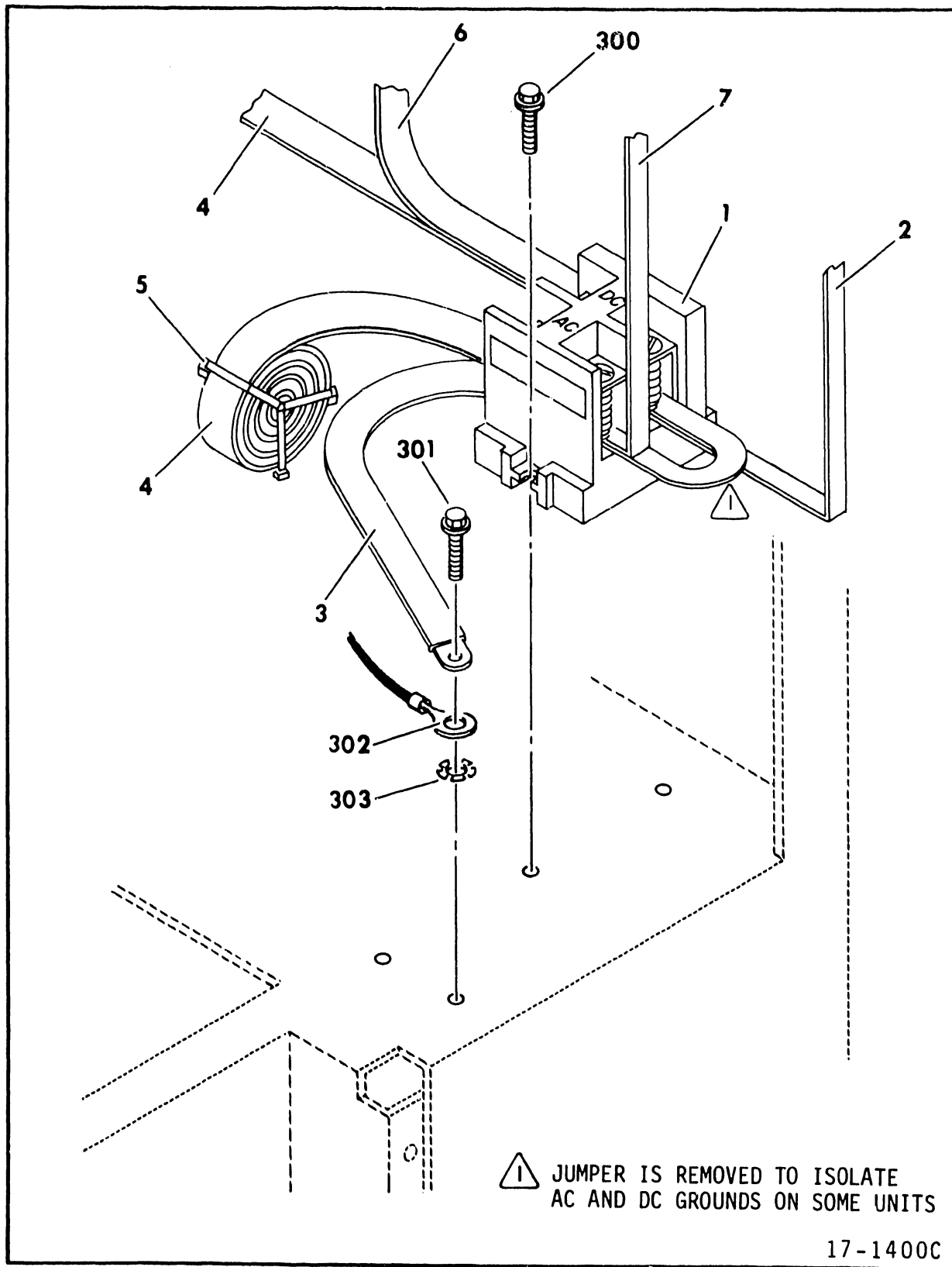


Figure 3A-14. Grounding Block Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-14	47424000	GROUNDING BLOCK ASSEMBLY	S/C 14 & Blw
3A-14	47424003	GROUNDING BLOCK ASSEMBLY	S/C 15 & Abv
1	53714400	BLOCK, Terminal Grounding	
2	94369556	CABLE, Ground (to Logic Terminal Board)	S/C 14 & Blw
2	94369593	CABLE, Ground (to Logic Terminal Board)	S/C 15 & Abv
3	94297013	CABLE, Ground (to Frame Ground)	
4	94297007	CABLE, Ground (One cable to either site ground or to next drive and second cable to left side of deck)	
5	94277411	TY-WRAP	
6	94297009	CABLE, Ground (to Deck right side)	
7	94297010	CABLE, Ground (to Logic Chassis)	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
GROUNDING BLOCK ASSEMBLY)

300	93592204	SCREW, Hex Washer Head, 8-32 x 5/8
301	93592238	SCREW, Hex Washer Head, 10-24 x 3/8

NOTE

Part numbers and notes for index numbers 302  
and 303 are on Frame & Air Assembly, Sheet 5.

302		CABLE, Ground
303		WASHER, External Tooth Lock, 10

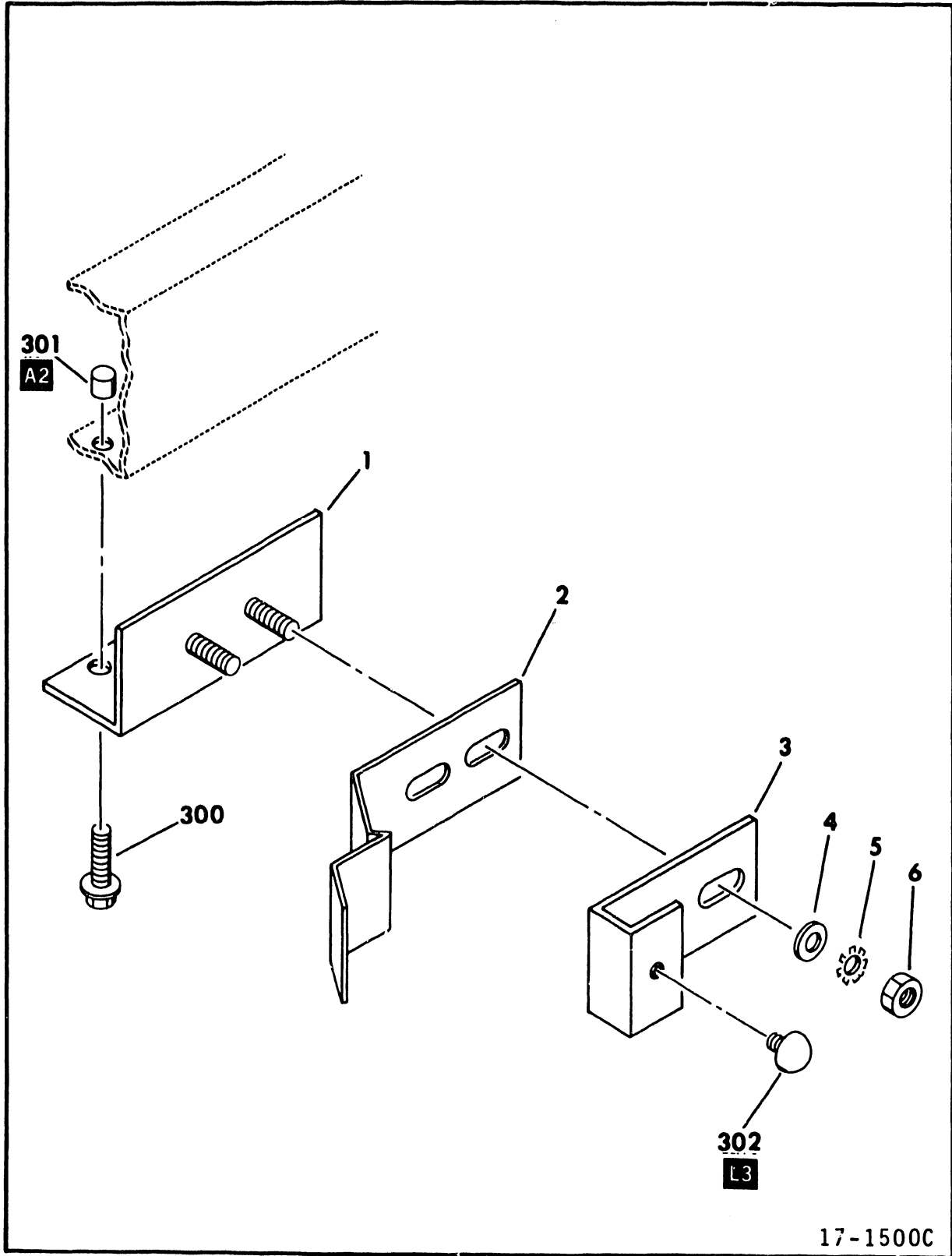


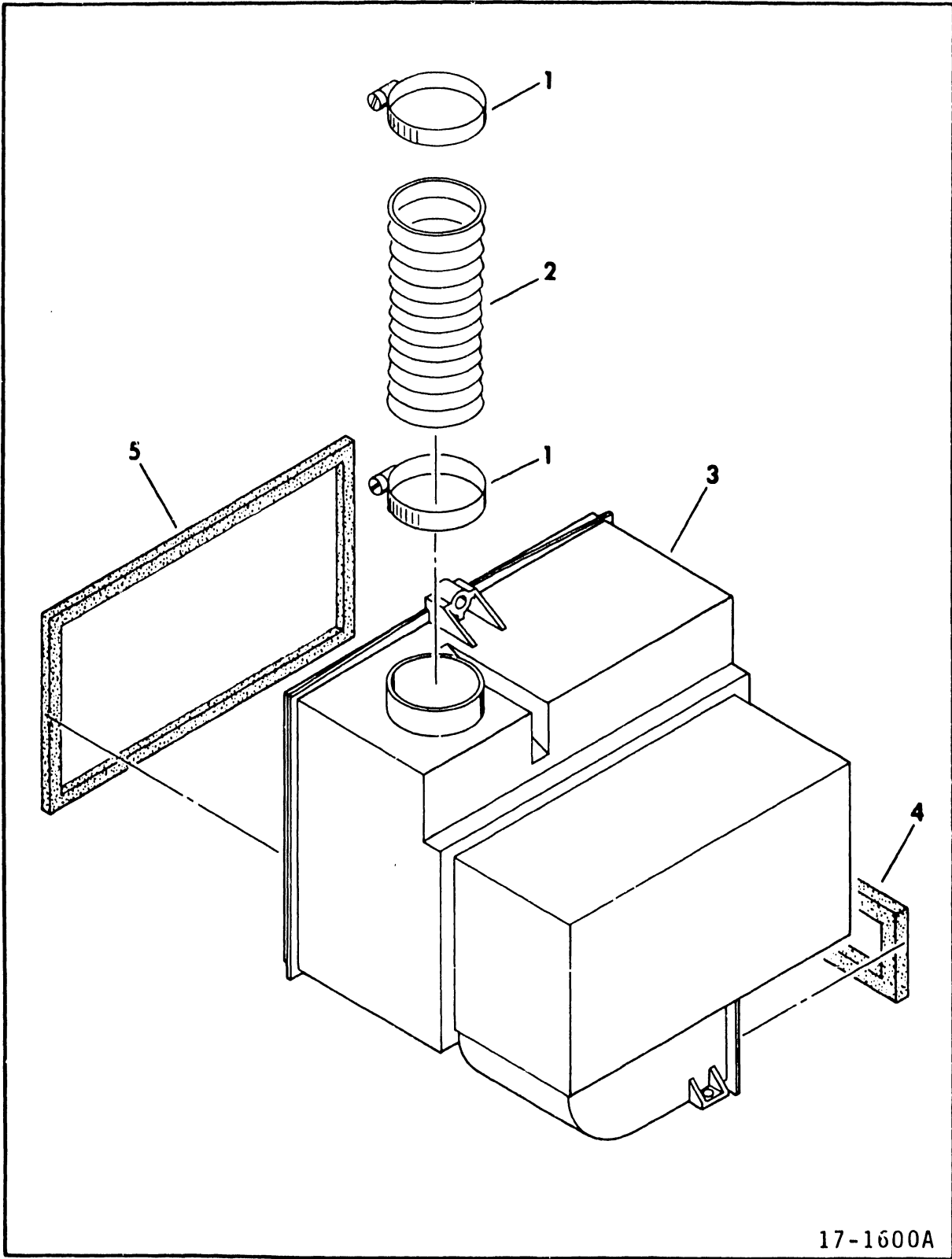
Figure 3A-15. Logic Chassis Latch Assembly

INDEX	PART	PART DESCRIPTION	NOTE
NO	NO		

3A-15	47420600	LOGIC CHASSIS LATCH ASSEMBLY	
1	75139900	BRACKET, Catch Spring Mounting	
2	75137800	LATCH, Logic Chassis	
3	75137700	BRACKET, Logic Stop	
4	10125607	WASHER, Plain, 10	
5	10126403	WASHER, External Tooth Lock, 10	
6	10125107	NUT, Hex, 10-24	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
LOGIC CHASSIS LATCH  
ASSEMBLY)

300	93592238	SCREW, Hex Washer Head, 10-24 x 3/8	
301	94353203	CAPS & PLUGS, Plastic	
302	93623000	BUMPER, Rubber	

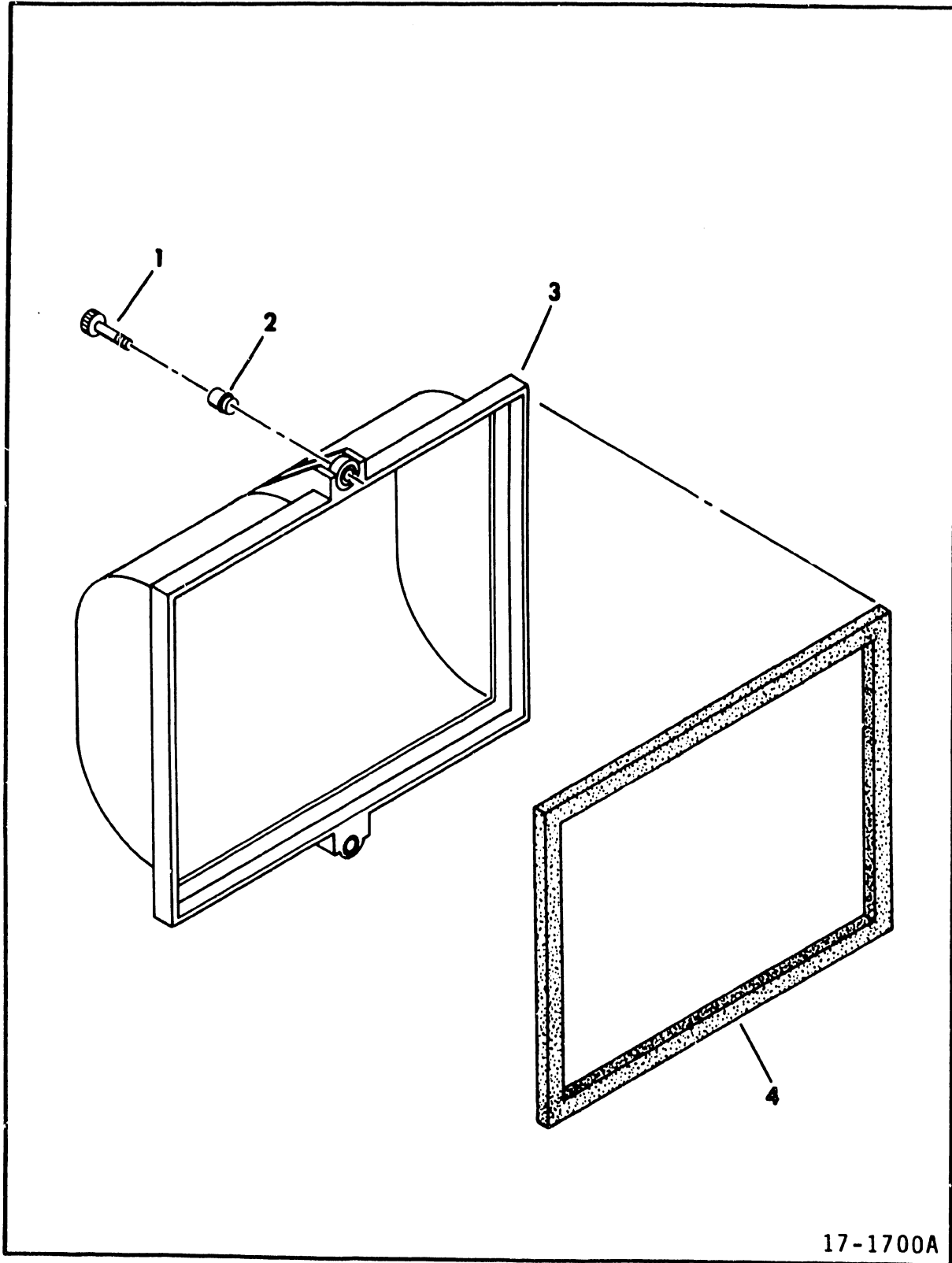


17-1600A

Figure 3A-16. Filter Housing Assembly

INDEX	PART	PART DESCRIPTION	NOTE
NO	NO		

3A-16	47420701	FILTER HOUSING ASSEMBLY	
1	94275261	CLAMP, Hose	
2	92001806	HOSE, Flexible	
3	75153700	HOUSING, Filter	
4	76579101	GASKET, Air Seal	
5	77806707	GASKET, Filter	

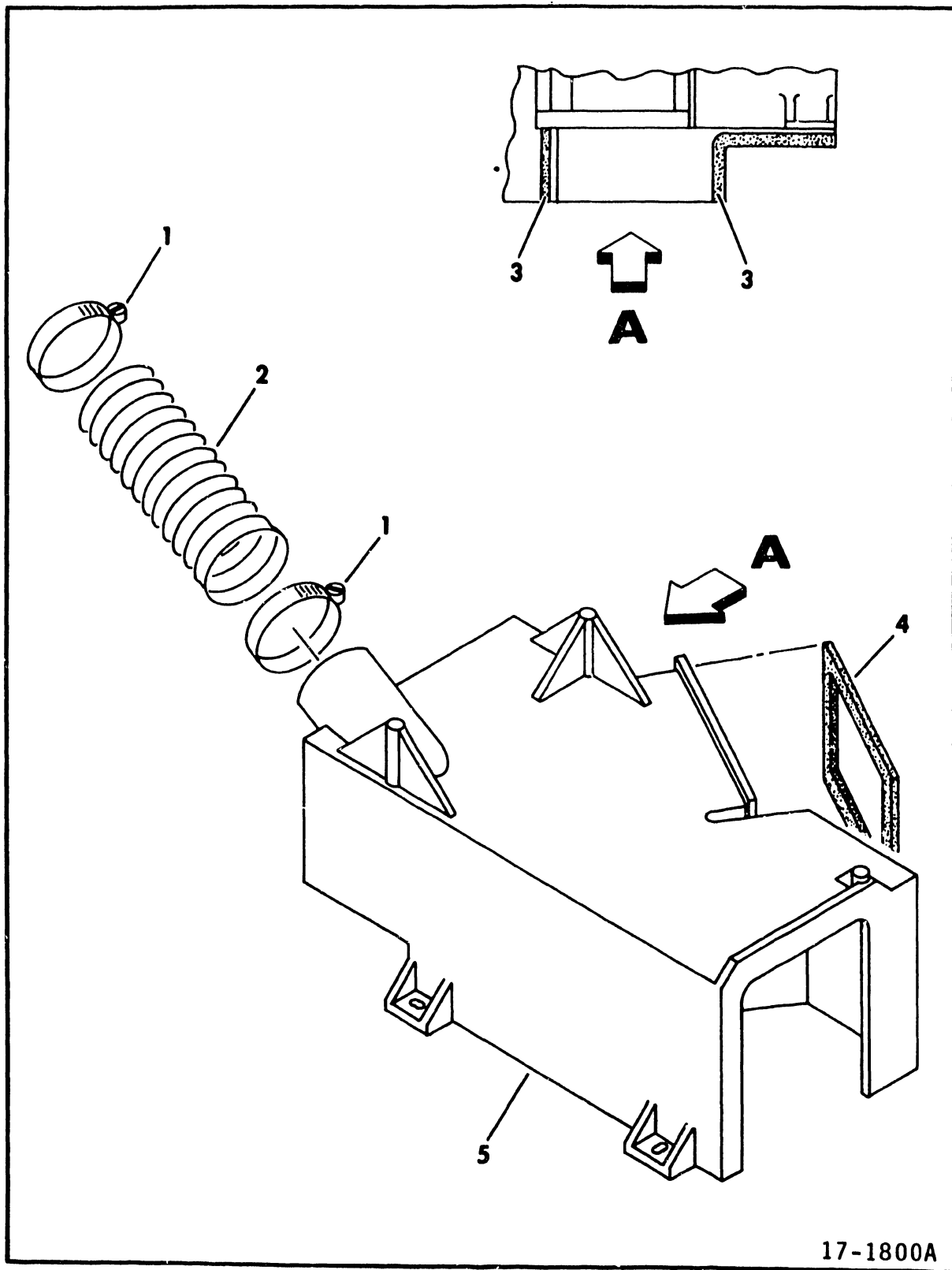


17-1700A

Figure 3A-17. Filter Housing Cover Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-17	47420900	FILTER HOUSING COVER ASSEMBLY	
1	93630109	FASTENER ASSEMBLY	
2		HARDWARE, Attaching	Supplied as a part of Fastener Assembly
3	75153800	COVER, Filter Housing	
4	77806702	GASKET, Filter	



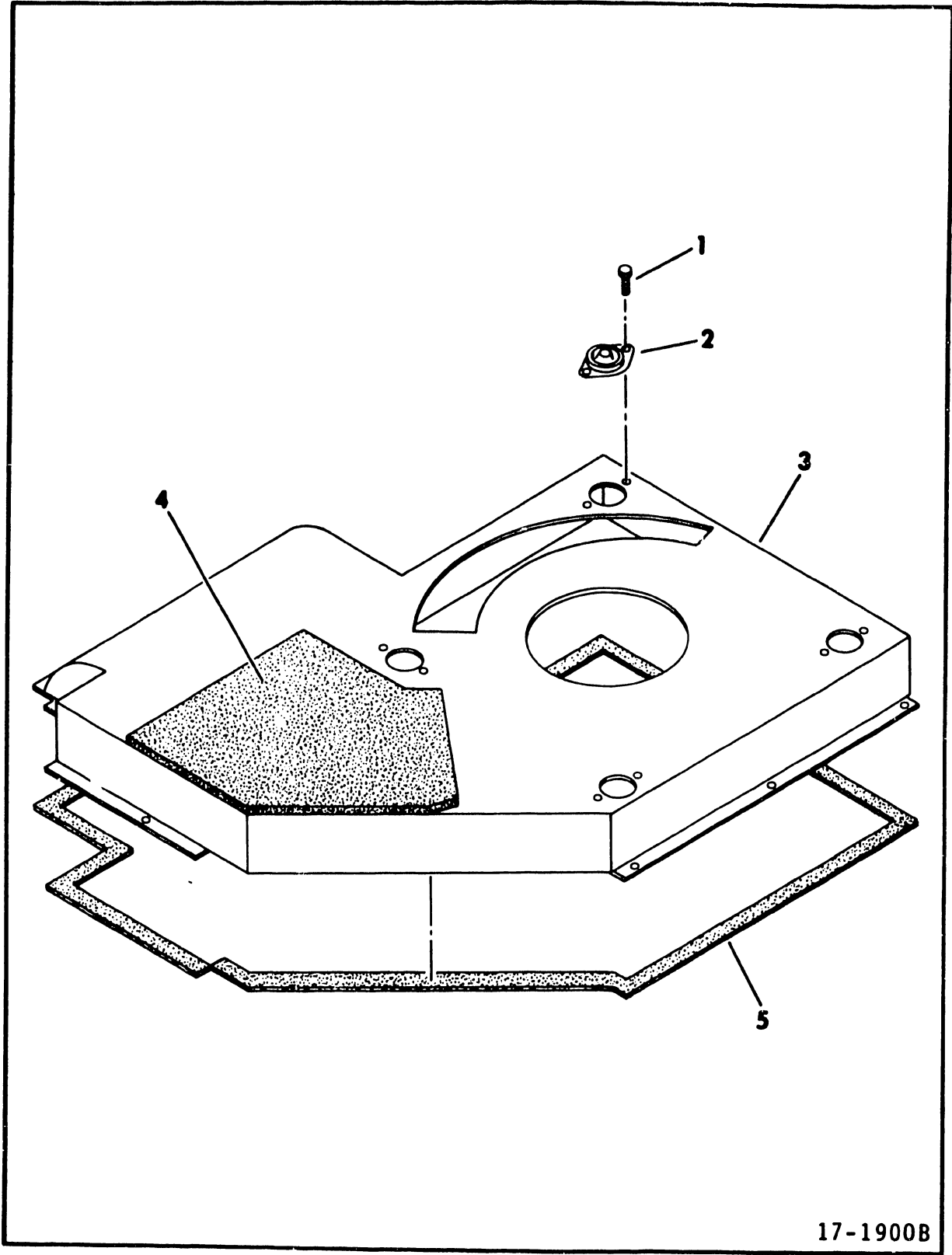


17-1800A

Figure 3A-18. Low Pressure Duct Assembly

INDEX	PART	PART DESCRIPTION	NOTE
NO	NO		

3A-18	47420800	LOW PRESSURE DUCT ASSEMBLY	
1	94275261	CLAMP, Hose	
2	94311635	HOSE, Flexible White	
3	95051502	FOAM, Adhesive Back Tape	
4	76579102	GASKET, Air Seal	
5	75136800	DUCT, Low Pressure	



17-1900B

Figure 3A-19. Blower Plenum Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-19	47422701	BLOWER PLENUM ASSEMBLY	S/C 14 & Blw, W/O 02489
3A-19	47422702	BLOWER PLENUM ASSEMBLY	S/C 14 & Abv, W/ 02489
1	93592200	SCREW, Hex Washer Head, 8-32 x 3/8	S/C 14 & Blw, W/O 02489
1	93749160	SCREW, Hex Washer head, 6-32 x 5/16	S/C 14 & Abv, W/ 02489
2	94243003	MOUNT, Shock	
3	75154000	PLENUM, Blower	S/C 04 & Blw, W/O 61325B
3	73156800	PLENUM, Blower	S/C 04 - 14, W/ 61325B, W/O 02489
3	72874230	PLENUM, Blower	S/C 14 & Abv, W/ 02489
4	94397639	FOAM, Acoustical Panel	
5	95051500	FOAM, Adhesive Back Tape	

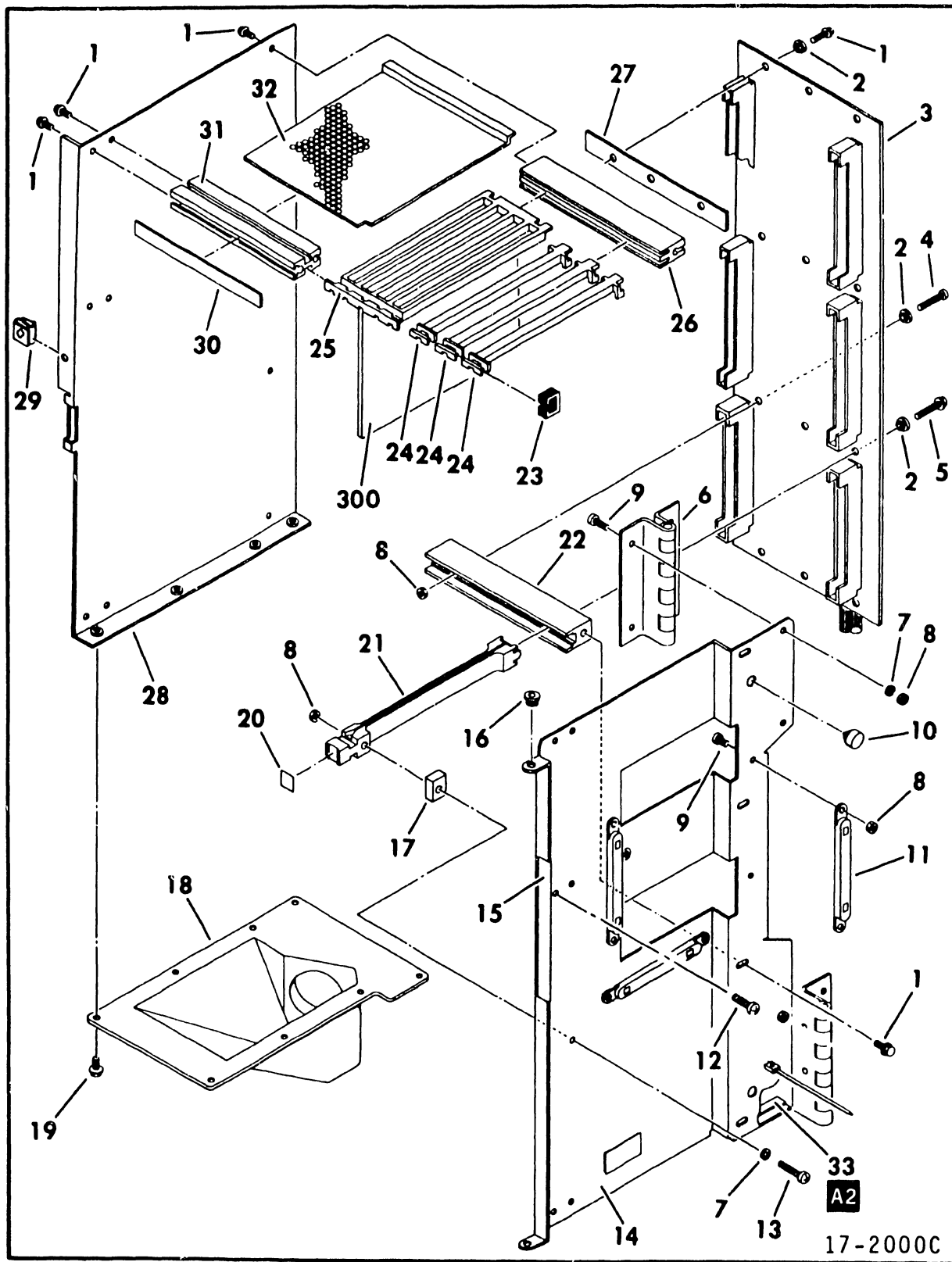


Figure 3A-20. Logic Chassis Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-20	751416XX	LOGIC CHASSIS ASSEMBLY(A3)	S/C 01 Only
1	93592200	SCREW, Hex Washer Head, 8-32 x 3/8	
2	94347108	WASHER, Shoulder	
3	751365XX	WIRE WRAP ASSEMBLY	
	82315001	POSTS, Wire Wrap	
	94393400	POSTS, Wire Wrap	
	82315000	POSTS, Wire Wrap	
4	10127127	SCREW, Pan Head Machine, 8-32 x 1	
5	94376929	SCREW, Hex Washer Head, 8-16 x 1	
6	75138600	HINGE, Logic	Upper
6	75138601	HINGE, Logic	Lower
7	10125804	WASHER, Spring Lock, 8	
8	10125106	NUT, Hex, 8-32	
9	10127122	SCREW, Pan Head Machine, 8-32 x 3/8	
10	92633015	BUMPER, Grommet-type	
11	94386407	MOUNT, Cable	
12	17901516	SCREW, Phillips, 8-32 x 3/8	
13	10127126	SCREW, Pan Head Machine, 8-32 x 7/8	
14	47403300	PANEL, Right Logic	
15	95660407	TAPE, Plastic Film	
16	92373003	NYLINER, Snap-in	
17	73053600	SPACER, Guide	
18	75136900	PLENUM	
19	93592196	SCREW, Hex Washer Head, 8-32 x 1/4	
20	73597928	PLUG, Letter	
21	82314500	GUIDE, Center Card	
22	82319803	BAR, Center Guide Mounting	
23	82316700	SPACER, Guide	
24	82311701	GUIDE, Circuit Card	
25	82312001	GUIDE, Circuit Card	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-20		LOGIC CHASSIS ASSEMBLY (CONT)	S/C 01 Only
26	82316504	BAR, Card Guide Support	
27	92001403	INSULATOR	
28	75137400	PANEL, Left Logic	
29	94317803	RECEPTACLE, Clip-on	
30	82311802	STRIP, Card Location	
31	82316604	BAR, Card Guide Mounting	
32	75139800	COVER, Logic Top 8-32 x 1	
33	00845501	GROMMET, Catepillar	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
LOGIC CHASSIS ASSEMBLY.)

300	CIC	LOGIC CARDS	
301	47203102	JUMPER PLUG ASSEMBLY	





INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-20	474029XX	LOGIC CHASSIS ASSEMBLY (A3)	S/C 02 & Abv
1	93592200	SCREW, Hex Washer Head, 8-32 x 3/8	
2	94347108	WASHER, Shoulder	
3	751365XX	WIRE WRAP ASSEMBLY	
	82315001	POSTS, Wire Wrap	
	94393401	POSTS, Wire Wrap	
	82315000	POSTS, Wire Wrap	
4	10127127	SCREW, Pan Head Machine, 8-32 x 1	
5	94376929	SCREW, Hex Washer Head, 8-16 x 1	
6	47416100	HINGE, Logic	Upper
6	47416101	HINGE, Logic	Lower
7	10125804	WASHER, Spring Lock, 8	
8	10125106	NUT, Hex, 8-32	
9	10127122	SCREW, Pan Head Machine, 8-32 x 3/8	
10	92633015	BUMPER, Grommet-type	
11	94386407	MOUNT, Cable	
12	17901516	SCREW, Phillips, 8-32 x 3/8	
13	10127129	SCREW, Pan Head Machine, 8-32 x 1-1/2	
14	47403300	PANEL, Right Logic	
15	95660407	TAPE, Plastic Film	
16	92373003	NYLINER, Snap-in	
17	73053600	SPACER, Guide	
18	75136900	PLENUM	
19	93592196	SCREW, Hex Washer Head, 8-32 x 1/4	
20	73597928	PLUG, Letter	
21	82314500	GUIDE, Center Card	
22	82319803	BAR, Center Guide Mounting	S/C 09 & Blw, W/O 02115A
22	82319808	BAR, Center Guide Mounting	S/C 09 & Abv, W/ 02115A
23	82316701	SPACER, Guide	
24	82311701	GUIDE, Circuit Card	
25	82312001	GUIDE, Circuit Card	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-20		LOGIC CHASSIS ASSEMBLY (CONT)	S/C 02 & Abv
26	82316504	BAR, Card Guide Support	
27	92001403	INSULATOR	
28	75137400	PANEL, Left Logic	
29	94317803	RECEPTACLE, Clip-on	
30	82311802	STRIP, Card Location	
31	82316604	BAR, Card Guide Mounting	
32	75139800	COVER, Logic Top 8-32 x 1	
33	93592202	SCREW, Hex Washer Head, 8-32 x 1/2	
34	94386407	MOUNT, Cable	S/C 09 & Abv
35	10125106	NUT, Hex, 8-32	S/C 09 & Abv
36	73597930	PLUG, Letter	S/C 09 & Abv, W/ 02115A
37	10127123	SCREW, Pan Head Machine, 8-32 x 1/2	S/C 09 & Abv, W/ 02115A
38	75143501	STRIKE-LATCH, Rear Door	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
LOGIC CHASSIS ASSEMBLY.)

300	CIC	LOGIC CARDS	
301	47203105	JUMPER PLUG ASSEMBLY	
302	94386402	MOUNT, Cable	
303	94277424	TIE, Cable	

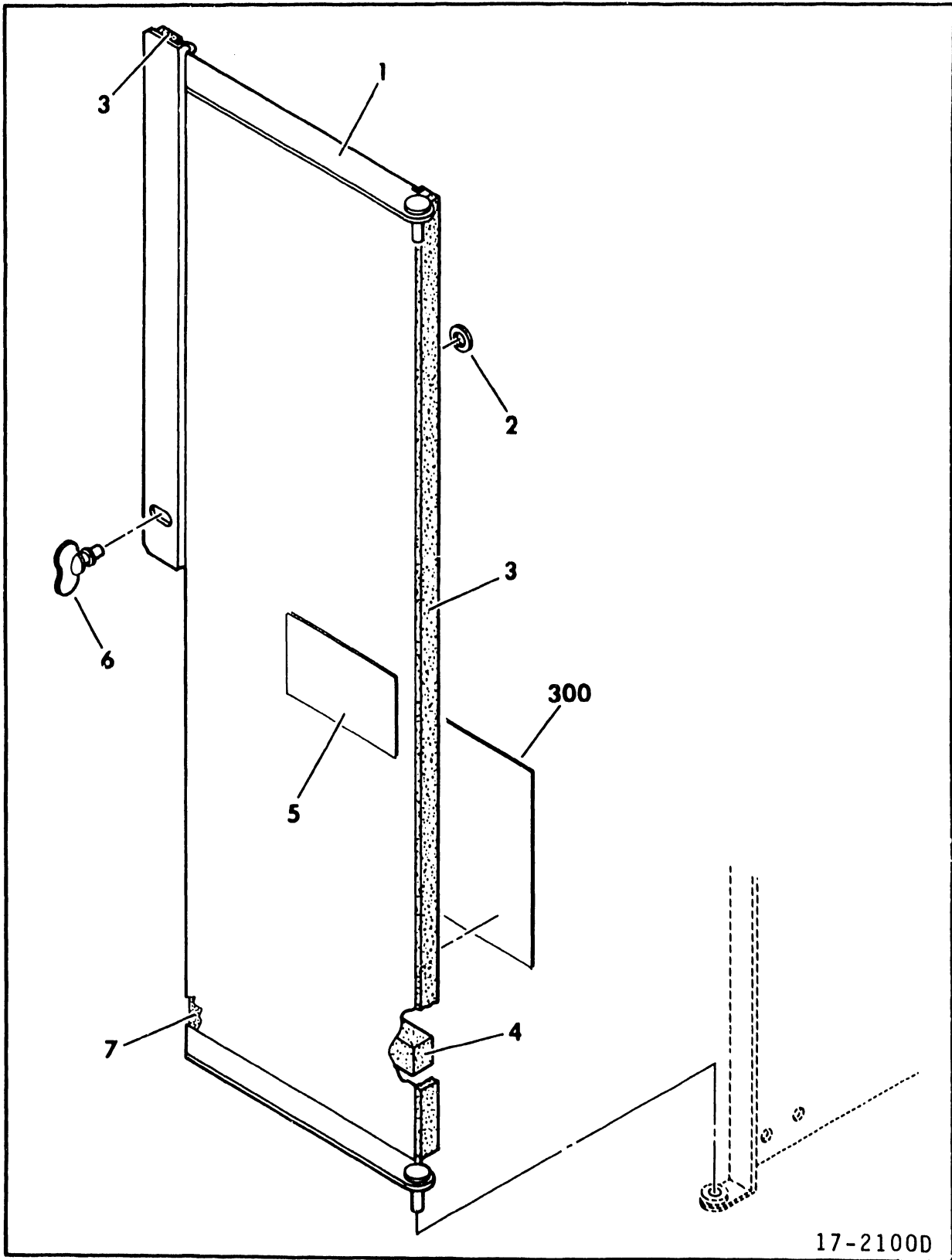


Figure 3A-21. Card Cover Assembly

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-21	75141900	CARD COVER ASSEMBLY	S/C 01 Only
3A-21	75141901	CARD COVER ASSEMBLY	S/C 02 & Abv
1	75137600	COVER, Logic Chassis	S/C 01 Only
1	75137601	COVER, Logic Chassis	S/C 02 & Abv
2	94317900	RETAINER, Split Ring	
3	94001106	TAPE, Foam	
4	94276604	TAPE, Foam	
5	24547540	LABEL, Static Electricity Warning	
6	94317703	FASTENER, Wing Type	
7	94001133	TAPE, Foam	

(ITEMS LISTED BELOW THIS  
NOTE ARE NOT PART OF THE  
CARD COVER ASSEMBLY)

300 77783419 LABEL, Card Guide

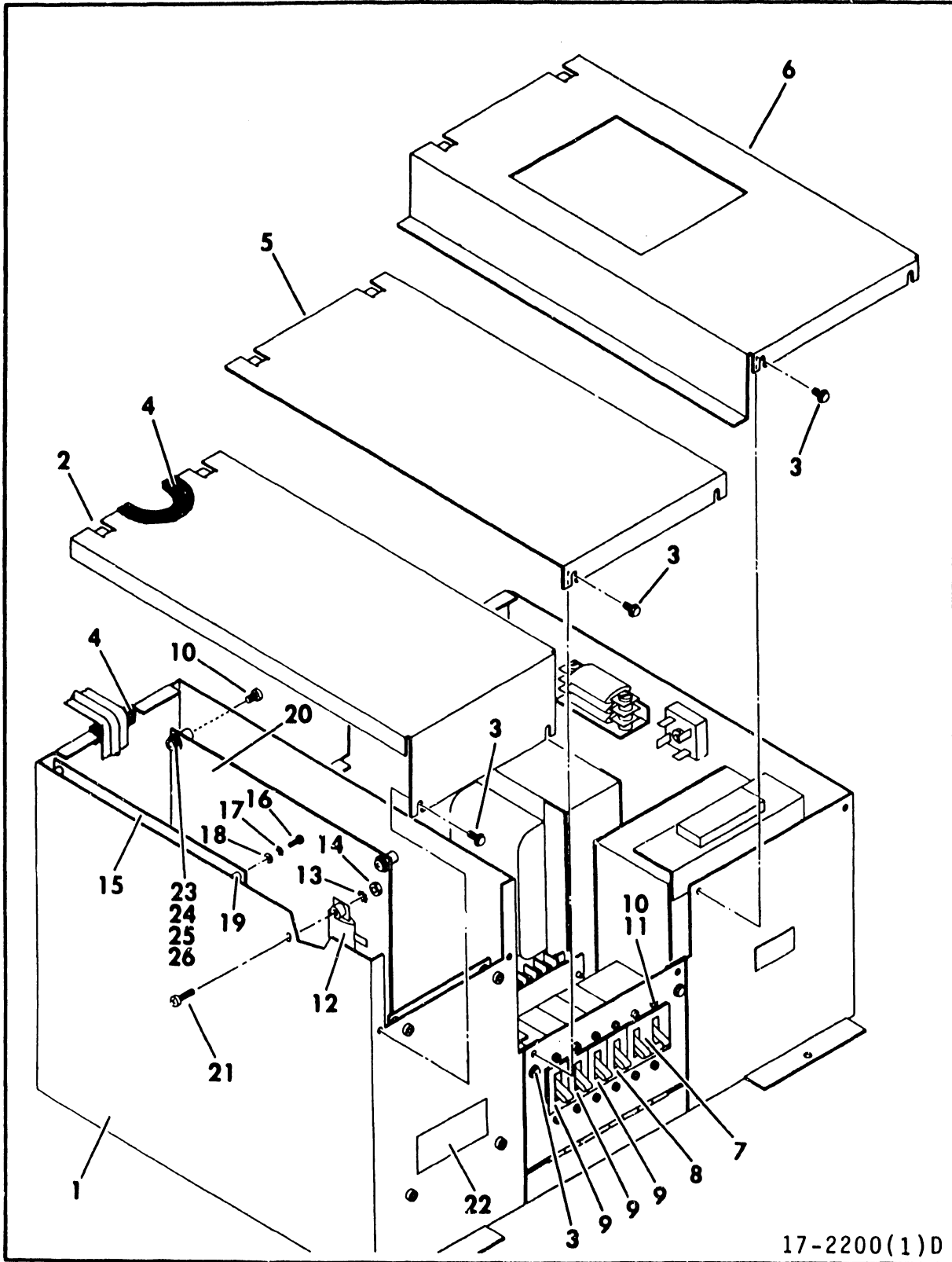


Figure 3A-22. DC Power Supply Assembly (Sheet 1 of 3)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-22	474980xx	DC POWER SUPPLY ASSEMBLY	S/C 03 & Blw, W/O 61376
3A-22	474991xx	DC POWER SUPPLY ASSEMBLY (A2) (Sheet 1 of 3)	S/C 03 & Abv, W/ 61376
1	73156300	BOX, DC Power Supply	
2	73156400	COVER, DC Box Power Amp	
3	93592198	SCREW, Hex Washer Head, 8-32 x 5/16	
4	94237705	TRIM, Safety Black	
5	73156500	COVER, DC Power Capacitors	
6	73156600	COVER, DC Box Transformer	
7	##	BREAKER, Circuit, 20 A (A2CB6A, B)	
8	##	BREAKER, Circuit, 10 A (A2CB7)	
9	##	BREAKER, Circuit, 5 A (A2CB8, A2CB9, A2CB10)	
10	93749158	SCREW, Machine Pan Head, 6-32 x 1/4	
11	95524408	WASHER, Internal Tooth Lock, 10	
12	95667612	RESISTOR, 50 Ohm, 70 W, (A2R5)	
13	10126402	WASHER, External Tooth Lock, 8	
14	10125106	NUT, Hex, 8-32	
15	CIC	_YUV COMPONENT ASSEMBLY (A2A2)	
16	10127104	SCREW, Pan Head Machine, 4-40 x 3/8	
17	10126400	WASHER, External Tooth Lock, 4	
18	10125603	WASHER, Plain, 4	
19	93564004	WASHER, Nylon	
20	CIC	_GDV COMPONENT ASSEMBLY (A2A1)	
21	10127125	SCREW, Pan Head Machine, 8-32 x 3/4	
22	92006924	LABEL, High Voltage Warning	60 Hz Units, Only
23	95658406	NUT, Hex, Brass, 8-32	
24	95510032	NUT, Hex, 6-32	
25	95524409	WASHER, Internal Tooth Lock, Bronze, 8	
26	95524401	WASHER, Internal Tooth Lock, 6	

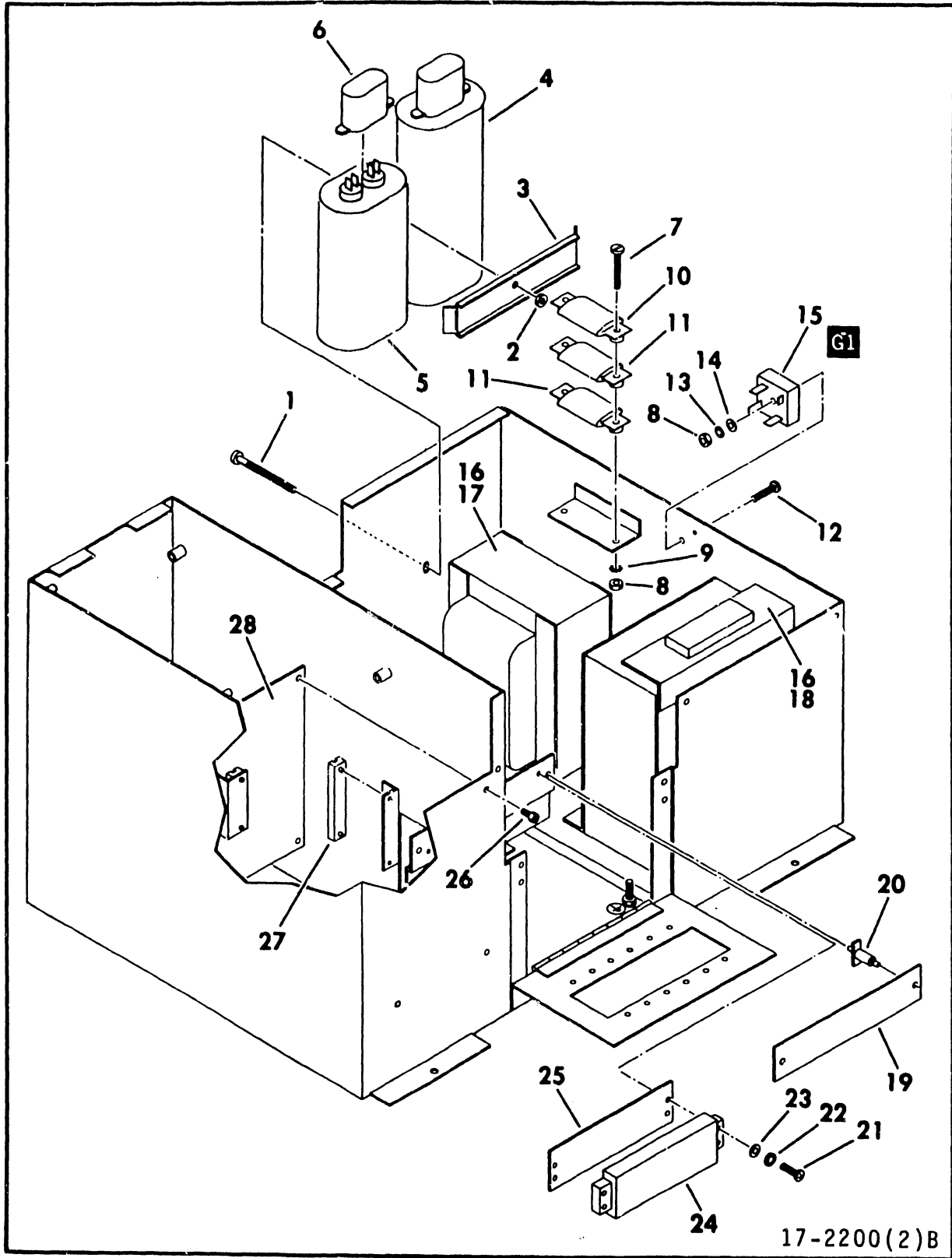
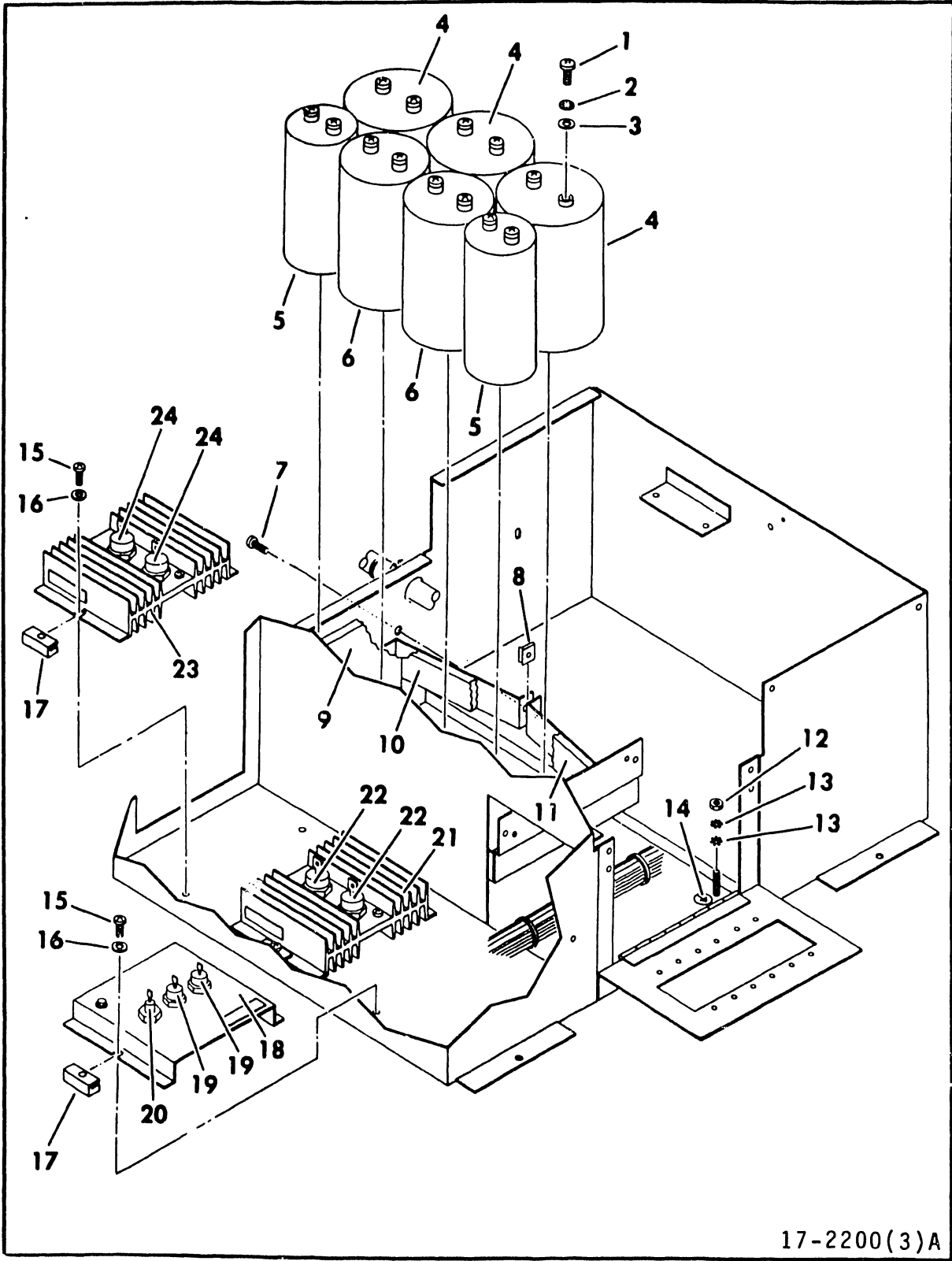


Figure 3A-22. DC Power Supply Assembly (Sheet 2)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-22		DC POWER SUPPLY ASSEMBLY (Sheet 2)	
1	93243258	SCREW, Machine Phillips, 10-32 x 2 1/4	
2	92376014	NUT, Self Locking, 10-32	
3	47243301	BRACKET, Capacitor	
4	76879008	CAPACITOR, 660 V AC, 10uF, (A2C1)	
5	76879005	CAPACITOR, 660 V AC, 5uF, (A2C2)	
6	95582500	BOOT, Double Entrance	
7	10127355	SCREW, Pan Head Machine, 8-32 x 1 3/4	
8	10125106	NUT, Hex, 8-32	
9	10126406	WASHER, External Tooth Lock, 8	
10	95667416	RESISTOR, Cycle Purge, 30 W, (A2R3)	
11	95667409	RESISTOR, 25 Ohm, 30 W, (A2R1, A2R2)	
12	10127125	SCREW, Pan Head Machine, 8-32 x 3/4	
13	10126104	WASHER, Internal Tooth Lock, 8	
14	10125606	WASHER, Plain, 8	
15	##	BRIDGE, Rectifier	
16	93660132	SCREW, Phillips Head with External Tooth Washer, 1/2 x 1/4 - 20	
17	70110900	TRANSFORMER, 50 V (A2T2)	60 HZ
17	70110800	TRANSFORMER, 50 V (A2T2)	50 HZ
18	70110700	TRANSFORMER, +30 V, +15V (A2T1)	60 HZ
18	70110600	TRANSFORMER, +30 V, +15 V (A2T1)	50 HZ
19	76577407	COVER, Terminal Block	
20	94378805	BOARD, Self-Locking Support Circuit	
21	10127115	SCREW, Pan Head Machine, 6-32 x 5/8	
22	10126103	WASHER, Internal Tooth Lock, 6	
23	10125613	WASHER, Plain, 6	
24	93041109	STRIP, Terminal Barrier (A2TB3)	
25	93107209	MARKER, Strip	
26	93749158	SCREW, Pan Head Machine, 6-32 x 1/4	
27	94377301	GUIDE, Card	
28	CIC	_VMV COMPONENT ASSEMBLY (A2A7)	





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Figure 3A-22. DC Power Supply Assembly (Sheet 3)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-22		DC POWER SUPPLY ASSEMBLY (Sheet 3)	
1	93234240	SCREW, Phillips Pan Head Machine, 10-32 x 1/2	
2	95524408	WASHER, Internal Tooth Lock, 10	
3	94047081	WASHER, Plain, 10	
4	95661322	CAPACITOR, 15 V DC, 160 000 uF (A2C3, A2C4, A2C5)	
5	95661319	CAPACITOR, 30 V DC, 35 000 uF (A2C6, A2C7)	
6	95578113	CAPACITOR, 50 V DC, 35 000 uF (A2C8, A2C9)	
7	95655522	SCREW, Sheet Metal, 6-20 x 1-1/4	
8	95634816	NUT, U-type Speed	
9	94397648	FOAM, Acoustical Panel	
10	94397647	FOAM, Acoustical Panel	
11	94397646	FOAM, Acoustical Panel	
12	10125106	NUT, Hex, 8-32	
13	10126402	WASHER, External Tooth Lock, 8	
14	94224667	LABEL, Information	
15	93660081	SCREW, Phillips, 8-32 x 5/8	
16	10125606	WASHER, Plain, 8	
17	95583100	SPACER, Insulation	
18	75142500	-36 V RECTIFIER ASSEMBLY (A2A6)	
19	##	DIODE, 50 W, 12 V (A2A6CR11)	
20	##	RECTIFIER, 12 A (A2A6CR9, A2A6CR10)	
21	75142601	-5 V RECTIFIER ASSEMBLY (A2A1)	
22	##	RECTIFIER, 40 A (A2A4CR3, A2A4CR4)	
23	75142600	+5 V RECTIFIER ASSEMBLY (A2A1)	
24	##	RECTIFIER, 40 A (A2A4CR1, A2A4CR2)	

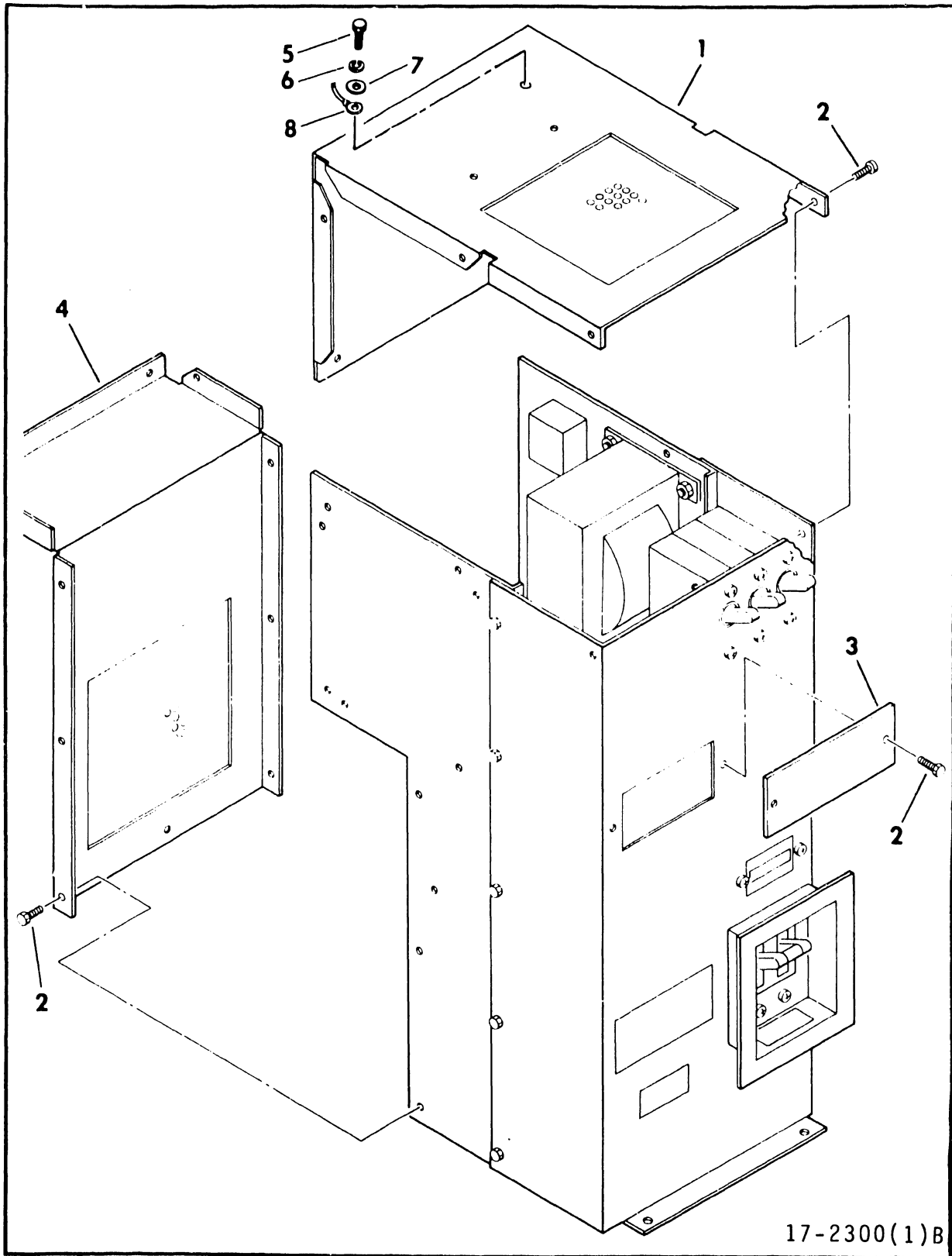


Figure 3A-23. AC Power Supply Assembly (Sheet 1 of 4)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-23	474983xx	AC POWER SUPPLY ASSEMBLY (A1)	S/C 02 W/O 61364 & Blw
3A-23	474948xx	AC POWER SUPPLY ASSEMBLY (A1) (Sheet 1 of 4)	S/C 02 W/ 61364 & Abv
1	75139200	COVER, Upper AC Power Supply	S/C 02 W/O 61364 & Blw
1	47498800	COVER, Upper AC Power Supply	S/C 02 W/ 61364 & Abv
2	93592198	SCREW, Hex Washer Head, 8-32 x 5/16	
3	94376721	PLATE, Nut	
4	75139100	COVER, Lower AC Power Supply	S/C 02 W/O 61364 & Blw
4	49498700	COVER, Lower AC Power Supply	S/C 02 W/ 61364 & Abv
5	10127113	SCREW, Pan Head Machine, 6-32 x 3/8	
6	10125803	WASHER, Spring Lock, 6	
7	10125605	WASHER, Plain, 6	
8	94281467	CABLE, Ground	

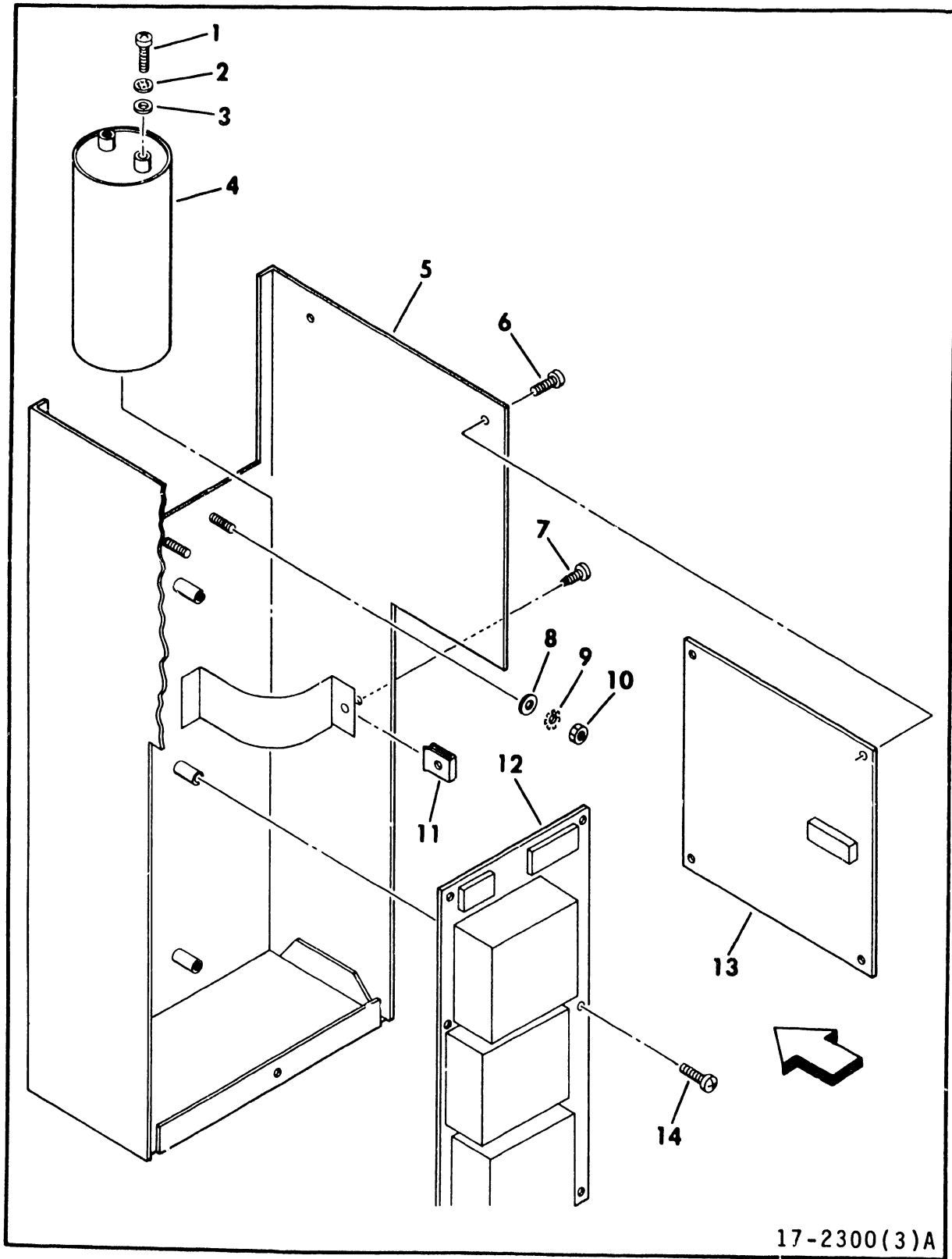


INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-23

AC POWER SUPPLY ASSEMBLY  
(Sheet 2)

1	92376014	NUT, Self Locking, 10-32	
2	70113200	TRANSFORMER, Linear (AlAT1)	
3	95634832	NUT, Speed U-type	
4	10126403	WASHER, External Tooth Lock, 10	
5	10127143	SCREW, Pan Head Machine, 10-32 x 1/2	
6	95655517	SCREW, Sheet Metal, 6-20 x 1/2	
7	##	METER, Time Elapsed (AlBM1)	
8	10125108	NUT, Hex, 10-32	
9	##	BREAKER, Circuit (AlCB2)	
10	##	BREAKER, Circuit (AlCB3, AlCB4)	
11	93749158	SCREW, Pan Head Machine, 6-32 x 1/4	
12	94375825	SCREW, Pan Head, 1/2 x 8-16	
13	93592198	SCREW, Hex Washer Head, 8-32 x 5/16	
14	95524408	WASHER, Bronze Lock, 10	
15	##	BREAKER, Circuit (AlCB1)	
16	17901511	SCREW, Phillips, 6-32 x 5/8	
17	10125613	WASHER, Plain, 6	
18	95524400	WASHER, Bronze Lock, 6	
19	93041105	STRIP Terminal	
20	93107205	STRIP, Marker	
21	92206901	LABEL, Bilingual Line Voltage Warning	
22	77579939	JUMPER, Ground	S/C 02 W/ 61364 & Abv
23	92033085	RETAINER, Push-on	S/C 03 W/ 61615 & Abv
24	92252130	ROD, Aluminum	S/C 03 W/ 61615 & Abv
25	93019312	SPACER	S/C 03 W/ 61615 & Abv



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Figure 3A-23. AC Power Supply Assembly (Sheet 3)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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3A-23

AC POWER SUPPLY ASSEMBLY  
(Sheet 3)

1	93234240	SCREW, Phillips Pan Head Machine, 10-32 x 1/2	
2	95524408	WASHER, Bronze Lock, 10	
3	94047081	WASHER, Brass Flat, 10	
4	95642319	CAPACITOR, 30 V DC, 35 000 uF (AlCl)	
5	77573400	BOX, Rear AC Power Supply	S/C 02 W/O 61364 & Blw
5	47494300	BOX, Rear AC Power Supply	S/C 02 W/ 61364 & Abv
6	93749158	SCREW, Pan Head Machine, 6-32 x 1/4	
7	95655519	SCREW, Sheet Metal, 6-20 x 3/4	
8	10125607	WASHER, Flat, 10	
9	10126403	WASHER, External Tooth Lock, 10	
10	10125107	NUT, Hex Machine, 10-24	
11	95634809	NUT, U-type Speed	
12	CIC	_VXV COMPONENT ASSEMBLY (A1A1) (See Figure 3A-24)	
13	CIC	_VLV REGULATOR BOARD (A1A2)	
14	93749162	SCREW, Pan Head Machine, 6-32 x 3/8	



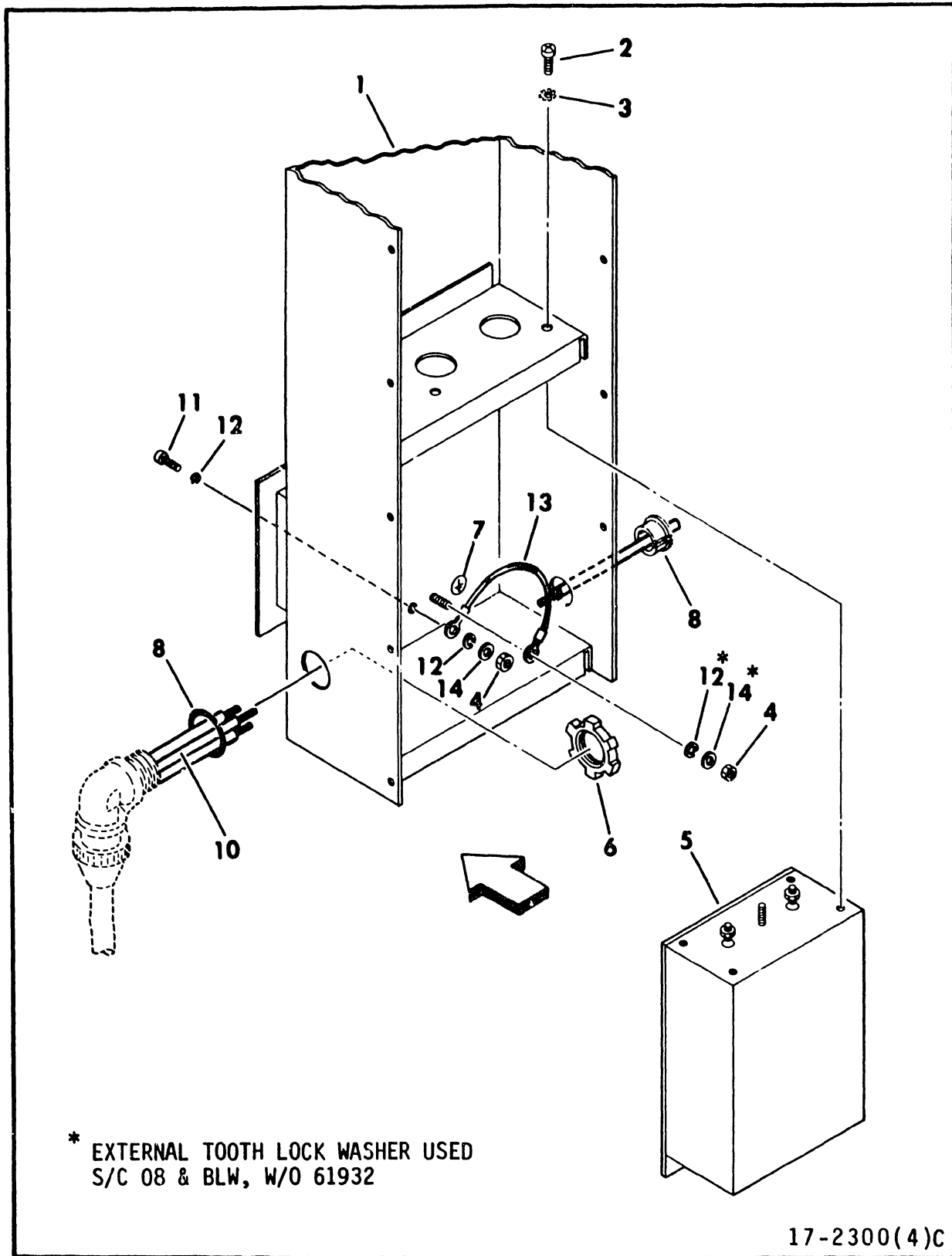


Figure 3A-23. AC Power Supply Assembly (Sheet 4)

INDEX NO	PART NO	PART DESCRIPTION	NOTE
3A-23		AC POWER SUPPLY ASSEMBLY (Sheet 4)	
1	77573300	BOX, Front AC Power Supply	S/C 02 & Blw, W/O 61364
1	47498900	BOX, Front AC Power Supply	S/C 02 - 08, W/ 61364 & W/O 61932
1	73157700	BOX, Front AC Power Supply	S/C 08 & Abv, W/ 61932
2	10127130	SCREW, Pan Head Machine, 10-24 x 5/16	
3	10126403	WASHER, External Tooth Lock, 10	
4	10125107	NUT, Hex, 10-24	
5	##	FILTER, Low Leakage (AlFL)	
6	92366001	NUT, Conduit Lock	
7	94224667	LABEL, VDE Grounding	
8	92074093	O-RING	S/C 02 & Blw, W/O 61364
9	94305531	BUSHING, Split	S/C 02 & Abv W/ 61364
10		W1 CABLE ASSEMBLY	See Cable & Harness Section for Part Infor- mation
11	10127144	SCREW, Pan Head Machine, 10-32 x 5/8	S/C 08 & Abv, W/ 61932
12	10125805	WASHER, Spring Lock, 10	S/C 08 & Abv, W/ 61932
13		JUMPER ASSEMBLY	See Sheet 1 for part number.
14	10125607	WASHER, Flat, 10	S/C 08 & Abv, W/ 61932

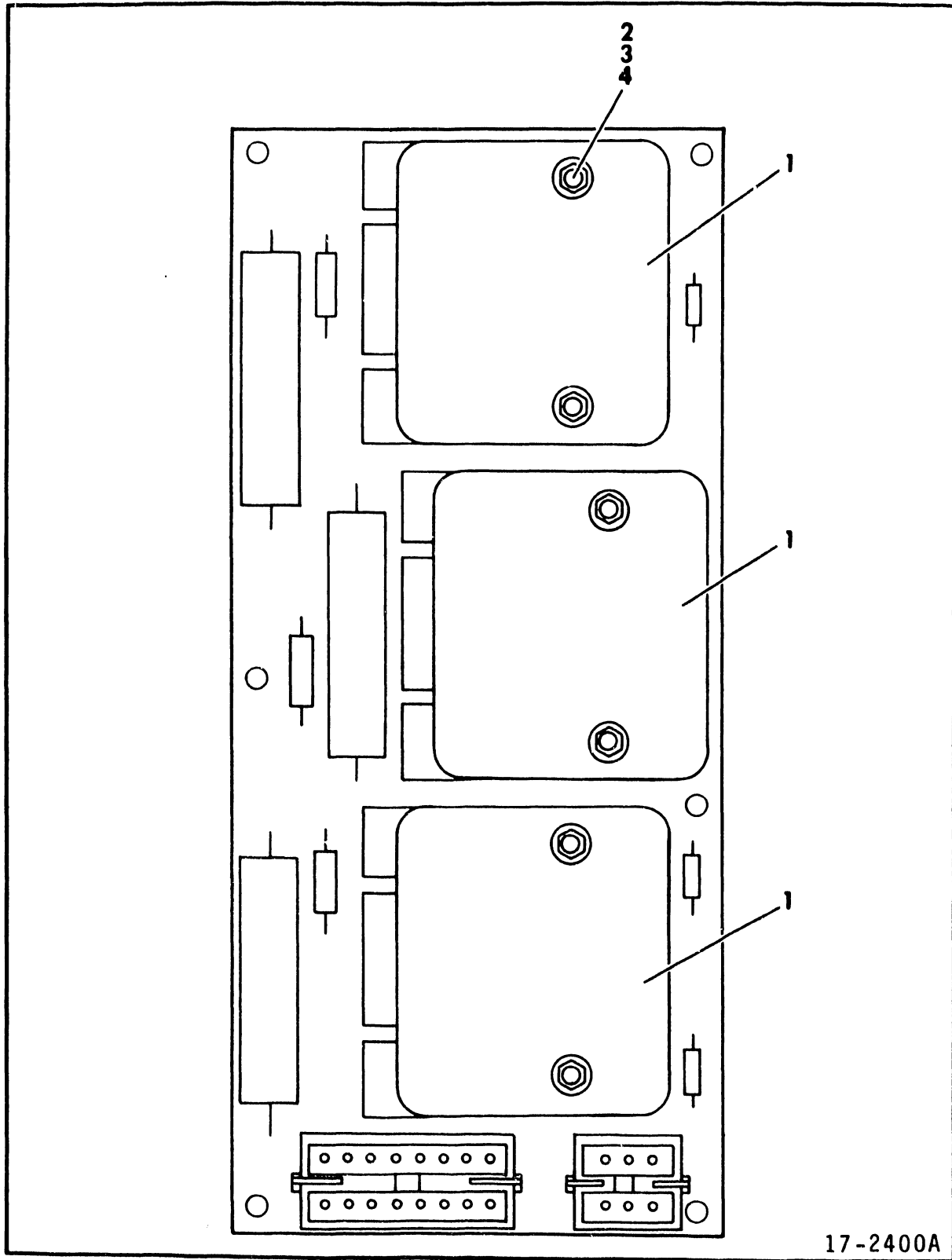


Figure 3A-24. -VXV Component Assembly

INDEX	PART	PART DESCRIPTION	NOTE
NO	NO		

3A-24	CIC	_VXV COMPONENT ASSEMBLY (A1A1) (Power Distribution Board)	
1	##	RELAY, Power (A1A1K1, A1A1K2, A1A1K3)	
2	93640035	STUD, Self Clinching	
3	10126104	WASHER, Internal Tooth Lock, 8	
4	95510027	NUT, Hex, 8-32	

**3B**

**CABLE AND**

**HARNES**

**PART**

**INFORMATION**

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## GENERAL

This section contains a partial parts breakdown for all cable and harness assemblies used in the fixed module drives (FMDs). The listings, arranged alphabetically by assembly name, are partial and contain only field-replaceable items.

Preceding the parts breakdown is a physical location code index (table 3B-1). This index identifies cables and harnesses by physical location rather than by name.

### Physical Location Codes

This section assumes that the user has a basic knowledge of physical location codes. Section 2 of this manual contains a pictorial locator of all physical locations within the FMD.

### How to Use This Section

Whether replacing an entire assembly or just a termination within that assembly, the procedure for using the section is the same:

- If assembly name is known, simply use appropriate listing. If name is not known:
- Determine physical location code of one terminator within assembly. Code may be stencilled on assembly or on flag attached to wire directly below terminator. (Code information is also available in section 2 of this manual.)
- Locate Code on table 3B-1. Page number following code refers to page number of assembly breakdown. (Multiple page numbers might indicate more than one configuration for an assembly -- 50 Hz vs 60 Hz, for example. Multiple numbers might also indicate more than one assembly "feeding" the same physical location. When additional descriptive information is necessary, the parts list will define terminal number, pin number, etc.

TABLE 3B-1. CABLES/HARNESSES PHYSICAL LOCATION INDEX

Physical Location	Page Number (3B- )	Physical Location	Page Number (3B- )
A1A	7	A2A5	16
A1AJ2	8	A2A7P3	16
A1AJ3	7, 8	A2A7P4	16
A1AJ4	7	A2CB6A	17
A1AJ5	7	A2CB6B	17
A1A1P1	8	A2CB8	17
A1A1P2	7	A2CB10	17
A1AP7	7	A2C3	16
A1ATB1	7	A2C4	16
A1A2	8, 9	A2C5	17
A1A2J1	8	A2C6	17
A1B	6	A2C7	17
A1BCB1A	9	A2C8	17
A1BCB1B	9	A2C9	17
A1BCB2	6	A2J4	17
A1BCB3	6	A2J8	17
A1BCB4	6	A2J9	17
A1BFL1	6	A2P4	19
A1BFL1A	9	A2P8	19
A1BFL1B	9	A2P9	19
A1BFL2	6	A2R1	18
A1BJ7	6	A2R2	18
A1BM1	9	A2R3	18
A1CB1	24	A2R4	18
A1C1	8, 9	A2TB1	18
A1P2	19	A2TB3	5
A1P3	22		
A1P4	5	A3A	23
A1P5	9	A3A04B	25
		A3A09	14, 15, 23
A2	5	A3B	23
A2A1	16	A3B02	19
A2A1J5	16	A3B02	19
A2A1P1	16	A3B03	23
A2A1P2	16	A3C	23
A2A1P5	19	A3C03	19, 23
A2A2P1	19		
		A4	13

Table Continued on Next Page

TABLE 3B-1. CABLES/HARNESSES PHYSICAL LOCATION INDEX (Contd)

Physical Location	Page Number (3B- )	Physical Location	Page Number (3B- )
A4J11	19	A7S1	14, 15
A5A3A09	14,	A7VCM1	20
A5A7S1	14,	A8J2	11
A5S1A	14, 15	A8J3	10
A5S1B	14, 15	A8P2	11
A5S3	15	A8P3	10
A5S3A	14	A9TB1	14, 15,
A5S4A	14, 15		17, 20,
A5S4B	14, 15		23, 25
A5XDS1	14, 15	A10A1P5	12
A5XDS2	14, 15		
A5XDS3	14, 15		
A5XDS4	14, 15		
A7P9	20		
A7P12	25		



INDEX NO	PART NO	PART DESCRIPTION	NOTE
75157200	AC/DC CABLE ASSEMBLY A1P4		
51906003	CONNECTOR, Plug		
51905818	CONTACT, Pin A2		
95604039	TERMINAL, Ring Tongue 16-14 Ga.	Safety Ground Stud	
95527000	A2TB3 TERMINAL, Ring Tongue 16-14 Ga.	Terminals 1, 3, 4, 6	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
75157800		AC POWER ASSEMBLY - Front Internal Harness	
		AlB	
95604039		TERMINAL, Ring Tongue 16-14 Ga.	Ground Stud
		AlBCB2	
95643212		TERMINAL, Ring Tongue 22-18 Ga.	
		AlBCB3	
93747029		TERMINAL, Piggy Back Slide On	Line and Load
		AlBCB4	
95643212		TERMINAL, Ring Tongue 22-18 Ga.	Line and Load
		AlBFL1	
95604057		TERMINAL, Ring Tongue, 12-10 Ga.	Load
		AlBFL2	
95604019		TERMINAL, Ring Tongue, 22-18 Ga.	
95604039		TERMINAL, Ring Tongue, 16-14 Ga.	
		AlBJ7	
51905906		CONNECTOR, 15 Cavity Receptacle	
51906200		CONTACT, Socket	Terminals 1,2,6,7,8,9
51906201		CONTACT, Socket	Terminals 4,10,11,12

INDEX NO	PART NO	PART DESCRIPTION	NOTE
75158000		AC POWER ASSEMBLY - Rear Internal Harness	
		AlA	
95604019		TERMINAL, Ring Tongue	Top Ground Stud
95604039		TERMINAL, Ring Tongue, 16-14 Ga.	Bottom Ground Stud
		AlAJ3	
51905904		CONNECTOR, 9 Cavity Receptacle	
51906201		CONTACT, Socket	
		AlAJ4	
51905903		CONNECTOR, 6 Cavity Receptacle	
51906200		CONTACT, Socket 20-14 Ga.	
		AlAJ5	
51905902		CONNECTOR, 4 Cavity Receptacle	
51906200		CONTACT, Socket	
		AlAP7	
51906006		CONNECTOR, 15 Cavity Receptacle	
51905809		CONTACT, Pin	Terminals 1,2,6, 7,8,9
51905810		CONTACT, Pin	Terminals 4,10, 11,12
		AlATB1	
95604033		TERMINAL, Quick Connect, 16-14 Ga.	Terminals 4
95604009		TERMINAL, Quick Connect, 22-18 Ga.	Terminal 5
95527000		TERMINAL, Spring Spade, 22-18 Ga.	Terminal 3
		AlAlP2	
94091009		CONNECTOR, 16 Cavity Receptacle	
93943003		CONTACT, Socket	Terminals 1,2,5, 9,14,15
95604050		TERMINAL, Ring Tongue	Terminal 5

INDEX NO	PART NO	PART DESCRIPTION	NOTE
75159500		AC POWER ASSEMBLY - Internal Harness Assembly	
		ALAJ2	
51905905		CONNECTOR, 12 Cavity Receptacle	
51906200		CONTACT, Socket	Terminals 1,2,6, 7,8,10,11,12
51906201		CONTACT, Socket	Terminals 4,5
		ALAJ3	
51905815		CONTACT, Pin	Terminals 8,9
		ALAJ1	
93947006		CONNECTOR, 6 Cavity Receptacle	
93943003		CONTACT, Socket	
		ALA2	
95643217		TERMINAL, Quick Connect	
94130008		TERMINAL, Quick Connect	Terminals E3, E6,E7
		ALA2J1	
93947009		CONNECTOR, 4 Cavity Receptacle	
93943003		CONTACT, Socket	
		ALC1	
95604039		TERMINAL, Ring Tongue	Positive and Negative
95604019		TERMINAL, Ring Tongue	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
	75159701	AC POWER ASSEMBLY - Wire Prep A1A2	
	95643217	TERMINAL, Quick Connect	S/C 05 W/ 61650 & Abv
		A1BFL1A	
	95604039	TERMINAL, Ring Tongue	
		A1BFL1B	
	94504039	TERMINAL, Ring Tongue	
		A1BM1	
	95527001	TERMINAL, Spring Spade	
		A1BCB1A	
	95604019	TERMINAL, Ring Tongue	
	95604039	TERMINAL, Ring Tongue	
		A1BCB1B	
	95604019	TERMINAL, Ring Tongue	
	95604039	TERMINAL, Ring Tongue	
		A1C1	
	95604057	TERMINAL, Ring Tongue	S/C 05 W/ 61650 & Abv

INDEX NO	PART NO	PART DESCRIPTION	NOTE
73044208	A	CABLE ASSEMBLY	
		A8J3	
94281201		CONNECTOR, 75 Pin	
93645007		CONTACT, Socket	
93645002		CONTACT, Socket	
		A8P3	
94361115		HOUSING, 60 Cavity Con- nector Socket	
94245603		CONTACT, Socket	

INDEX	PART	PART DESCRIPTION	NOTE
NO	NO		

73044400	B CABLE ASSEMBLY A8J2		
93643016	BLOCK, Connector		
93645011	CONTACT, Socket		
68553402	A8P2 CONNECTOR, 26 Cavity		

INDEX NO	PART NO	PART DESCRIPTION	NOTE
	75141500	BLOWER CABLE ASSEMBLY A10A1P5	
	51906002	CONNECTOR, 4 Cavity Receptacle	
	51905815	CONTACT, Pin	



INDEX NO	PART NO	PART DESCRIPTION	NOTE
	76552303	BRAKE CABLE ASSEMBLY A4	
	93948008	CONNECTOR, 4 Cavity Housing	
	93942017	CONTACT, Pin, 22-18 Ga.	
	77799101	CAPACITOR AND RECTIFIER ASSEMBLY	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
75158801		CONTROL PANEL HARNESS A3A09	S/C 07 & Blw
94245616		CONTACT, Socket A5A3A09	
94261107		CONNECTOR, 14 Cavity Receptacle	
94245602		CONTACT, Socket A5S1A	
95643244		TERMINAL, Quick Connect A5S1B	Normally Open
95643246		TERMINAL, Quick Connect	Common
95643244		TERMINAL, Quick Connect A5S3A	Normally Open
95643246		TERMINAL, Quick Connect	Common
95643244		TERMINAL, Quick Connect A5S3B	Normally Closed
95643246		TERMINAL, Quick Connect	Common
95643244		TERMINAL, Quick Connect	Normally Open and Normally Closed
		A5S4A	
95643246		TERMINAL, Quick Connect	Common
95643244		TERMINAL, Quick Connect A5S4B	Normally Open
95643244		TERMINAL, Quick Connect A5XDS1	Normally Open
95643246		TERMINAL, Quick Connect	Positive and Negative
		A5XDS2	
95643246		TERMINAL, Quick Connect	Positive
95643244		TERMINAL, Quick Connect	Negative
		A5XDS3	
95643246		TERMINAL, Quick Connect	Positive
95643244		TERMINAL, Quick Connect	Negative
		A5XDS4	
95643246		TERMINAL, Quick Connect	Positive
95643244		TERMINAL, Quick Connect	Negative
		A5A7S1	
95643225		TERMINAL, Quick Connect A7S1	
95643225		TERMINAL, Quick Connect A9TB1	
95643212		TERMINAL, Quick Connect	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
75158802		CONTROL PANEL HARNESS	S/C 08 - 14, S/C 15 W/O 02615 S/C 15 & Abv, W/ 02615
75158803		CONTROL PANEL HARNESS	
		A3A09	
94361107		CONNECTOR, 12 Cabivy Receptacle	
94245602		CONTACT, Socket	
		A7S1	
95643225		TERMINAL, Quick Connect	Right
94245602		CONTACT, Socket	Left
		A9TB1	
95643212		TERMINAL, Quick Connect	S/C 15 & Blw, W/O 02615 S/C 15 & Abv, W/ 02615
95604009		TERMINAL, Quick Connect	
		A5S1A	
95643244		TERMINAL, Quick Connect	
		A5S1B	
95643244		TERMINAL, Quick Connect	
		A5S3	
95643244		TERMINAL, Quick Connect	
		A5S4A	
95643246		TERMINAL, Quick Connect	
		A5S4B	
95643244		TERMINAL, Quick Connect	
		A5XDS1	
95643244		TERMINAL, Quick Connect	Negative
95643246		TERMINAL, Quick Connect	Positive
		A5XDS2	
95643244		TERMINAL, Quick Connect	
95643246		TERMINAL, Quick Connect	
		A5XDS3	
95643244		TERMINAL, Quick Connect	Negative
95643246		TERMINAL, Quick Connect	Positive
		A5XDS4	
95643244		TERMINAL, Quick Connect	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
75156802		DC INTERNAL HARNESS (Sheet 1 of 2)	
	A2A1	-5V	
95604050		TERMINAL, Ring Tongue	Ground Stud
	A2A1	+5V	
95604054		TERMINAL, Ring Tongue	Ground Stud
	A2A1	-10V	
95604050		TERMINAL, Ring Tongue	In Stud
	A2A1	+10V	
95604054		TERMINAL, Ring Tongue	In Stud
	A2A1J5		
93947010		CONNECTOR, 1 Cavity Receptacle	
93943008		CONTACT, Socket	
	A2A1P1		
94388616		CONNECTOR, 10 Cavity Receptacle	
94389300		CONTACT, Wiper	
	A2A1P2		
94388612		CONNECTOR, 9 Cavity Receptacle	
94389300		CONTACT, Wiper	
	A2A2J2		
51905900		CONNECTOR, 2 Cavity Receptacle	
51906200		CONTACT, Socket	
	A2A5		
95643212		TERMINAL, Quick Connect	Positive and Negative
	A2A7P2		
94388604		CONNECTOR, 4 Cavity Receptacle	
94389300		CONTACT, Wiper	
	A2A7P3		
94388608		CONNECTOR, 6 Cavity Receptacle	
94389300		CONTACT, Wiper	
	A2A7P4		
94388622		CONNECTOR, 14 Cavity Receptacle	
94389300		CONTACT, Wiper	
	A2C3		
95604019		TERMINAL, Ring Tongue	Positive
95604057		TERMINAL, Ring Tongue	Positive and Negative
	A2C4		
95604019		TERMINAL, Ring Tongue	Positive
95604057		TERMINAL, Ring Tongue	Positive and Negative

INDEX NO	PART NO	PART DESCRIPTION	NOTE
DC INTERNAL HARNESS (Sheet 2)			
		A2C5	
95604019		TERMINAL, Ring Tongue	Positive and Negative
95604057		TERMINAL, Ring Tongue	Positive and Negative
		A2C6	
95604039		TERMINAL, Ring Tongue	Positive and Negative
		A2C7	
95604039		TERMINAL, Ring Tongue	Positive and Negative
		A2C8	
95604039		TERMINAL, Ring Tongue	Positive and Negative
		A2C9	
95604039		TERMINAL, Ring Tongue	Positive and Negative
		A2CB6A	
95604019		TERMINAL, Ring Tongue	Load and Line
		A2CB6B	
95604057		TERMINAL, Ring Tongue	Load and Line
		TERMINAL, Quick Connect	
		A2CB8	
94504019		TERMINAL, Ring Tongue	Load and Line
		A2CB10	
95604039		TERMINAL, Ring Tongue	Load and Line
95604019		TERMINAL, Ring Tongue	Load
95643241		TERMINAL, Quick Connect	Normally Open and Common
		A2J4	
93947005		CONNECTOR, 2 Cavity Receptacle	
93943008		CONTACT, Socket	
		A2J8	
94254700		CONNECTOR, 6 Cavity Housing	
51739400		CONTACT, Slide-On	Terminals 1,2,3, 4,5
		A2J9	
51905904		CONNECTOR, 9 Cavity Housing	
51906207		CONTACT, Socket	Terminals 2,3, 4,5
51906201		CONTACT, Socket	Terminal 1

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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DC INTERNAL HARNESS (Sheet 3)

		A2R1	
95643227		TERMINAL, Quick Connect	
		A2R2	
95643227		TERMINAL, Quick Connect	
		A2R3	
95643227		TERMINAL, Quick Connect	
		A2R5	
95643227		TERMINAL, Quick Connect	
		A2TB1	
95604054		TERMINAL, Ring Tongue	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
	75156002	DC MAIN HARNESS ASSEMBLY	S/C 14 & Blw
	75156003	DC MAIN HARNESS ASSEMBLY (Sheet 1 of 2)	S/C 15 & Abv
		A1P2	
	51906005	CONNECTOR, 12 Cavity Plug	
	51905807	CONTACT, Pin	
	51905811	CONTACT, Pin	Terminals 10, 11,12
		A2A1P5	
	93948009	CONNECTOR, 1 Cavity Housing	
	93942008	CONTACT, Pin	
		A2A2P1	
	94219898	CONNECTOR, 22 Cavity Plug	
	94219903	CONTACT, Duo Tyne, 22-18 Ga.	Terminals 7,8,10 13,16,19
	94219902	CONTACT, Duo Tyne	Terminals 11, 12, 15
		A2A2P2	
	51906000	CONNECTOR, 2 Cavity Plug	
	51905807	CONTACT, Pin	
		A2P4	
	93948000	CONNECTOR, 2 Cavity Housing	
	93942008	CONTACT, Pin	
		A2P8	
	51739300	CONNECTOR, 6 Cavity Plug	
	51739201	PIN, Contact	
		A2P9	
	51906004	CONNECTOR, 9 Cavity Plug	
	51905809	PIN, Contact	
	51905811	PIN, Contact	
		A3A09	
	94361101	CONNECTOR, Housing	
	94245602	CONTACT, Socket	
		A3B02	
	94245602	CONTACT, Socket	
		A3C03	
	51863005	CONNECTOR, Housing	
	94245602	CONTACT, Socket	
		A4J11	
	93947009	CONNECTOR, 4 Cavity Housing	
	93943008	CONTACT, Socket	
	92002400	PLUG, Polarizing	

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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DC HARNESS ASSEMBLY (Sheet 2)

		A7P9	
94219892		CONNECTOR, 6 Cavity Housing	
94219903		CONTACT, Duo Tyne, 22-18 Ga.	
		A7VCM1	
93747025		TERMINAL, Quick Connect, 22-18 Ga.	Terminals 1,2
95604019		TERMINAL, Quick Connect, 22-18 Ga.	Ground
		A9TB1	
95643212		TERMINAL, Quick Connect, 22-18 Ga.	S/C 14 & Blw
95604009		TERMINAL, Quick Connect, 22-18 Ga.	S/C 15 & Abv
95643216		TERMINAL, Quick Connect, 14-16 Ga.	S/C 14 & Blw
95604033		TERMINAL, Quick Connect, 14-16 Ga.	S/C 15 & Abv
95643217		TERMINAL, Quick Connect, 12-14 Ga.	S/C 14 & Blw
95604050		TERMINAL, Quick Connect, 12-14 Ga.	S/C 15 & Abv



INDEX NO	PART NO	PART DESCRIPTION	NOTE
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47433800	DIAGNOSTIC FLAT CABLE HARNESS ASSEMBLY		
75158203	DIAGNOSTIC CABLE ASSEMBLY A10P1(Pin Nos. 1-13) to A3A09(Pin Nos. 33-45)		
75158203	DIAGNOSTIC CABLE ASSEMBLY A2A7P1(Pin Nos. 1-13) to A3A09(Pin Nos. 18-30) A6P1(Pin Nos. 1-13) to A3A09(Pin Nos. 33-45)		

INDEX NO	PART NO	PART DESCRIPTION	NOTE
75143000	DRIVE MOTOR ASSEMBLY ALP3		
51906004	CONNECTOR, 9 Cavity Receptacle		
51905815	CONTACT, Pin		Terminals 1,2,3 5,6
51906202	CONTACT, Socket		Terminals 7,8

INDEX NO	PART NO	PART DESCRIPTION	NOTE
	75156200	LOGIC CHASSIS HARNESS ASSEMBLY	S/C 14 & Blw
	75156201	LOGIC CHASSIS HARNESS ASSEMBLY	S/C 15 & Abv
		A3A	
	95643254	FASTON, 90°	-5V,+5V,-24V, +24V,GND
		A3B	
	95643254	FASTON, 90°	-5V,+5V,-24V, +24V,GND
		A3C	
	95643254	FASTON, 90°	-5V,+5V,-24V, +24V,GND
		A3A09	
	94361112	CONNECTOR, 9 Cavity Socket Housing	
	94245602	CONTACT,Socket	
		A3B03	
	51863002	CONNECTOR, Double Row Housing	
	94245602	CONTACT, Socket	
		A3C03	
	51863002	CONNECTOR, Double Row Housing	
	94245602	CONTACT, Socket	
		A9TB1	
	95643216	TERMINAL, Quick Connect, 12-14 Ga.	S/C 14 & Blw Terminals 1-9
	95604033	TERMINAL, Quick Connect, 12-14 Ga.	S/C 15 & Abv
	95643212	TERMINAL, Quick Connect, 20-17 Ga.	S/C 14 & Blw Terminal 13
	95604009	CONNECTOR, Ring Tongue, 20-17 Ga.	S/C 15 & Abv Terminal 13

INDEX NO	PART NO	PART DESCRIPTION	NOTE
	75157400	POWER CABLE ASSEMBLY	60 Hz, S/C 01
	75157402	POWER CABLE ASSEMBLY	60 Hz, S/C 02 - 08 W/ 61364, W/O 61932
	75157404	POWER CABLE ASSEMBLY	60 Hz, S/C 08 & Abv, W/61932
	75157401	POWER CABLE ASSEMBLY	50 Hz, S/C 01
	75157403	POWER CABLE ASSEMBLY	50 Hz, S/C 02 - 08 W/ 61364, W/O 61932
	75157405	POWER CABLE ASSEMBLY	50 Hz, S/C 08 & Abv, W/ 61932
		ALCB1	
	95604057	TERMINAL, Ring Tongue	
	94368003	CONNECTOR, Locking	60 Hz only

INDEX NO	PART NO	PART DESCRIPTION	NOTE
	47403800	SERVO CABLE ASSEMBLY	S/C 14 & Blw
	47403801	SERVO CABLE ASSEMBLY	S/C 15 & Abv
		A3A04B	
	94374214	CONNECTOR, 1 Cavity Low Force	
	94374201	CONTACT, Low Force	
		A7P12	
	94374206	CONNECTOR, 6 Cavity Low Force	
	94374201	CONTACT, Low Force	
		A9TB1	
	95643212	CONNECTOR, Quick Connect 24-26 Ga.	S/C 14 & Blw
	95604009	CONNECTOR, Ring Tongue, 24-26 Ga.	S/C 15 & Abv

INDEX NO	PART NO	PART DESCRIPTION	NOTE
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46433900	TRANSMISSION FLAT CABLE ASSEMBLY		
76548001	TRANSMISSION CABLE		
	A7P1 to A3C09 (Pin Nos. 32-44)		
	A7P2 to A3C09 (Pin Nos. 17-29)		
	A7P3 to A3C09 (Pin Nos. 2-14)		

**3C**  
**SPARE**  
**PARTS**  
**LIST**

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**GENERAL**

The Spare Parts List serves as an aid in determining the interchangeability of assemblies and parts to be spared. An example of the columns used in the Spare Parts List is shown on the next page.

**NOTE**

The spare parts list establishes the support service level of the unit. Individual parts, assemblies, or components not on this list may be long lead time items subject to significant delays.

The Spare Parts List is divided into four columns:

Items Appear On - This column cross-references the part number in the spare

parts list to the associated figure number, page number, and index number in the illustrated parts breakdown.

Description - This column gives the name and a brief description of the part or assembly. This column also tracks series code history information.

Part Number and Replacement Part Number - These columns provide an eight-digit number. The difference between the two columns is that the Part Number column gives all the possible part numbers used for a particular part or assembly, while the Replacement Part Number column gives the interchangeable spare part number.

Notes - This column provides additional information such as Field Change Order (FCO), Special Purchase Order (SPO), serial number, and machine configuration.



EXAMPLE OF SPARE PARTS LIST

ENGINEERING RECOMMENDED SPARE PARTS LIST

ITEMS APPEAR ON			DESCRIPTION	PART NUMBER	REPLACE- MENT PART NUMBER	NOTES
Fig. No.	Page No.	Index No.				
3A-11	3A-37	25	CONTROL PANEL ASSEMBLY Used S/C 14 and above Used S/C 14 and above	WWWW YYYY	XXXX ZZZZ	Single Channel Dual Channel

In the example above, the control panel assembly is referenced as index 25 on figure 3A-9, which appears on page

3A-37. The original part number for single-channel units was WWWW; order part number XXXX if it must be replaced.

ENGINEERING RECOMMENDED SPARE PARTS LIST

ITEMS APPEAR ON			DESCRIPTION	PART NUMBER	REPLACE- MENT PART NUMBER	NOTES
Fig. No.	Page No.	Index No.				

TOOLS & MATERIALS

CARD EXTENDER ASSEMBLY - 30 Pack	82318800	82318800	
CARD EXTENDER ASSEMBLY - 60 Pack	82318700	82318700	
CARRIAGE TOOL	77795800	77795800	
COIL INSTALLATION TOOL	87285300	87285300	
DRIVER TOOL	47481600	47481600	
DRIVER TYPE I TOOL	94391300	94391300	
DRIVER TYPE I TOOL	94391311	94391311	
DUST COVER, TOP INLET	77573101	77573101	
DUST COVER, BOTTOM INLET	77573100	77573100	
LEAD GUIDE	47155100	47155100	
PULLEY HEIGHT TOOL	87199200	87199200	

PARTS & ASSEMBLIES

3A-5	3A-23	3	LENS (WRITE PROTECT)		
			Used S/C 01 - 12	94394230	94394257
			Used S/C 13 and above	94394257	94394257
3A-5	3A-23	5	LENS (READY)		
			Used S/C 01 - 12	94394200	94394250
			Used S/C 13 and above	94394250	94394250

ENGINEERING RECOMMENDED SPARE PARTS LIST

ITEMS APPEAR ON			DESCRIPTION	PART NUMBER	REPLACE- MENT PART NUMBER	NOTES
Fig. No.	Page No.	Index No.				
3A-5	3A-23	7	LENS (FAULT CLEAR) Used S/C 01 - 12 Used S/C 13 and above	94394201 94394253	94394253 94394253	
3A-5	3A-23	9	LENS (START) Used S/C 01 - 12 Used S/C 13 and above	94394203 94394258	94394258 94394258	
3A-7	3A-29	3	BELT, Drive Used S/C 01 and above	92314002	92314002	50 Hz Units
3A-7	3A-29	3	BELT, Drive Used S/C 01 and above	92314122	92314122	60 Hz Units
3A-8	3A-31	3	COIL ASSEMBLY Used S/C 01 and above	77790700	77790700	
3A-9	3A-35	301	SWITCH, Pressure Sensitive (A7S1) Used S/C 01 and above	94368300	94368300	
3A-10	3A-39		DRIVE MOTOR ASSEMBLY Used S/C 01 - 04 Used S/C 05 and above	75143000 75143002	75143002 75143002	60 Hz Units
3A-10	3A-39		DRIVE MOTOR ASSEMBLY Used S/C 01 and above	75143001	75143001	50 Hz Units
3A-12	3A-45	4	FILTER, Aluminum Used S/C 01 and above	00815489	00815489	

ENGINEERING RECOMMENDED SPARE PARTS LIST

ITEMS APPEAR ON			DESCRIPTION	PART NUMBER	REPLACE- MENT PART NUMBER	NOTES
Fig. No.	Page No.	Index No.				
3A-12	3A-49	2	FILTER, Air Used S/C 01 and above	94391401	94391401	
3A-12	3A-49	8	BLOWER & CABLE ASSEMBLY (A10) Used S/C 01 and above	75141500	75141500	
3A-22	3A-93	7	BREAKER, Circuit, 20 A and 0.5 A (A2CB6A/6B) Used S/C 01 and above	95647228	95647228	
3A-22	3A-93	8	BREAKER, Circuit, 10 A (A2CB7) Used S/C 01 and above	95657052	95657052	
3A-22	3A-93	9	BREAKER, Circuit, 5 A (A2CB8, A2CB9, A2CB10) Used S/C 01 and above	95657051	95657051	
3A-22	3A-95	15	BRIDGE, Rectifier Used S/C 01 and above	95582000	95582000	
3A-22	3A-97	19	DIODE, 50 W, 12 V (A2A6CR11) Used S/C 01 and above	50241205	50241205	
3A-22	3A-97	20	RECTIFIER, 12 A (A2A6CR9, A2A6CR10) Used S/C 01 and above	95642602	95642602	
3A-22	3A-97	22	RECTIFIER, 40 A (A2A4CR3, A2A5CR4) Used S/C 01 and above	95654206	95654206	

ENGINEERING RECOMMENDED SPARE PARTS LIST

ITEMS APPEAR ON			DESCRIPTION	PART NUMBER	REPLACE- MENT PART NUMBER	NOTES
Fig. No.	Page No.	Index No.				
3A-22	3A-97	24	RECTIFIER, 40 A (A2A4CR1, A2A4CR2) Used S/C 01 and above	95654205	95654205	
3A-22	3A-101	7	METER, Time Elapsed (AlBm1) Used S/C 01 and above	94390902	94390902	50 Hz Units Only
3A-23	3A-101	7	METER, Time Elapsed (AlBm1) Used S/C 01 and above	94390903	94390903	60 Hz Units Only
3A-23	3A-101	9	BREAKER, Circuit (AlCB2) Used S/C 01 and above	95587002	95587002	
3A-23	3A-101	10	BREAKER, Circuit (AlCB3, AlCB4) Used S/C 01 and above	95587005	95587005	
3A-23	3A-101	16	BREAKER, Circuit (AlCB1) Used S/C 01 and above	94245217	94245217	
3A-23	3A-105	5	FILTER, Low Leakage (AlFL) Used S/C 02 and above	94355403	94355403	
3A-24	3A-107	1	RELAY, Power (AlAlK1, AlAlK2, AlAlK3) Used S/C 01 and above	94260901	94260901	

ENGINEERING RECOMMENDED SPARE PARTS LIST

ITEMS APPEAR ON			DESCRIPTION	PART NUMBER	REPLACE- MENT PART NUMBER	NOTES
Fig. No.	Page No.	Index No.				

CABLES & HARNESSSES

BRAKE AND CABLE ASSEMBLY

Used S/C 01 and above                      76552303    76552303

TRANSMISSION CABLE ASSEMBLY

Used S/C 01 - 10                              47433900    47433901

Used S/C 11 and above                      47433901    47433901

**3D  
CARD  
INTERCHANGE-  
ABILITY  
CHART**

# CARD INTERCHANGEABILITY CHART

3D

---

## GENERAL

The card interchangeability chart (CIC) provides the latest revision level of a card, its location in the logic chassis, and its part number for ordering purposes.

Prior to attempting to use the charts, be sure to read and understand the rules for interpreting the CIC as given on page 3D-3.

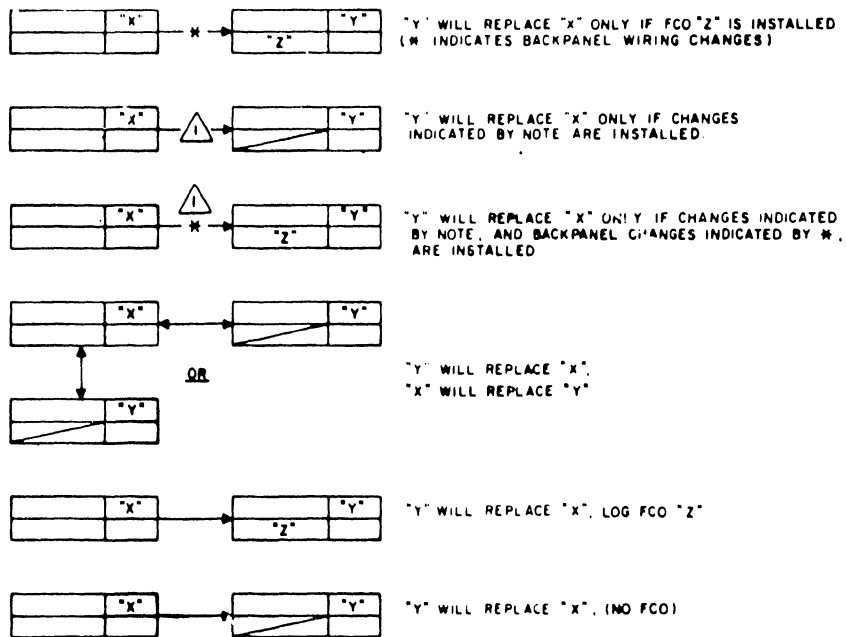
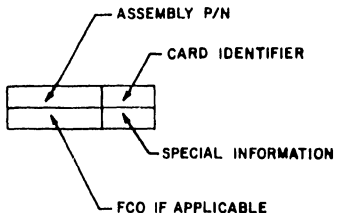


4 3 2 1

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

PART NO	CD	DESCRIPTION
75155700	0	KEY
01	8	1 BY FMD LOGIC STD OEM
02	6	1 BY FMD NON-LOGIC
04	2	1 BY FMD LOGIC-BZ7E1-J,K
05	9	1 BY FMD LOGIC-BZ7E2-J,K
06		1 BY FMD LOGIC-BZ7E1-P,R
07		1 BY FMD LOGIC-BZ7E1-W,Y

REVISIONS					
REV	ECO	DESCRIPTION	DRY	DATE	CHK'D
A	223000	RELEASED			
B	PER428	CREATE BZ7E3	MT	8-4-80	
C	PER427	ADD DPA	CB	1-3-81	
D	PER184	ADD TABS FOR BZ7E2	EL	2-23-81	
E	DWG2445	ADD TABS FOR BZ7E1-P,R	DLF	11-16-82	



DRAWN Duren, M 4/30/79	CONTROL DATA	CARD INTERCHANGEABILITY CHART	CODE IDENT 19333	C	83323560	J	E
CHECKED K. N. N. A. L. 5/16/79	LARGE DISK DIVISION	1 BY FMD	CROSS REF NO	SHEET 1 of 1	PAGE 3D-3		
ENGINEER B. E. L. M. 1/11/79						REF: 75155700 FMD-1	

4 3 2 1

REVISION STATUS OF SHEETS

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B	B	B																		
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U	U																			
V		V																		
W	W																			
Y	Y																			
Z	Z																			
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AB	AB																			
AC	AC																			
AD	AD																			
AE	AE																			
AF		AF																		
AG	AG																			
AH	AH																			
AJ	AJ																			

REVISIONS

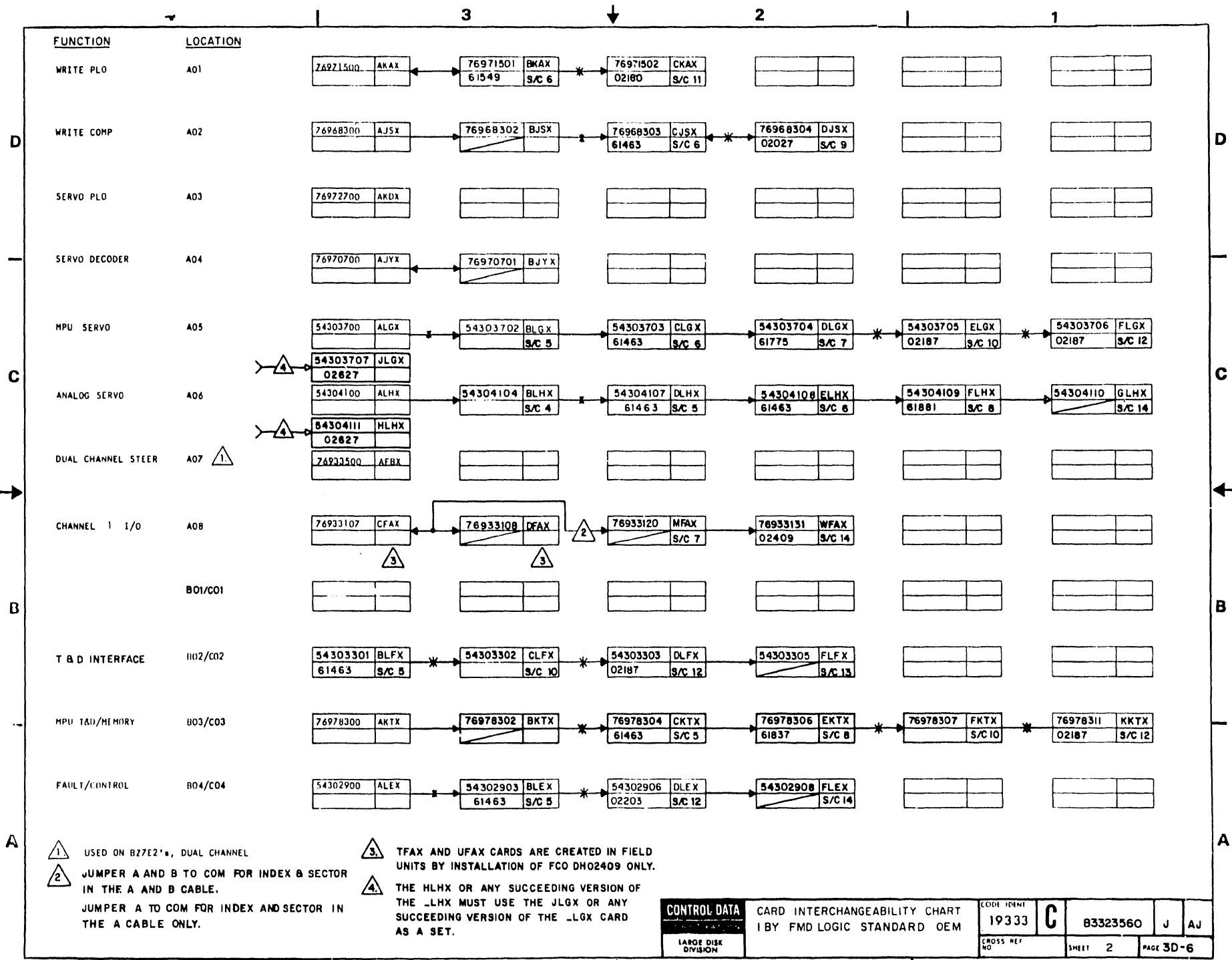
REV	ECO	DESCRIPTION	UNIT	DATE	CHK'D
A	PE23000	RELEASED		5-27-81	MKP
B	PE23000	INCOMP NEW CARD		7-4-80	MKP
C	PE61216	DELETE PARTS	CB	3-14-80	MKP
D	PE61448	E PROM CHG	MF	7-23-80	MKP
E	PE61381	ALHX TO BLHX	MF	7-23-80	MKP
F	PE61281	OFFSET FIX	MF	7-23-80	MKP
G	PE61463	ADD FTD CAPABILITIES	TH	9-8-80	MKP
H	PE61480	AJSK TO BJSK	TH	9-19-80	MKP
J	PE61506	CARD AND B/P CHG	CB	11-10-80	MKP
K	PE61340	DJTR TO EJTR + B/P CHG	CB	12-8-80	MKP
L	PE61349	AKAX TO BKAX	CB	1-9-81	MKP
M	PE60748	CFAX TO MFAX	CB	1-12-81	MKP
N	PE61888	CLGX AND ELHX	CB	1-18-81	MKP
P	PE61751	AJVK -> CJVK	DPS	5-27-81	MKP
R	PE61814	CORRECT DWG	CB	3-23-81	MKP
S	PE61775	CLGX -> DLGX	DPS	5-27-81	MKP
T	PE61881	CHG CARD TYPE	DPS	5-27-81	MKP
U	PE61837	ADD NEW CARDS	DPS	5-27-81	MKP
V	PE61831	ADD LOCK TO DATA SIGNAL	DPS	5-27-81	MKP
W	PE60207	CHG GATING	CB	6-28-81	MKP
Y	DHO2082	FAULTY ERRORS	DWG	9-28-81	MKP
Z	DHO2080	BKAX CARD TO CKAX	DWG	9-28-81	MKP
AA	DHO2198	RWK FJTR TO HJTR	S A W	11/8/81	MKP
AB	DHO2187	ADD TEST & DIAG	DWG	12-8-81	MKP
AC	DHO2203	BLFX TO DLEX	DWG	12-8-81	MKP
AD	DHO2353	DLFX TO FLFX	MAP	2-23-82	MKP
AE	DHO2380	FLHX - DLHX	DBH	4-22-82	MKP
AF	DHO2383	CJVK TO BJVK CARD	CB	4-22-82	MKP
AG	DHO2488	DLEX TO FLEX	CB	7-28-82	MKP
AH	DHO2537	FLEX TO HLEX	DLP	11-17-82	MKP
AJ	DHO2827	FLOR TO JLOR, BLHX TO HLHX	DLP	11-17-82	MKP

DRAWN	Duran, M	4-30-79
CHECKED	PHENIX	5-16-79
ENGINEER	J. R. Farnon	5/16/79
APPROVED		

MAGNETIC PERIPHERALS INC.  
 10000 W. 10th St. - Overland Park, KS 66211

CARD INTERCHANGEABILITY CHART  
 1 BY FMD LOGIC STD OEM

LARGE DISK DIVISION	C	83323560	J	AJ
CODE IDENT	19333	CROSS REF NO	SHEET 1 of 3	PAGE 3D-5



① USED ON B27E2's, DUAL CHANNEL

② JUMPER A AND B TO COM FOR INDEX & SECTOR IN THE A AND B CABLE.

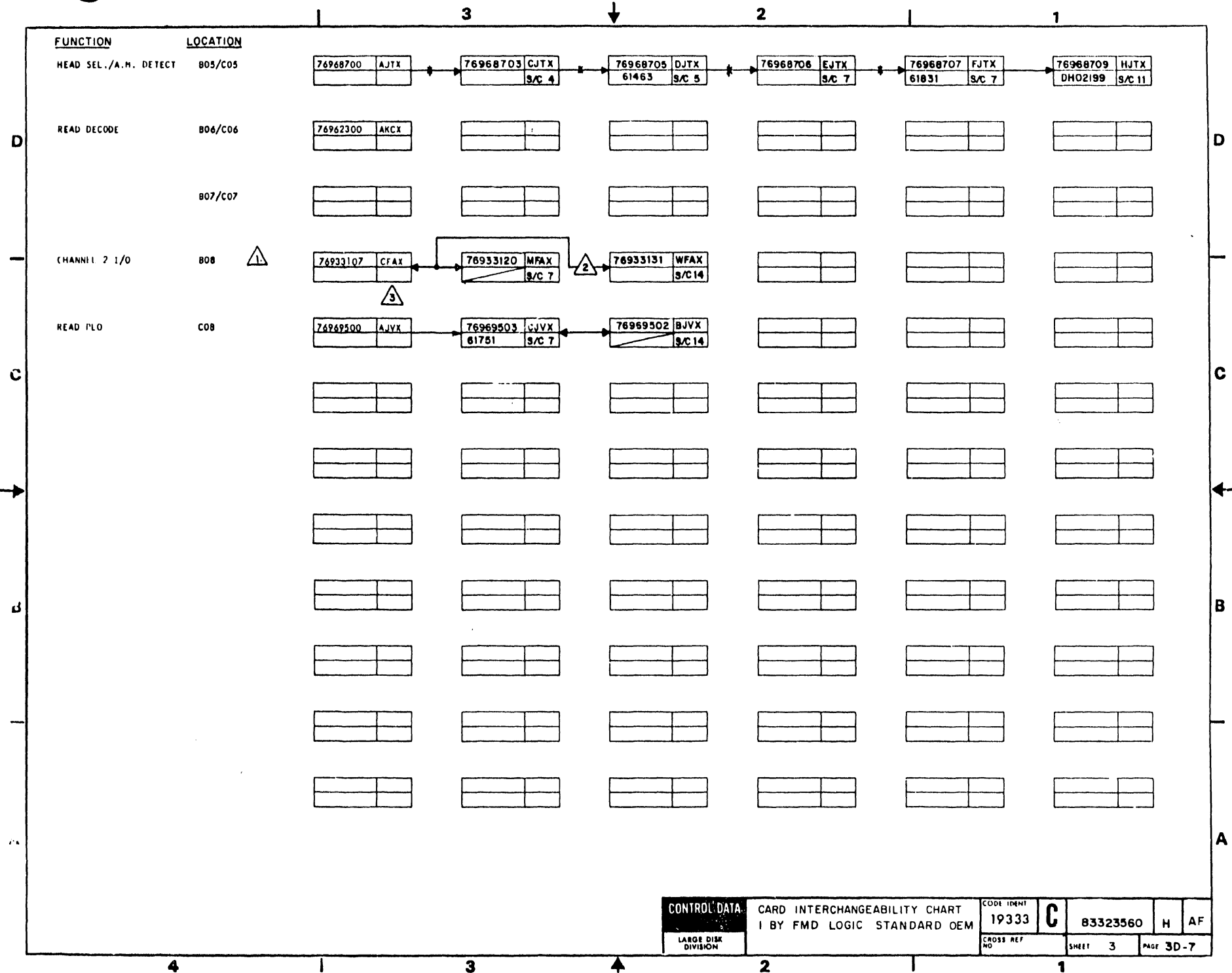
JUMPER A TO COM FOR INDEX AND SECTOR IN THE A CABLE ONLY.

③ TFAX AND UFAX CARDS ARE CREATED IN FIELD UNITS BY INSTALLATION OF FCO DH02409 ONLY.

④ THE HLHX OR ANY SUCCEEDING VERSION OF THE \_LHX MUST USE THE JLGX OR ANY SUCCEEDING VERSION OF THE \_LGX CARD AS A SET.

**CONTROL DATA** CARD INTERCHANGEABILITY CHART  
I BY FMD LOGIC STANDARD OEM

CODE IDENT	19333	C	83323560	J	AJ
CROSS REF NO		SHEET	2	PAGE	3D-6

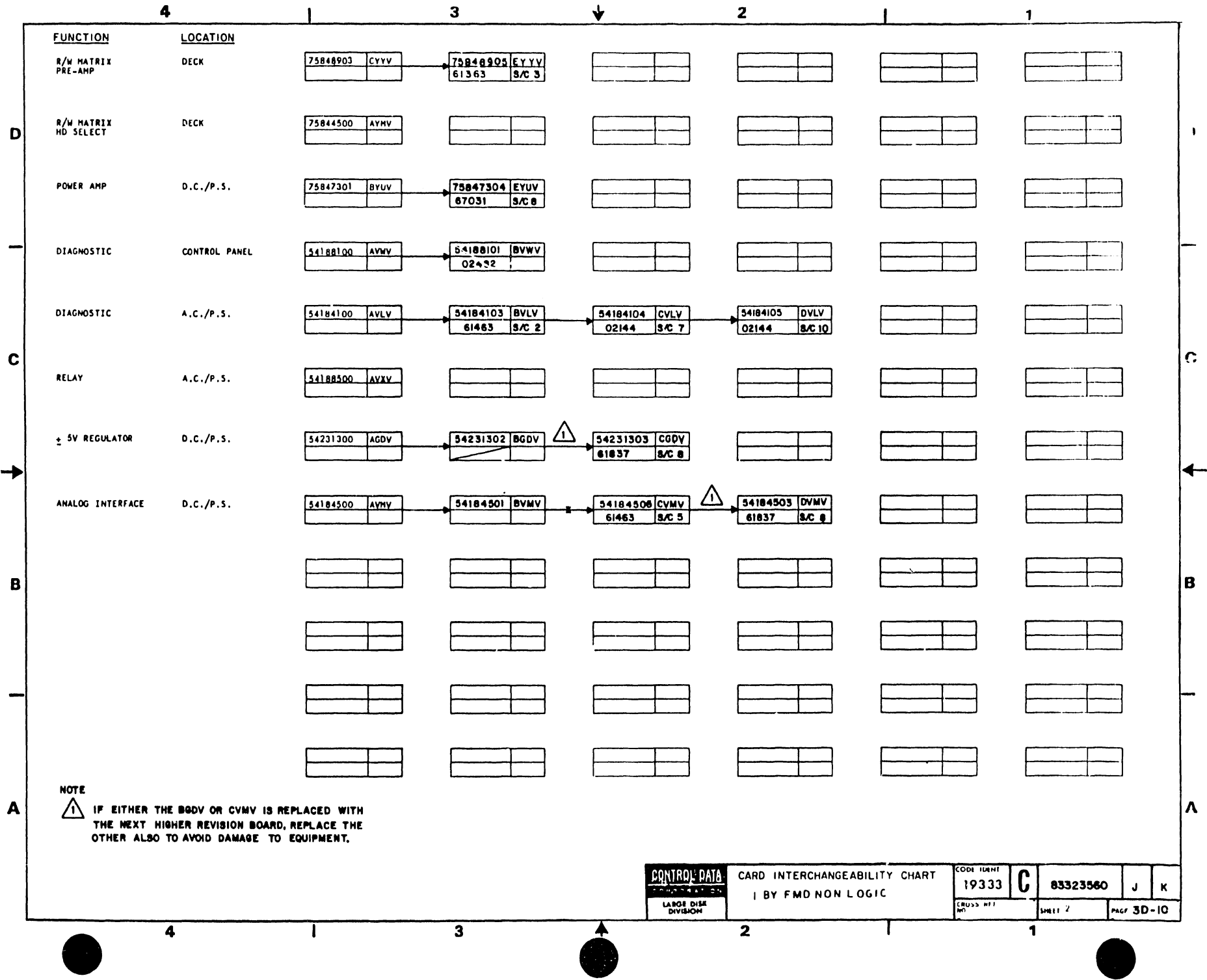


REVISION STATUS OF SHEETS

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B	B																			
C	C																			
D	D																			
E	E																			
F	F																			
G	G																			
H	H																			
J	J																			
K	K																			

REV	ECO	DESCRIPTION	DATE	BY
A	PEE900	RELEASED	8-2-77	PEE
B	ML1382	NEW H/W DECK CARD	5-11-77	ML
C	PE61274	ADD & REPLACE LAPS	5-11-77	PE
D	PE61378	ADD CAPACITOR	7-11-77	PE
E	PE61483	ADD FTU CAPABILITIES	1-10-78	PE
F	PE61587	CHLV TO CVLV	1-10-78	PE
G	PE61670	ADD FTU FUNCTIONS	2-21-81	GI
H	PE61837	ADD NEW CARDS	5-3-81	DF
J	PE62144	CHLV TO DVLV	9-23-81	DF
K	PE62688	AVVY TO BVVY	11-18-82	DLF

<table border="1"> <tr><td>DRAWN</td><td>D. W. B. Jr.</td><td>8-1-77</td></tr> <tr><td>CHECKED</td><td>P. E. N. / A. G.</td><td>5-11-77</td></tr> <tr><td>ENGINEER</td><td>J. R. J.</td><td>5/11/77</td></tr> <tr><td>APPROVED</td><td></td><td></td></tr> </table>	DRAWN	D. W. B. Jr.	8-1-77	CHECKED	P. E. N. / A. G.	5-11-77	ENGINEER	J. R. J.	5/11/77	APPROVED			MAGNETIC PERIPHERALS INC. A Division of International Business Machines Corporation	CARD INTERCHANGEABILITY CHART 1 BY FMD NON LOGIC	LARGE DISK DIVISION <b>C</b>	83323560	J K
DRAWN	D. W. B. Jr.	8-1-77															
CHECKED	P. E. N. / A. G.	5-11-77															
ENGINEER	J. R. J.	5/11/77															
APPROVED																	
			CODE IDENT 19333	CROSS REF NO.	SHEET 1 of 2												
					PAGE 3D-9												



NOTE  
<sup>1</sup> IF EITHER THE BGDV OR CVMV IS REPLACED WITH THE NEXT HIGHER REVISION BOARD, REPLACE THE OTHER ALSO TO AVOID DAMAGE TO EQUIPMENT.

REVISION STATUS OF SHEETS

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B	B	B																		
C	C																			
D		D																		
E	E																			
F	F																			
G	G																			
H		H																		
J	J																			
K	K																			
L	L																			
M		M																		
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S	S																			
T		T																		
U	U																			
V	V																			

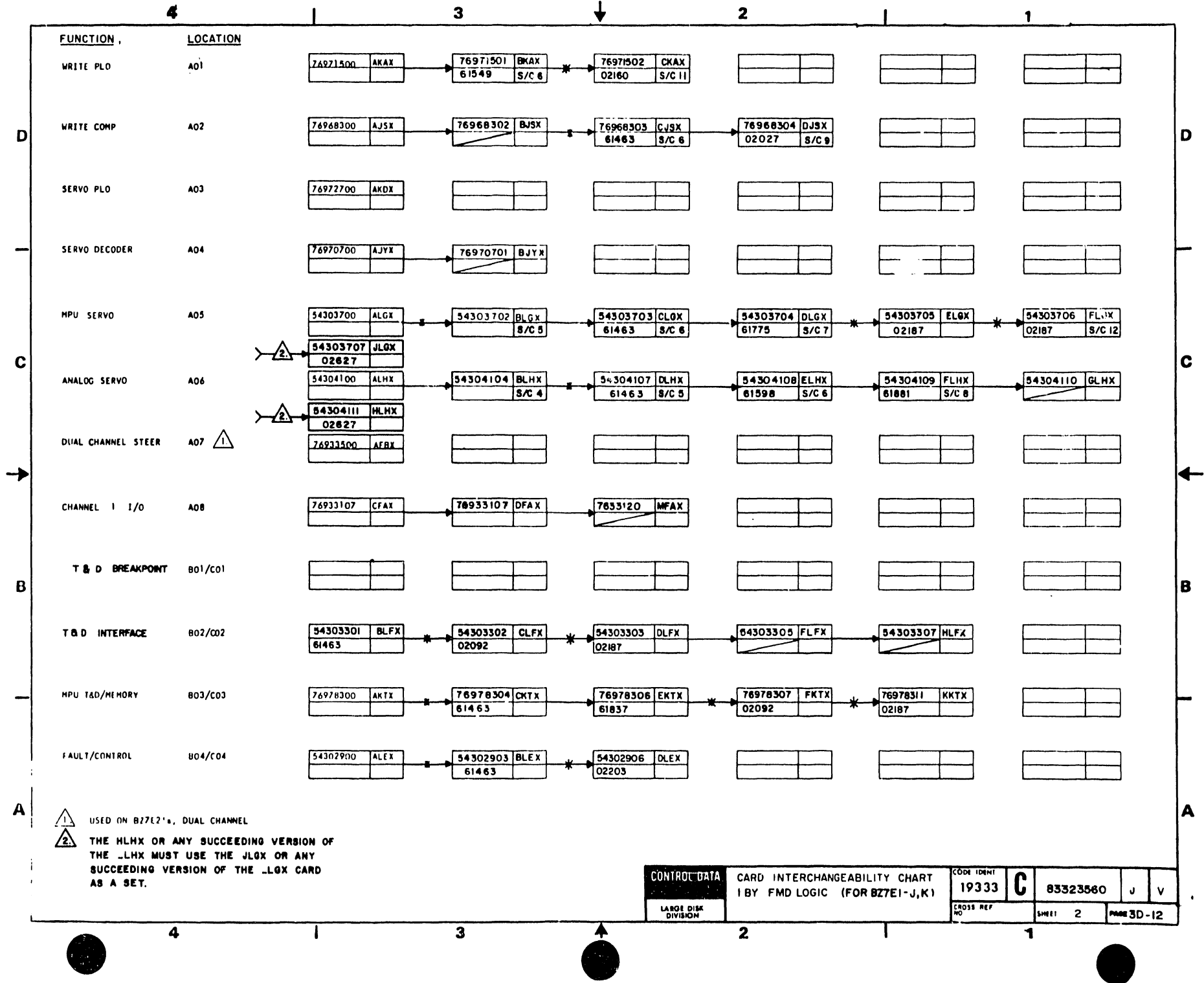
REVISIONS					
REV	ECO	DESCRIPTION	UNIT	DATE	CHK'D
A	PE13000	RELEASED		6-5-79	✓
	PE 81787	AC. CPAY	CB	1-12-81	✓
B	PE81745	CPAR TO MPAR	CB	1-12-81	✓
C	PE81888A	CLBX TO ELBX	CB	2-21-81	✓
D	PE81731A	AJVK → CJVK	DFB	5-27-81	✓
E	PE81775	CLBX → DLBX	DFB	5-27-81	✓
F	PE81881	CMG CARD TYPE	DFB	5-27-81	✓
G	PE81937	ADD NEW CARDS	DFB	5-28-81	✓
H	PE81831	ADD LOCK TO DATA SIGNAL	DFB	5-28-81	✓
J	PE02027	CMG GATING	CB	6-16-81	✓
K	DM02082	FALTY ERROR	DWF	9-28-81	
L	DM02080	BLAX TO CLAX	DWF	9-28-81	
M	DM02188	RWR PJTX TO NJTX	B. A. M.	11/2/81	
N	DM02087	ADD TEST & DIAG	DWF	12-8-81	✓
P	DM02203	BLX TO DLX	DWF	12-8-81	✓
R	DM02353	DLFX TO FLFX	MRP	2-23-82	
S	DM02380	FLHX - GLHX	DBH	4-23-82	
T	DM02383	CJVK TO BJVK CARD	CB	4-28-82	
U	DM02887	FLFX TO HLFX	DLP	11-17-82	
V	DM02887	FLFX TO JLFX, GLHX TO HLHX	DLP	11-17-82	

DRAWN	Duren, M	4-20-79
CHECKED	✓	
ENGINEER	by R. Lamm	3/10/79
APPROVED		

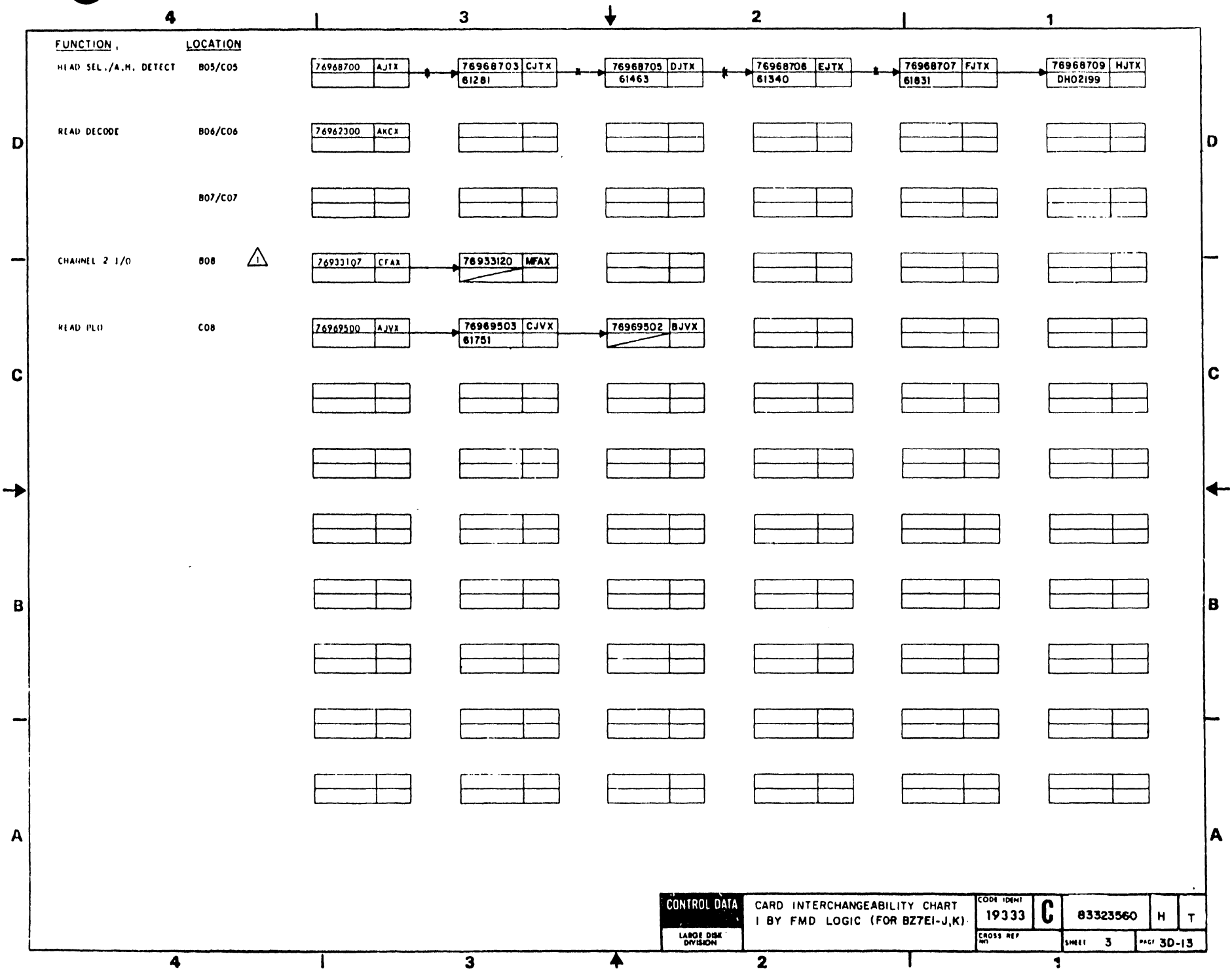
MAGNETIC PERIPHERALS INC.  
 A DIVISION OF  
 INTERNATIONAL BUSINESS MACHINES CORPORATION

CARD INTERCHANGEABILITY CHART  
 1 BY FMD LOGIC (FOR BZ 7E1-J,K)

LARGE DISK DIVISION	<b>C</b>	83323560	J	V
CODE IDENT	19333	CROSS REF. 'C'	SHEET 1 of 3	PAGE 3D-11







CONTROL DATA LARGE DISK DIVISION	CARD INTERCHANGEABILITY CHART 1 BY FMD LOGIC (FOR BZ7E1-J,K)		CODE IDENT 19333	<b>C</b>	83323560	H	T
	CROSS REF NO		SHEET 3	PAGE 3D-13			



		4	3	2	1
		FUNCTION	LOCATION		
D	WRITE PLO	A01	76971502 CKAX 02160		
	WRITE COMP	A02	76968304 DJBX 02027		
	SERVO PLO	A03	76972700 AKDX		
	SERVO DECODER	A04	76970701 BJYX		
C	MPU SERVO	A05	54303706 FLGX 02187	2. → 54303709 JLGX 02627	
	ANALOG SERVO	A06	54304110 GLHX	2. → 54304111 HLHX 02627	
B		A07			
	CHANNEL 1 I/O	A08	1. 76933131 WFAQ		
		B01/C01			
	T & D INTERFACE	B02/C02	54303305 FLFX	→ 54303307 HLFX	
A	MPU T & D / MEMORY	B03/C03	76978311 KKTX 02187		
	FAULT/CONTROL	B04/C04	54302907 ELEX		

1. JUMPER A AND B TO COM FOR INDEX & SECTOR IN THE A AND B CABLE.  
JUMPER A TO COM FOR INDEX AND SECTOR IN THE A CABLE ONLY.

2. THE HLHX OR ANY SUCCEEDING VERSION OF THE \_LHX MUST USE THE JLGX OR ANY SUCCEEDING VERSION OF THE \_LGX CARD AS A SET.

CONTROL DATA  
NORMANDALE  
DIVISION

CARD INTERCHANGEABILITY CHART  
1 BY FMD LOGIC (FOR B27E1-W/Y)

CODI IDENT  
19333

C

83323560

J

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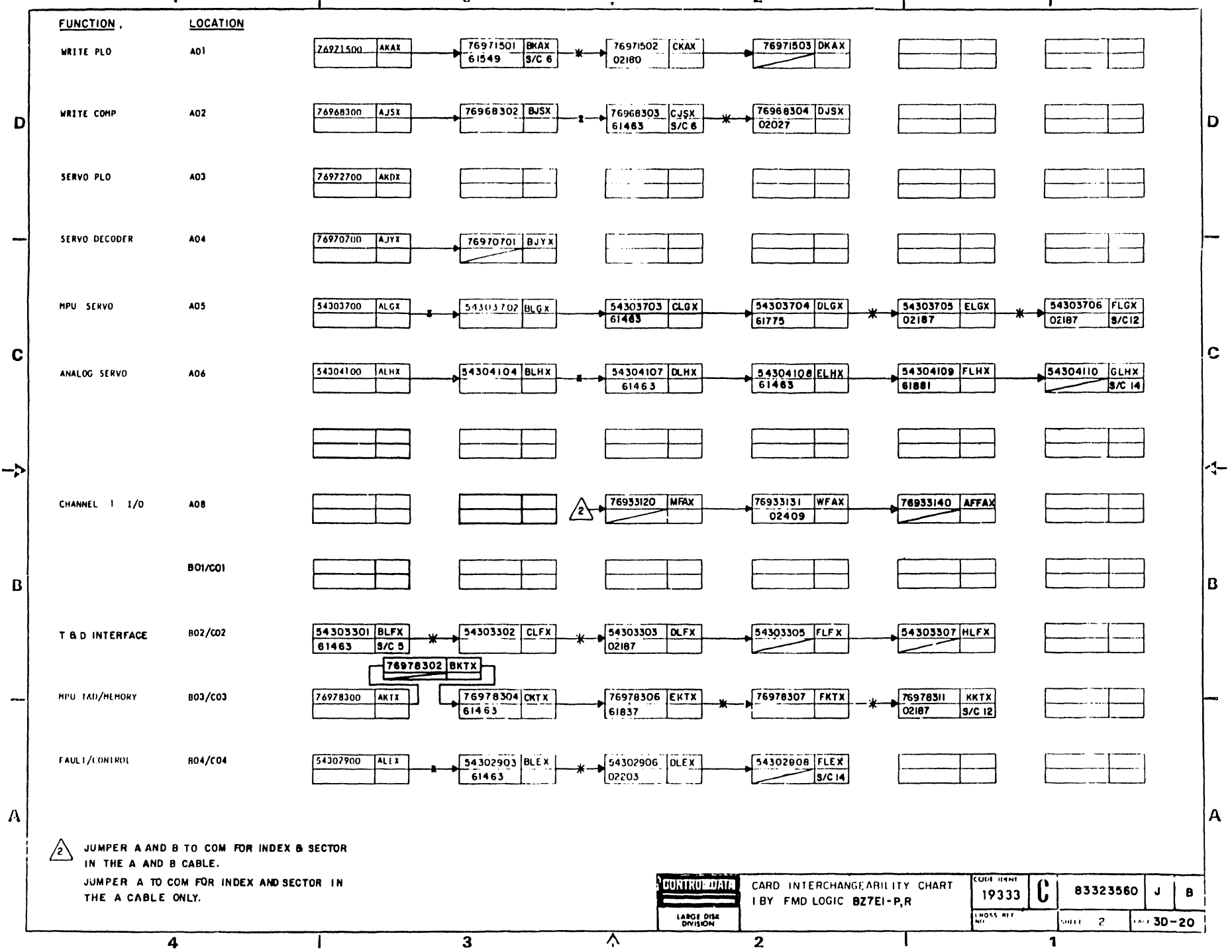
CROSS REF  
NO

SHEET 2

PAGE 3D-16

FUNCTION		LOCATION											
HEAD SEL./A.M. DEFECT	805/C05	76968709	HJTX										
		DHO2199											
READ DECODE	806/C06	76962300	AKCX										
	807/C07												
	808												
READ PLO	C08	76969502	BJVX										



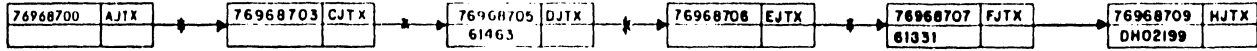


2 JUMPER A AND B TO COM FOR INDEX & SECTOR IN THE A AND B CABLE.  
 JUMPER A TO COM FOR INDEX AND SECTOR IN THE A CABLE ONLY.

CONTINENTAL LARGE DISK DIVISION	CARD INTERCHANGEABILITY CHART 1 BY FMD LOGIC 827E1-P,R	CODE IDENT 19333	C	83323560	J	B
		CROSS REF NO.	SHEET 2	PAGE 3D-20		

FUNCTION LOCATION

HEAD SEL./A.M. DETECT 005/C05



READ DECODE 006/C06



007/C07



READ PLO 008



D  
C  
B  
A

D  
C  
B  
A

<b>CONFIDENTIAL</b> LARGE DISK DIVISION	CARD INTERCHANGEABILITY CHART I BY FMD LOGIC BZ7E1-P,R	CONT. IDENT 19333	<b>C</b>	83323560	J	A
		SHEET 3	3D-21			



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**CDC® FIXED MODULE DRIVE  
BZ7E1/7E2**

**LOGIC DIAGRAMS  
WIRE LISTS**

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**Volume 2 of 2**

**HARDWARE MAINTENANCE MANUAL**



## REVISION RECORD

REVISION	DESCRIPTION
<p style="text-align: center;">07 03-25-80</p>	<p>ECO's reflected to date are as follows: 56625, 56728, 59485, 59531, 59549, 59575, 59586, 59661, 59669, 59670, 59675, 59680, 59954, 59708, 59714, 59718, 59732, 59733, 59776, 59806, 59819, 59821, 59822, 59864, 59872, 59944, 59954, 59963, 59967, 59971, 59977, 61000, 61013, 61025, 61076, 61105, 61137, 61150, 61179, 61196, 61197, 61216, 61217, 61223, 61224, 61227, 61236, 61321, 61361</p>
<p style="text-align: center;">A 05-07-80</p>	<p>Manual released. This edition obsoletes all previous editions.</p>
<p style="text-align: center;">B 11-14-80</p>	<p>Manual revised to include the following ECO's: PE 61274, 61281, 61363, 61364, 61376, 61381, 61446, 61456, 61463, 61480, 61556, 61598, 61626, 61650.</p> <p>This edition obsoletes all previous editions.</p>
<p style="text-align: center;">C 06-18-81</p>	<p>Manual revised to include the following ECO's: PE 61340, 61549, 61727, 61734, 61737 and FCO 61737, 61745, 61751 and FCO 61751, 61775, 61831 and FCO 61831, 61835, 61837 and FCO 61837, 61881 and FCO 61881, and 61932.</p> <p>This edition obsoletes all previous editions.</p>

REVISION LETTERS I, O, Q  
AND X ARE NOT USED.

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of this manual.

## REVISION RECORD (Contd)

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E (08-27-82)	Correction to list of Publications and add new models to configuration chart. Manual revised to include ECOs DH 02353B, 02356, 02380B, 02393A 02409A, 02482, 02492A, 02537 and FCOs DH 02409 and 02482.

# LIST OF EFFECTIVE PAGES

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# PREFACE

---

## INTRODUCTION

This manual contains reference information applicable to the BZ7E1/BZ7E2 Fixed Module Drive (FMD). It has been prepared for field service engineers and other technical personnel involved with maintaining this equipment. The model features and configuration chart shown on the following page identifies the various equipments covered in this manual and lists some of their salient features. This Preface also includes a list of abbreviations used in this Manual.

## MANUAL ARRANGEMENT

Maintenance information is contained in two volumes. Volume 1 contains:

- Section 1 - Installation and Checkout;
- Section 2 - Corrective Maintenance;
- Section 3 - Parts Data.

This manual, which is Volume 2, contains two sections.

- Section 1 - Contains logic diagrams and assembly schematic diagrams.
- Section 2 - Contains wire lists.

## OTHER MANUALS

For additional information concerning the units described in this manual refer to the following manuals:

<u>PUBLICATION NO.</u>	<u>TITLE</u>
83323560	Hardware Maintenance, Vol 1: Installation and Checkout, Preventive and Corrective Maintenance, Parts Data
83323550	Hardware Reference Manual: Gener- al Description, Operation, Theory of Operation

83322440

CDC Microcircuits Manual, Vol 1:  
IC data sheets classified by CDC  
identifiers, logic families, IC  
symbology.

83324440

CDC Microcircuits Manual, Vol 2:  
ICs identified by industry-recog-  
nized vendor type numbers

### CONFIGURATION CHART

MODEL	FREQUENCY		FIXED HEADS INSTALLED	ROUND/FLAT I/O CABLE	SINGLE/DUAL CHANNEL
	60 Hz	50 Hz			
BZ7E1-A	X		No	Round	Single
-B		X	No	Round	Single
-C	X		No	Flat	Single
-D		X	No	Flat	Single
-E	X		Yes	Round	Single
-F		X	Yes	Round	Single
-G	X		Yes	Flat	Single
-H		X	Yes	Flat	Single
-J	X		No	Flat	Single
-K		X	No	Flat	Single
-M	X		No	Flat	Single
-N		X	No	Flat	Single
-P	X		No	Flat	Single
-R		X	No	Flat	Single
-U	X		No	Flat	Single
-V		X	No	Flat	Single
-W	X		No	Flat	Single
-Y		X	No	Flat	Single
-P	X		No	Flat	Single
-R		X	No	Flat	Single
-U	X		No	Flat	Single
-V		X	No	Flat	Single
-W	X		No	Flat	Single
-Y		X	No	Flat	Single



## CONFIGURATION CHART (Contd)

MODEL	FREQUENCY		FIXED HEADS INSTALLED	ROUND/FLAT I/O CABLE	SINGLE/DUAL CHANNEL
	60 Hz	50 Hz			
BZ7E2-A	X		No	Round	Dual
-B		X	No	Round	Dual
-C	X		No	Flat	Dual
-D		X	No	Flat	Dual
-E	X		Yes	Round	Dual
-F		X	Yes	Round	Dual
-G	X		Yes	Flat	Dual
-H		X	Yes	Flat	Dual
-L	X		Yes	Round	Dual
-S	X		No	Flat	Dual
-T		X	No	Flat	Dual

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## ABBREVIATIONS

---

ADRS	Address	FWD	Forward
AGC	Automatic Gain Control	FXD HD	Fixed Head
BA	Bus Available	GND	Ground
CA1	Control Register A, line one	HD SEL	Head Select
CH	Channel	IND	Indicator
CLR FLT	Clear Fault	I/O	Input/Output
CNTR	Counter	IRQ	Interrupt Request
CS	Chip Select	LSI	Large Scale Integration
CTLR	Controller	MEM	Memory
CYL SEL	Cylinder Select	MFM	Modified Frequency Modulation
DAC	Digital to Analog Converter	MPU	Microprocessing Unit
DET	Detector	MR	Memory Ready
DIAG	Diagnostic	MUX	Multiplexer
DRVR	Driver (transmitter)	NMI	Nonmaskable Interrupt
E	Enable (usually Buffered Enable)	NRZ	Non Return to Zero
ECL	Emitter Coupled Logic	PIA	Peripheral Interface Adapter
EPROM	Erasible Programmable ROM	PLO	Phase Locked Oscillator
FMD	Fixed Module Drive	PWR	Power
FREQ	Frequency	RAM	Random Access Memory
		RCVR	Receiver

RE	Ram Enable	TPC	Triple Programmable counter
REV	Reverse	TTL	Transistor/Transistor Logic
ROM	Read Only Memory	VFO	Variable Frequency Oscillator
RS1	Register Select One	VMA	Valid Memory Address
RTZ	Return to Zero	WRT	Write
R/W	Read/Write		
T&D	Test and Diagnostic		

**1**

# **DIA GRAMS**

---

## INTRODUCTION

This manual contains diagrams that logically describe the FMD in terms of the functions that it performs. It also contains schematics that show the wiring of the various assemblies. These diagrams follow the logic.

Theory, functional descriptions, flow charts, simplified circuits, and timing diagrams are contained in Publication Number 83323550.

## CROSS REFERENCE NUMBERS

The key to using the logic diagrams is the Cross Reference number located in each title block. This number is used as the means of identifying the routing of signals between logic cards. Each slot of the logic chassis has been assigned a cross reference number: the card at location A01 has the number 010X; the "X" is the sheet number. Therefore, a reference to "0103" indicates that the signal origin or destination will be found on sheet 3 of the logic diagrams for the card at A01. The cross reference number increments at each card slot, whether or not a card is actually installed in the slot. Cross reference number 300X and above are used for assembly schematics.

Cross reference numbers remain the same for each location; they do not change even though a different card type may be installed later.

## MISCELLANEOUS INFORMATION

Each logic diagram sheet has a title description of the primary logic function performed on that sheet. Table 1-1 lists the cross reference number, card location where the logic is found, and the title of each sheet.

Many of the signal names are abbreviated. Meanings of these abbreviations are contained in the front matter of this manual.

Descriptions of logic diagrams symbology, integrated and discrete component circuits, and brief theoretical discussions are contained in volume 1 of the Logic Cards Manual, Pub. number 83322440. Volume 2, Pub. number 83324440, contains data sheets with vendor numbers and unique CDC identifiers.

TABLE 1-1. CONTENTS OF DIAGRAMS

Cross Ref.No.	Card Location	Title
0101	A01	WRITE PLO DIAGRAMS
0102		Gated Seek End, FTU Mode, Servo Fast Start, Frequency Clamp
0103		Write Sample, Squelch, Read Gate, Mux Diagnostic Data, Mux 0-5 Select
0104		$\pm 1F$ (9.67 MHz) and $\pm 2F$ (19.34 MHz) Clocks
0105		PLO Charge Pump
0201	A02	WRITE COMPENSATION DIAGRAMS
0202		MFM Write Data, VCO 1F Clock
0203		Data Window Circuit
0204		Data Input, NRZ Data
0205		Compensated Write Data, Bits 0-3
0301	A03	SERVO PLO DIAGRAMS
0302		Loop 1 Filter Switch, Voltage Regulators
0303		Loop 2 Output
0304		Loop 1 Output
0305		Loop 2 Divide Counter
0306		Loop 1 Divide Counter

Table Continued on Next Page

TABLE 1-1. CONTENTS OF DIAGRAMS (Contd)

Cross Ref.No.	Card Location	Title
0307		Blanking Window
0308		Loop 2 Filter Switch, ECL to TTL Converter
0401	A04	QUADBIT SERVO DECODER DIAGRAMS
0402		Quadbit Decoder, Timer Gate, Servo Data,
0403		±Position, (Odd + Even) /2
0404		Timer Gate, Gated Servo Clock, Servo Data, PLO Clock Counter
0405		Sector Count Pulse, Index Gate, Sync Bit Decoder
0501	A05	MPU SERVO DIAGRAMS
0502		PIA-0, On Cylinder Comparator
0503		PIA-1,
0504		PIA-2, ±DAC
0505		Servo Microprocessor
0506		Programmable Timer
0507		ROM Memories
0601	A06	ANALOG SERVO DIAGRAMS
0602		Seek End, On Track, Tracking Crossing Pulse, Linear Region
0603		Power Amp Drive, FWD/REV Offset, Current Sense

Table Continued on Next Page



TABLE 1-1. CONTENTS OF DIAGRAMS (Contd)

Cross Ref.No.	Card Location	Title	
0604		Fill In Integrator	
0605		Comparator Position DAC	
0606		Diagnostic or I/O Mux, Address Mark Enable, RTZ Seek	
0701		A07	DUAL CHANNEL STEERING DIAGRAMS
0702		Channel Selected, Reserved, and Busy	
0703		Channel Enable/Disable	
0704		Disable, Interrupt, and Seek End	
0801		A08	CHANNEL I I/O DIAGRAMS (SERIES CODES 01-06)*
0802		Channel I Receivers and Unit Select	
0803		Channel I Receivers	
0804		CH I Receivers and SEQ Power	
0805		CH I Transmitters	
0806		CH I Transmitters	
0901		A09	A-ROW LOGIC CHASSIS TIE POINTS DIAGRAMS
0902		Logic Chassis Tie Points	
1001		No Card	T & D BREAKPOINT DIAGRAMS
1002			Backpanel Connections
*The logic set for series code 07 and up follows 0806.			
Table Continued on Next Page			

TABLE 1-1. CONTENTS OF DIAGRAMS (Contd)

Cross Ref.No.	Card Location	Title
1101	B02/C02	TEST AND DIAGNOSTIC INTERFACE DIAGRAMS
1102		Simulated I/O
1103		Bidirectional Data Port
1104		Servo Communication
1105		Digital Voltmeter and Analog Signal Sampler
1106		Analog Multiplexer
1107		Digital Signal Sampler
1201	B03/C03	MPU TEST AND DIAGNOSTIC MEMORY DIAGRAMS
1202		Test & Diagnostic Microprocessor
1203		Buffered Address Lines
1204		Receivers/Transmitters
1205		EPROM Memories 3 & 4
1206		EPROM Memories 1 & 2
1207		RAM Memories 1 & 2
1208		Memory Decoders
1209		PIA-1, Programmable Timer 1
1210		PIA-2, Programmable Timer 2
Table Continued on Next Page		

TABLE 1-1. CONTENTS OF DIAGRAMS (Contd)

Cross Ref.No.	Card Location	Title
1211		Motor Relay and Brake Drivers, Sequence Relay
1212		Test & Diagnostic Read & Write
1213		Diagnostic Read Error, Diagnostic Write Data, Fault Gating
1301	B04/C04	FAULT/CONTROL FUNCTION DIAGRAMS
1302		Write/Head Select/Read and Write Voltage Faults
1303		Seek Error and Fault Indicators
1304		Power On Master Clear, Unit Ready, Fault
1305		Index and Guardband Decoders
1306		Sector Switches and Decoder
1307		Write Enable, Write Protected
1308		Index One Shot, Gated CH I/II Enables
1309		Unit Select Switches, Index Bit Register and Decoder
1310		Motor at Speed Detection
1311		Missing Index Detection
1312		PLO Locked Detector, Guardband One Shots
Table Continued on Next Page		

TABLE 1-1. CONTENTS OF DIAGRAMS (Contd)

Cross Ref.No.	Card Location	Title
1401	B05/C05	HEAD SELECTION/ADDRESS MARK DETECTION DIAGRAMS
1402		Movable Head Sel Bits 0-5, Fixed Head Sel Bits 0-7, Write Zones 0/1, RTZ or Power On MC
1403		PLO Fast Start, Address Mark Found
1404		Fixed Head Chip Select 5-16, Low Gain Select
1405		Address Mark Found, On Cylinder, Raw Data
1406		Movable Head Chip Select 0-4, Y Select 0-7
1407		Bus or Diagnostic Bits 0-9, Read/Write Gate
1501	B06/C06	READ DECODER DIAGRAMS
1502		High Resolution Pulse Shaper and Preamplifier
1503		Low Resolution Pulse Shaper and Preamplifier
1504		Low Resolution Zero Cross Detectors
1505		High Resolution Zero Cross Detector and Pulse Shaper
1601	No Card	
Table Continued on Next Page		

TABLE 1-1. CONTENTS OF DIAGRAMS (Contd)

Cross Ref.No.	Card Location	Title
1701	B08	CHANNEL II I/O DIAGRAMS (SERIES CODES 01-06)*
1702		Channel II Receivers and Unit Select
1703		Channel II Receivers
1704		Channel II Receivers and Seq Power
1705		Channel II Transmitters
1706		Channel II Transmitters
1801	No Cards	
↓ 2401		
2501	C07	READ PLO DIAGRAMS (SERIES CODES 01-13)**
2502		Raw data, Lookahead, Strobe, PLO Fast Start
2503		Read Clock, NRZ Read Data
2504		PLO Ones/Zeros Decode
2505		Phase Lock Oscillator
2601	C09	C-ROW LOGIC CHASSIS TIE POINTS DIAGRAMS
2602		Logic Chassis Tie Points
2701	Deck	READ/WRITE CHASSIS DIAGRAMS
2702		Head Select Fault Lines, Fixed Head Chip Select Lines, Y Select Lines
<p>*The logic set for series code 07 and up follows 1706.</p>		
<p>**The logic set for series code 14 and up follows 2505.</p>		
<p>Table Continued on Next Page</p>		

TABLE 1-1. CONTENTS OF DIAGRAMS (Contd)

Cross Ref.No.	Card Location	Title
2703		Read Preamplifier
2704		Write Zone Compensation
2705		Write Current Sense
2801	Deck	HEAD SELECT DIAGRAMS
2802		Head Select Matrix Decode Heads 0-15
2803		Head Select Matrix Decode Heads 16-31
2804		Head Select Matrix Decode Heads 32-39
2901	Deck	BULKHEAD MATRIX BOARD DIAGRAMS
2902		HDA Interconnecting Wiring
3001	-	AC POWER DIAGRAMS
3002		AC Power Distribution
3003		Drive Motor and Motor Control
3004		+5 V MPU Regulator Board
3101	-	DC POWER DIAGRAMS
3102		DC Power Supply, 60 Hz
3103		DC Power Supply, 50 Hz
3104		DC Circuit Breakers
Table Continued on Next Page		

TABLE 1-1. CONTENTS OF DIAGRAMS (Contd)

Cross Ref.No.	Card Location	Title
3105		+5 Volt Regulator
3106		-5 Volt Regulator
3107		Power Amplifier
3108		Power Amplifier
3109		Power Amplifier
3110		Power Supply Diagnostic Interface
3111		PIA -5 Receivers/Transmitters
3112		Power Supply Voltage Monitoring
3201		CONTROLS AND MISCELLANEOUS DIAGRAMS
3202		Operator Panel
3203		Test and Diagnostic Control Panel
3204		Test and Diagnostic Control Panel
3205		Test and Diagnostic Control Panel
3206		Deck and Frame Wiring
3207		I/O Panel to Logic Cards Wiring





1. LOGIC ARRANGEMENT

THE LOGIC DIAGRAMS ARE ASSIGNED CROSS REFERENCE NUMBERS. EACH CARD LOCATION AND ASSEMBLY SCHEMATIC IS ASSIGNED A UNIQUE CROSS REFERENCE NUMBER WHERE THE FIRST TWO DIGITS REPRESENT THE LOCATION WHILE THE THIRD AND FOURTH DIGITS ARE THE SHEET NUMBER WITHIN THAT SET. REFER TO SHEET 3 FOR AN EXPLANATION OF INTER-SHEET REFERENCING. CROSS REFERENCE NUMBERS ARE SHOWN BELOW.

CROSS REFERENCE NO.	LOCATION/FUNCTION	COMPONENTS SHOWN
0101 ↓ 0801	CARD LOC A01 ↓ CARD LOC A08	CARD IN ROW A
0901	TIE POINTS	A-ROW LOGIC CHASSIS TIE POINT
1001		NOT USED
1101 ↓ 1501	CARD LOCS B02/C02 ↓ ↓ B06/C06	CARDS IN ROWS B AND C. THE CARDS IN THESE SLOTS SPAN BOTH ROW B AND ROW C IN THE LOGIC CHASSIS.
1601		NOT USED
1701	CARD LOC B08	CARD IN ROW B
1801 1901 2001 2101 2201 2301 2401		NOT USED ↓ ↓ NOT USED
2501	CARD LOC C08	CARD IN ROW C
2601	TIE POINTS	C-ROW LOGIC CHASSIS TIE POINTS
2701 2801 2901	DECK AREA DECK AREA HDA	READ/WRITE CARDS MOVABLE HEAD SELECT MATRIX BULKHEAD MATRIX CARD
3001	AC PWR DIST	MAIN CIRCUIT BREAKER, LINE FILTER, DRIVE MOTOR & BRAKE, BLOWER MOTOR
3101	DC PWR DIST	AC TO DC SUPPLIES, CIRCUIT BREAKERS, REGULATOR, POWER AMPLIFIER, DIAGNOSTIC BOARD.
3201	CONTROL & MISC.	OPERATOR PANEL, TEST & DIAG. PANEL, DECK & FRAME WIRING, I/O PANEL

2. LOGIC SYMBOLOLOGY

LOGIC SYMBOLS FOR INTEGRATED CIRCUITS ARE DRAWN AS SHOWN IN THE LOGIC CARDS MANUAL. PUBLICATION NUMBER 83322440.

3. ABBREVIATIONS

ABBREVIATIONS ARE DEFINED IN A LIST PROVIDED IN THE FRONT MATTER OF THIS MANUAL.

4. LOGIC LEVELS

- A. TTL "1" = +3.6 (±1.6) V  
"0" = +0.4 (±0.4) V
- B. ECL "1" = -0.79 (±0.18) V  
"0" = -1.95 (±0.43) V

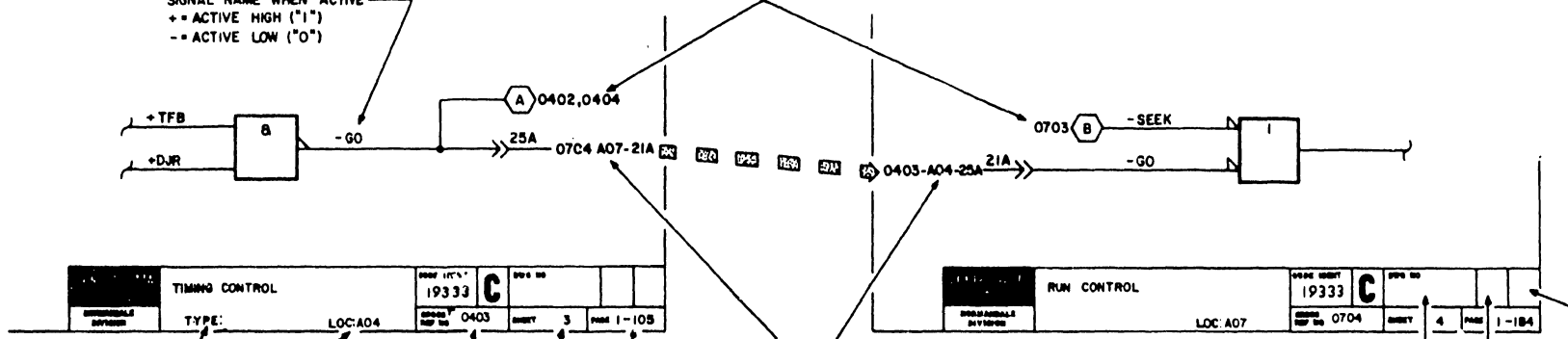
5. CARD USAGE

CARDS ARE INSTALLED AT LOCATIONS A07 AND B08 ONLY IF THE DUAL CHANNEL OPTION IS PURCHASED. FOR SINGLE CHANNEL OPERATION, A JUMPER PLUG IS INSTALLED ON THE WIRE WRAPPED SIDE OF THE BACKPANEL AT CARD SLOT A07 (SEE PAGE 1-15).

D

HEXAGON IDENTIFIES SIGNALS LEAVING OR ENTERING THIS SHEET BUT NOT THIS CARD. ADJACENT NUMBERS IDENTIFY OTHER CROSS REFERENCE NUMBERS WHERE SIGNAL IS USED.

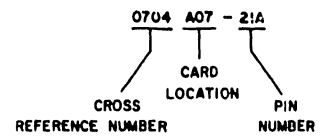
SIGNAL NAME WHEN ACTIVE  
 += ACTIVE HIGH ("1")  
 -= ACTIVE LOW ("0")



1 CARD TYPE  
 3 CARD LOCATION  
 3 CROSS REFERENCE NUMBER OF THIS SHEET  
 SHEET NUMBER  
 PUBLICATION PAGE NUMBER

SOURCE SHOWS WHERE SIGNAL ORIGINATES

DESTINATIONS SHOW ALL LOCATIONS WHERE OUTPUT SIGNALS GO WITHOUT REGARD TO ACTUAL BACKPANEL WIRE ROUTING, IN THE EXAMPLE SHOWN IT IS AS FOLLOWS:



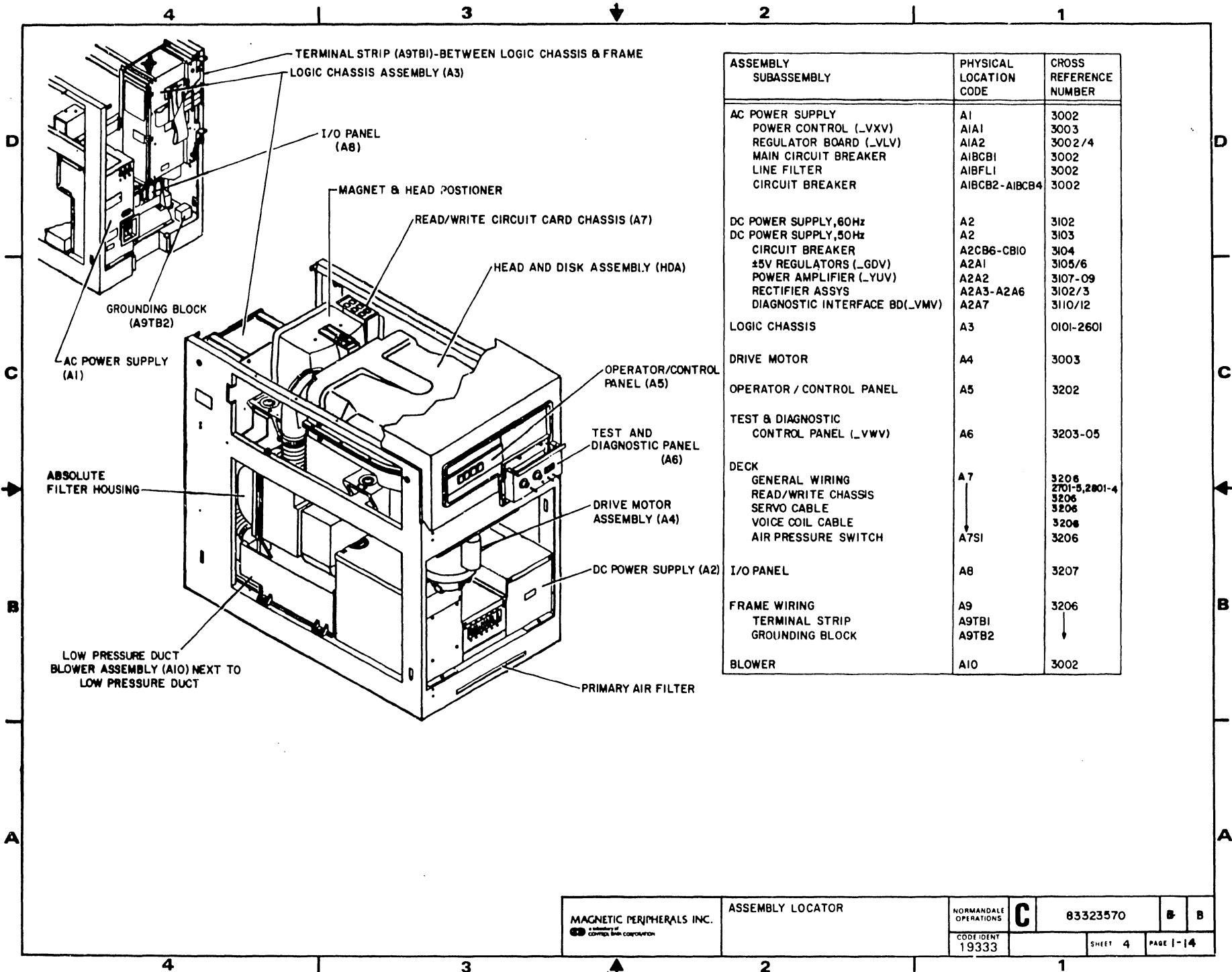
NOTES:

- 1 CARD TYPE SHOWN HERE ON SHEET 1 OF DIAGRAMS FOR EACH LOCATION
- 2 FOR FACTORY USE ONLY, DOES NOT APPEAR IN PRINTED MANUALS
- 3 TO CORRELATE CROSS REFERENCE NUMBERS TO CARD LOCATIONS:
  - ROW A - FIRST TWO DIGITS IS CARD LOCATION  
EXAMPLE: 04XX-A04
  - ROW B - SUM OF FIRST TWO DIGITS IS CARD LOCATION  
EXAMPLE: 12XX-B03
  - ROW C - SINCE SLOTS 2 THROUGH 6 ARE USED BY CARDS WHICH SPAN BOTH ROWS B & C, ONLY ONE UNIQUE CROSS REFERENCE NUMBER IS USED IN ROW C: 25XX-C08.

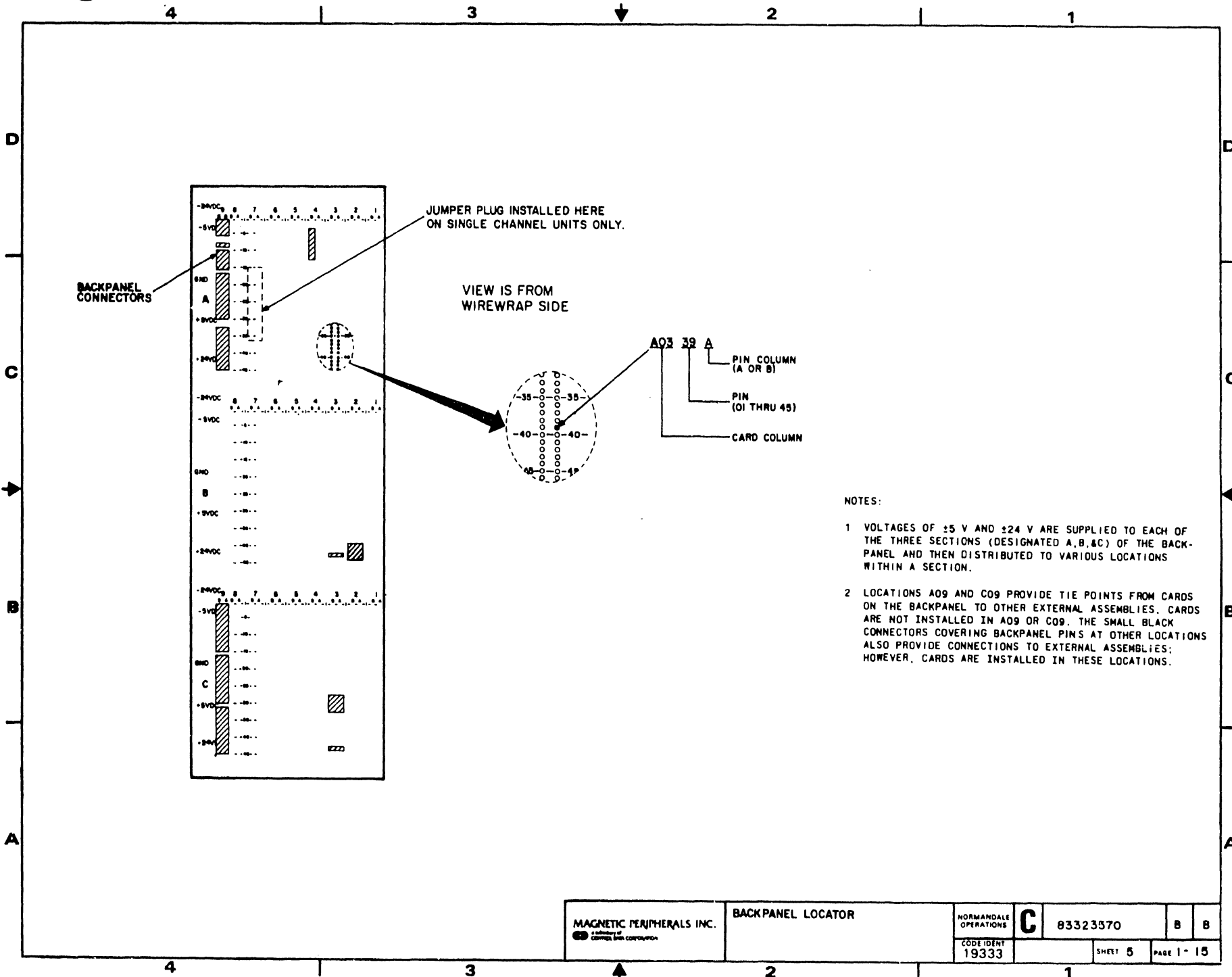
ENGINEERING DIAGRAM 2	PUBLICATION DIAGRAM
DIAGRAM NO.	PUBLICATION NO.
DIAGRAM CHECK DIGIT	PUBLICATION REVISION LETTER
REVISION LEVEL OF THIS SHEET WITHIN DIAGRAM SET FOR THIS SPECIFIC LOCATION. MUST AGREE WITH "REVISION STATUS OF SHEETS LISTING ON SHEET 1 OF THIS LOCATION"	

A

CONTROL DATA NORMANDALE DIVISION	INTER-SHEET REFERENCING		CODE IDENT 19333 C	83323570	A	A
	CROSS REF NO	SHEET 3	PAGE 1-13			



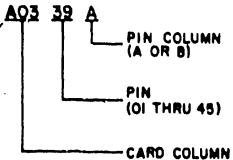
ASSEMBLY SUBASSEMBLY	PHYSICAL LOCATION CODE	CROSS REFERENCE NUMBER
AC POWER SUPPLY	A1	3002
POWER CONTROL (.LVXV)	A1A1	3003
REGULATOR BOARD (.VLV)	A1A2	3002/4
MAIN CIRCUIT BREAKER	A1BCB1	3002
LINE FILTER	A1BFL1	3002
CIRCUIT BREAKER	A1BCB2-A1BCB4	3002
DC POWER SUPPLY, 60Hz	A2	3102
DC POWER SUPPLY, 50Hz	A2	3103
CIRCUIT BREAKER	A2CB6-CB10	3104
±5V REGULATORS (.GDV)	A2A1	3105/6
POWER AMPLIFIER (.YUV)	A2A2	3107-09
RECTIFIER ASSYS	A2A3-A2A6	3102/3
DIAGNOSTIC INTERFACE BD(.VMV)	A2A7	3110/12
LOGIC CHASSIS	A3	0101-2601
DRIVE MOTOR	A4	3003
OPERATOR / CONTROL PANEL	A5	3202
TEST & DIAGNOSTIC CONTROL PANEL (.VWV)	A6	3203-05
DECK	A7	3206
GENERAL WIRING		2701-5, 2801-4
READ/WRITE CHASSIS		3206
SERVO CABLE		3206
VOICE COIL CABLE		3206
AIR PRESSURE SWITCH	A7SI	3206
I/O PANEL	A8	3207
FRAME WIRING	A9	3206
TERMINAL STRIP	A9TB1	
GROUNDING BLOCK	A9TB2	
BLOWER	A10	3002



BACKPANEL CONNECTORS

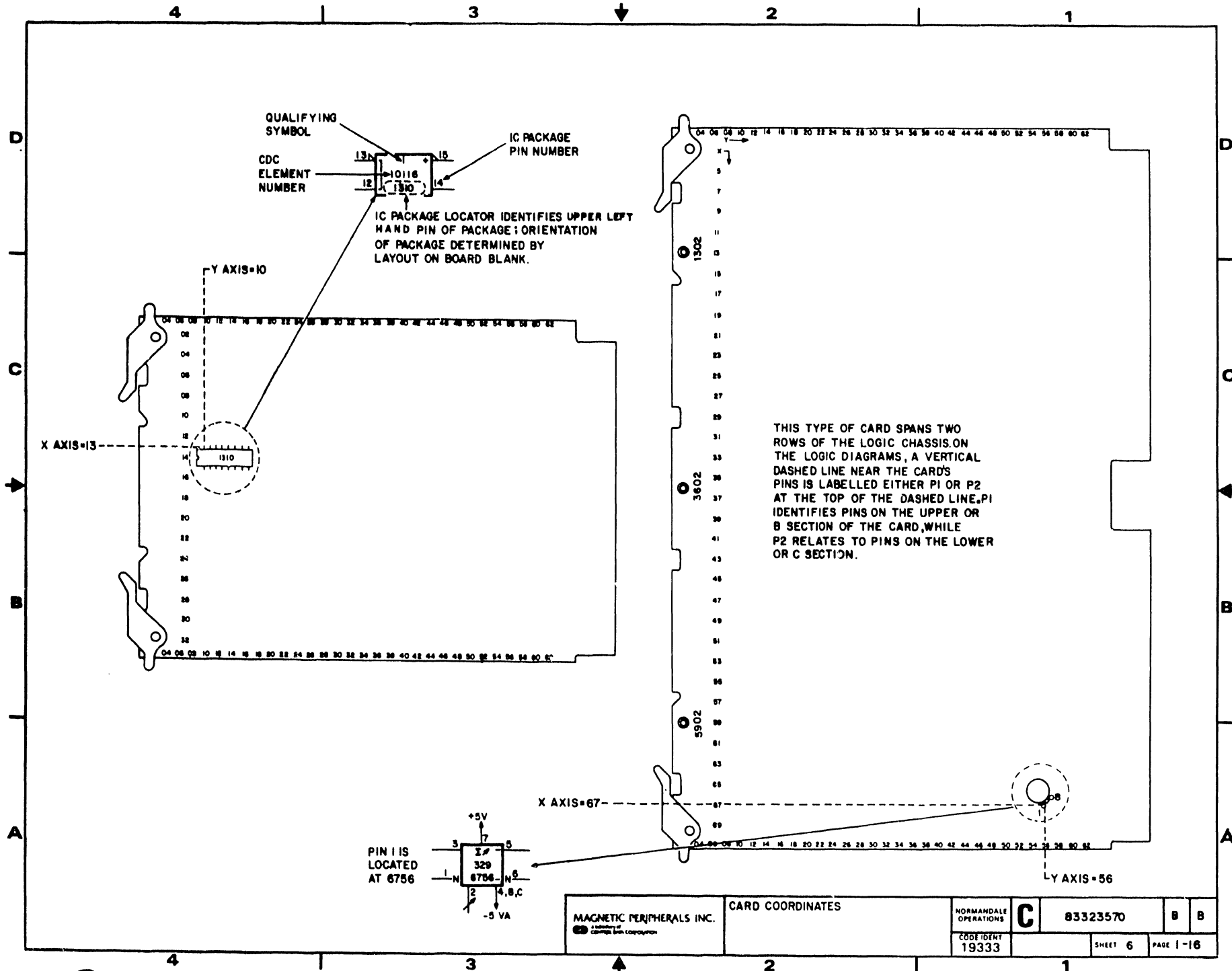
JUMPER PLUG INSTALLED HERE ON SINGLE CHANNEL UNITS ONLY.

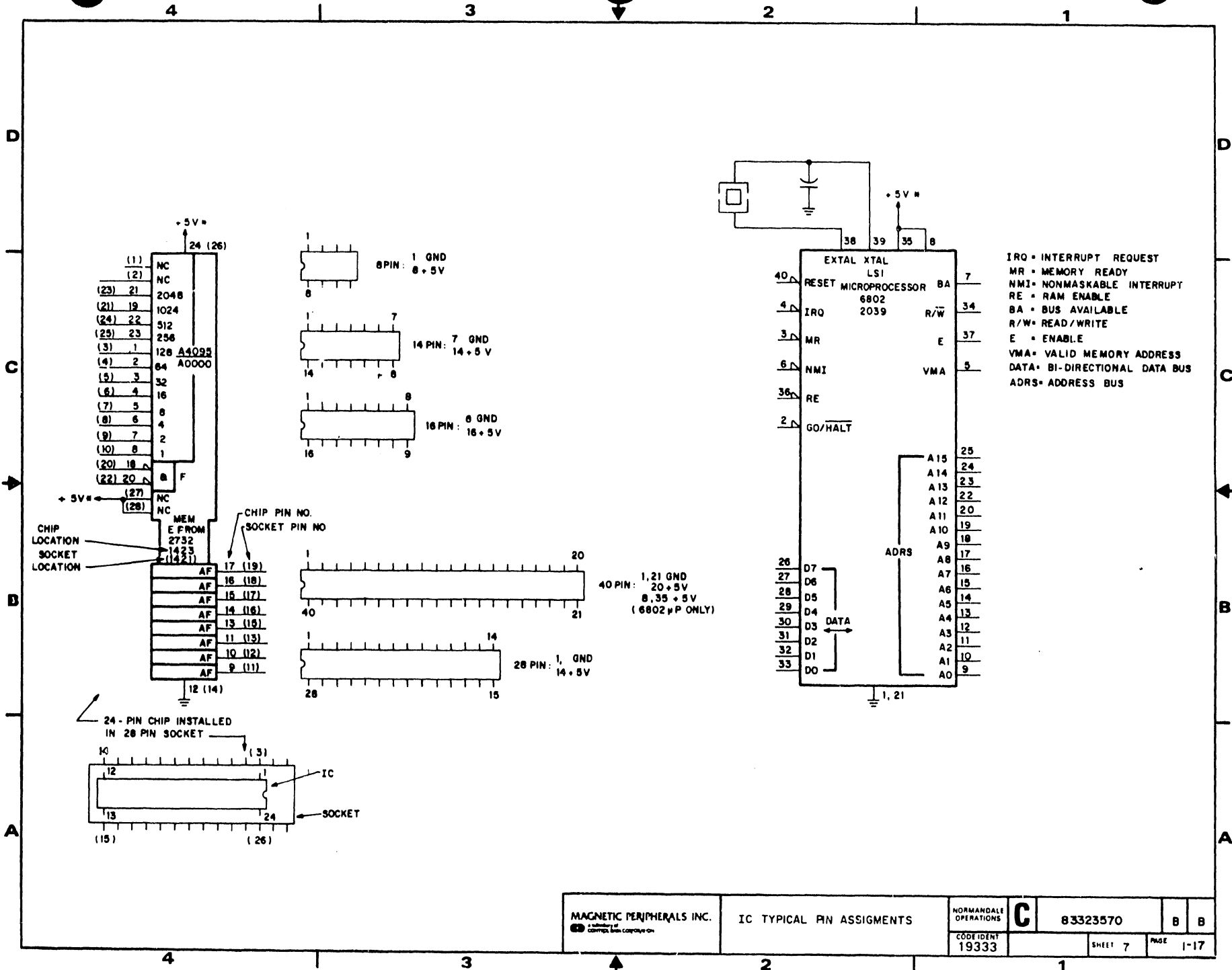
VIEW IS FROM WIREWRAP SIDE



NOTES:

- 1 VOLTAGES OF  $\pm 5$  V AND  $\pm 24$  V ARE SUPPLIED TO EACH OF THE THREE SECTIONS (DESIGNATED A, B, & C) OF THE BACKPANEL AND THEN DISTRIBUTED TO VARIOUS LOCATIONS WITHIN A SECTION.
- 2 LOCATIONS A09 AND C09 PROVIDE TIE POINTS FROM CARDS ON THE BACKPANEL TO OTHER EXTERNAL ASSEMBLIES. CARDS ARE NOT INSTALLED IN A09 OR C09. THE SMALL BLACK CONNECTORS COVERING BACKPANEL PINS AT OTHER LOCATIONS ALSO PROVIDE CONNECTIONS TO EXTERNAL ASSEMBLIES; HOWEVER, CARDS ARE INSTALLED IN THESE LOCATIONS.







### REVISION STATUS OF SHEETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A	A															
B			B	B	B															
C			C	C																
D					D															
E	E	E	E	E																
F			F	F																
G	G																			
H	H	H																		
J		J																		

### UNUSED TERMINATORS

LOCATION	PIN(S)
1409	2,3,4
1421	2
1809	2,3,4
1821	2,3,6,7

### UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
10105	1921	6,7,14,15
10124	1109	1,3,12,13,14,15
146LS	2954	8,10

### FILTER CAPS

22 uF	
+5 V	-5 V
1641	3253
1009	0164
3222	2321
2221	0242
2864	
0821	



### FILTER CAPS

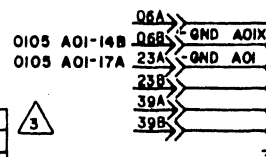
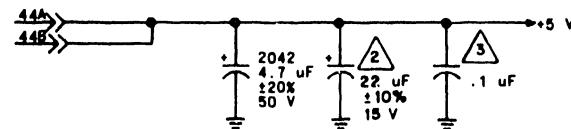
.1 uF		
+5 V	-5 V	
0632	1853	0809
1032	2253	0923
1632	2653	1507
0542	2853	2220
1253		2708
		3309



REVISIONS					
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD
A	PE23000	RELEASED	CB	1-9-80	
B	PE1463	ADD FTU CAPABILITY	MF	9-18-80	
C	PE1558	ALLOWS FTU WRITE OPERATIONS	CB	11-8-80	
D	PE1734	IN FTU MODE, PREVENTS DRIVE FROM INTERRUPTING CONTROLLER	CB	3-12-81	
E	PE1548	IMPROVE CLOCK CIRCUIT; AKAX TO BKAX	CB	5-12-81	
	PE1804				
F	PE1998	PLO WRITE CLOCK JITTER PROG	TF	8-2-81	PKP
G	DHO2092	FAULTY ERROR FIX	Dwt	1-18-82	
H	DHO2160	LOW AMPLITUDE HEAD FIX, BKAX TO BKAX	Dwt	1-18-82	
J	DHO2187	ADD TEST & DIAG INFO	Dwt	1-18-82	

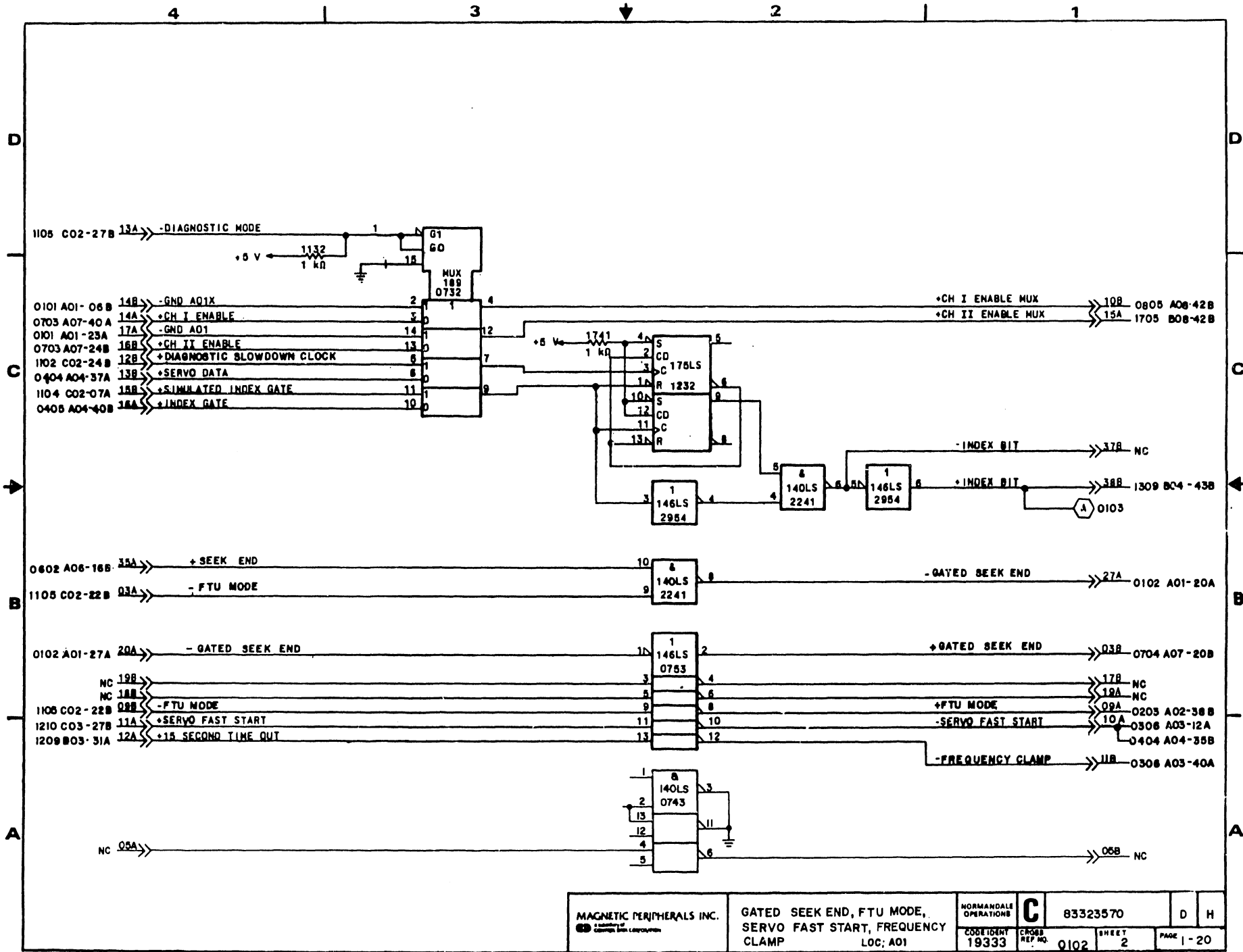
### NOTES:

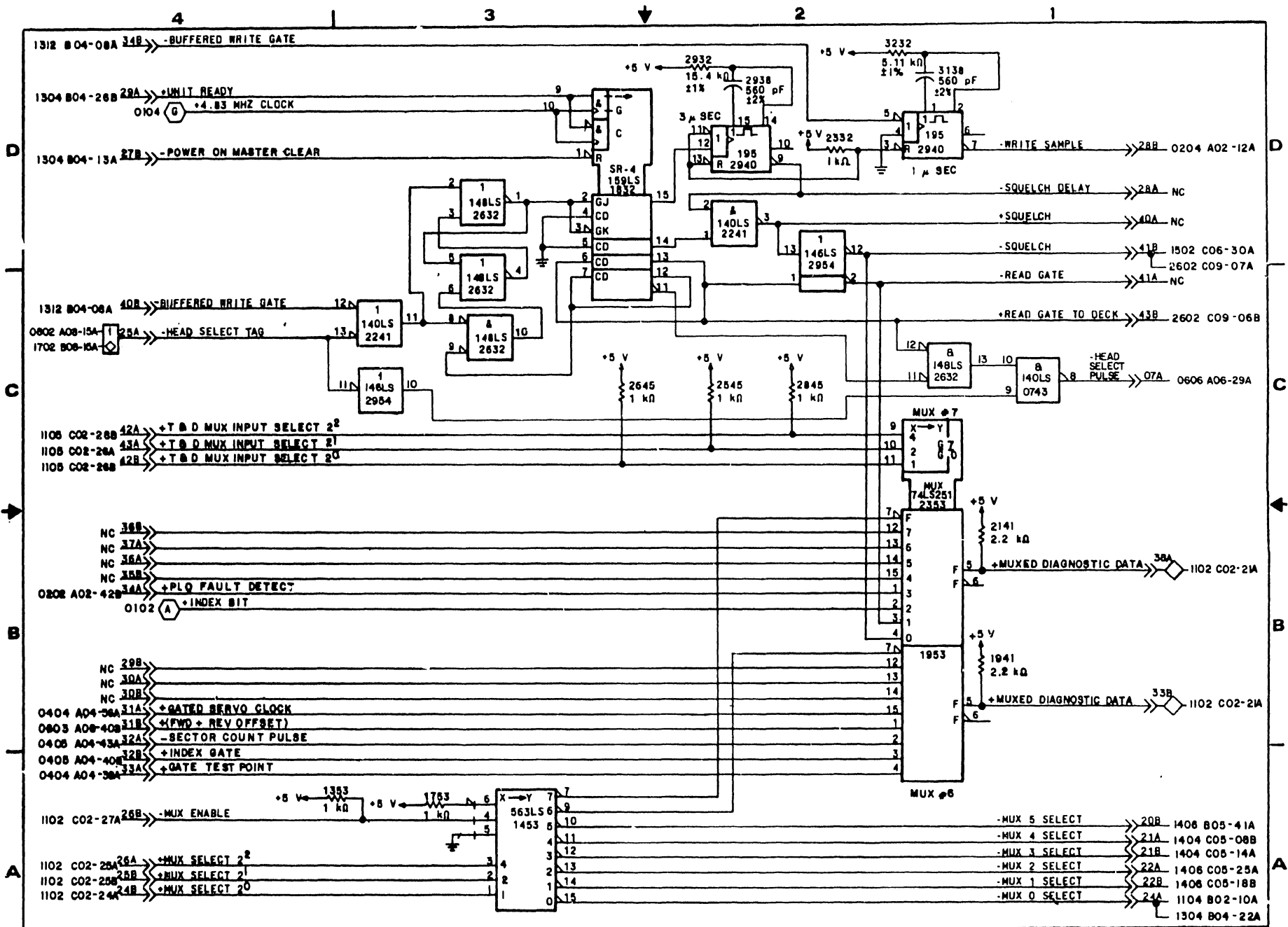
- TYPICAL TERMINATOR CONFIGURATION. .5 V PIN NO 1 GND
- SEE TABLE FOR 22 uF FILTER CAPACITOR LOCATION
- SEE TABLE FOR .1 uF FILTER CAPACITOR LOCATION



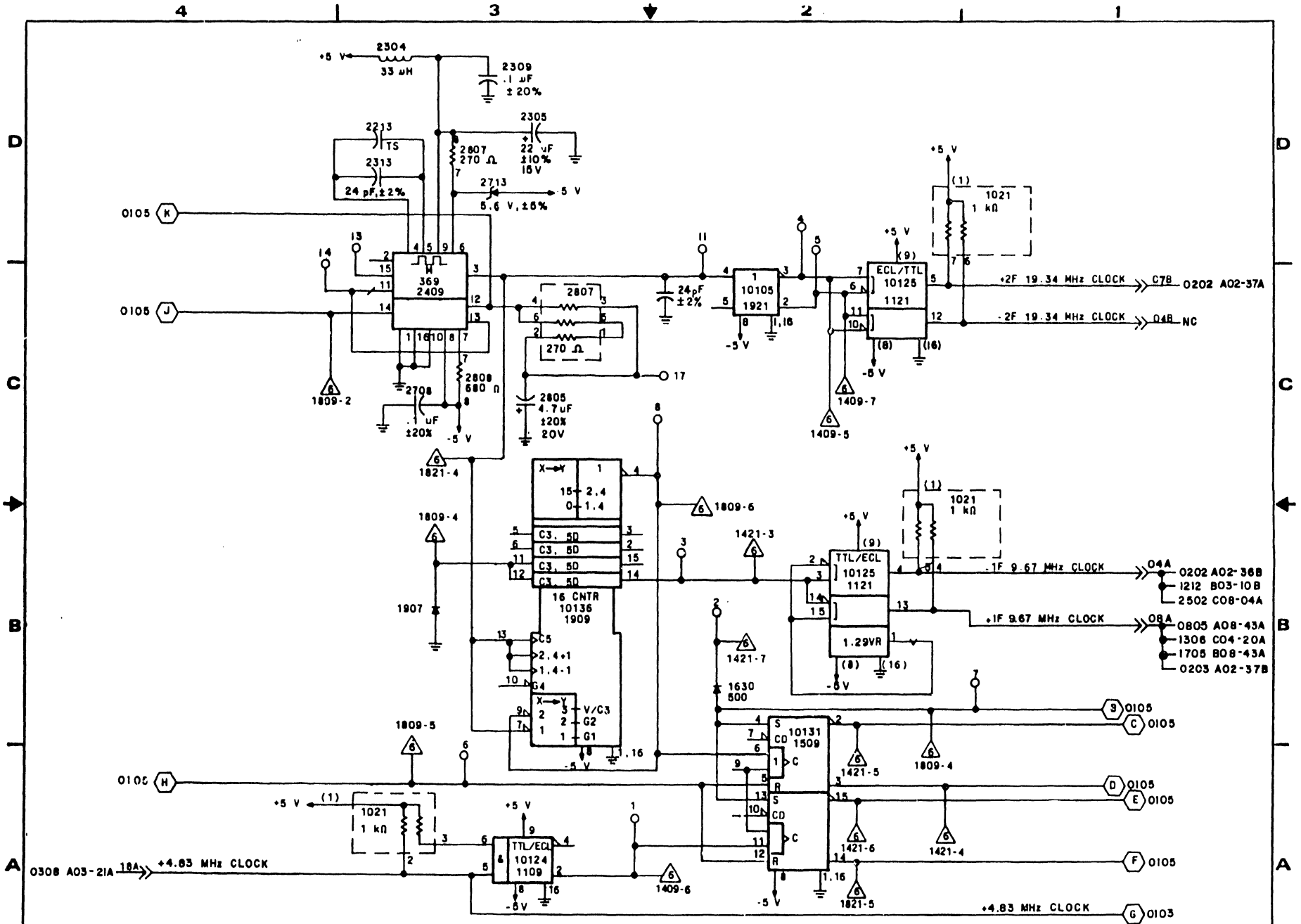
DRAWN	C. BIRD	S. B. - 80	MAGNETIC PERIPHERALS INC. A Division of General Electric Company	WRITE PLO DIAGRAMS TYPE: CRAX	NORMANDALE OPERATIONS	C	83323570	D	J
CHECKED									
ENGINEER	<i>W. R. ...</i>	<i>1/2/80</i>							
APPROVED									
			LOC A01	CODE IDENT 19333	CROSS REF NO 0101	SHEET 1 of 5	PAGE 1-19		

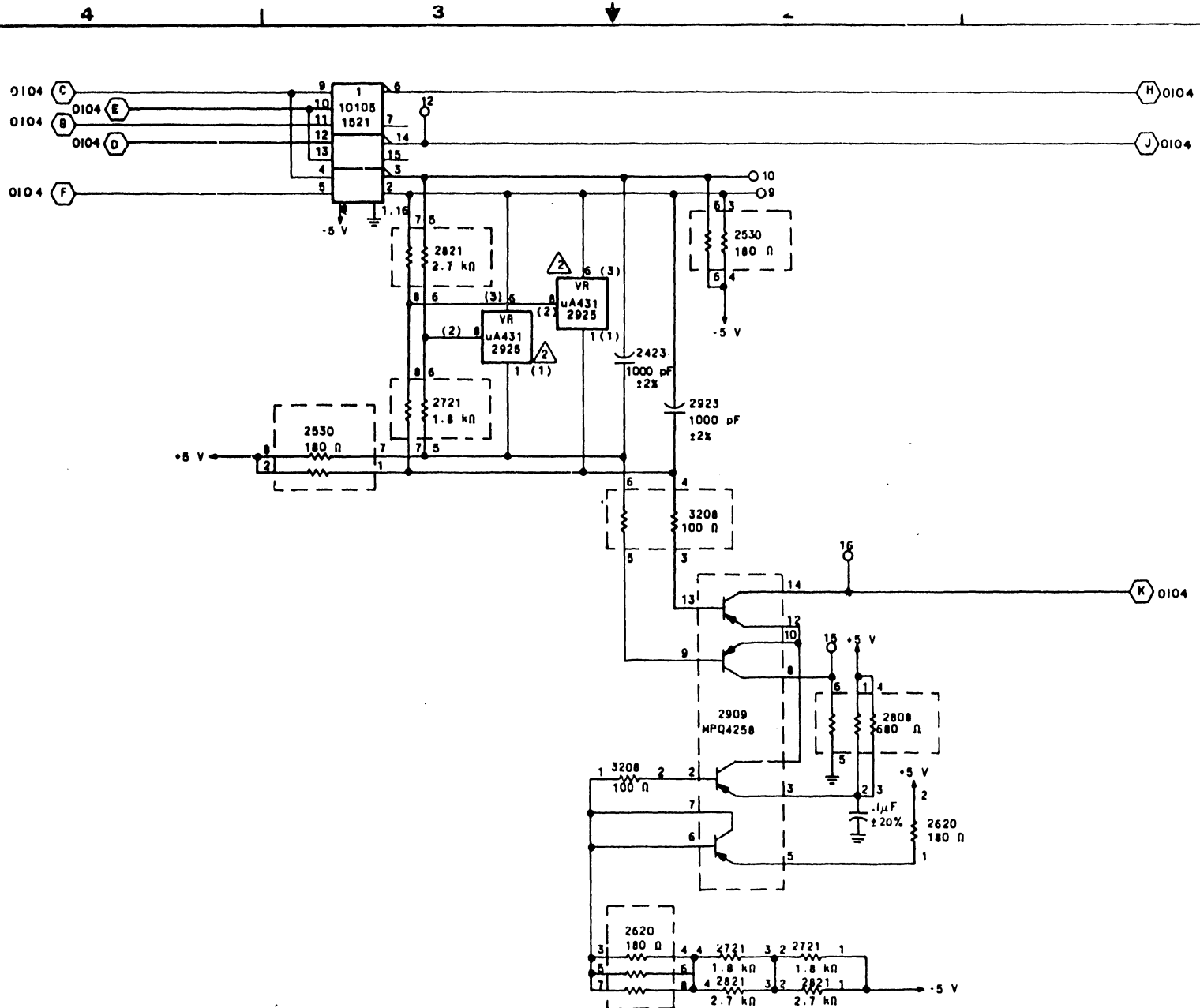






MAGNETIC PERIPHERALS INC. Control Unit Corporation	WRITE SAMPLE, SQUELCH, READ GATE, MUX DIAGNOSTIC DATA, MUX 0-5 SELECT LOC: A01	NORMANDALE OPERATIONS	C	83323570	D	J





REVISION STATUS OF SHEETS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	A	A	A	A															
B	B			B																
C				C																
D		D	D																	
E	E	E	E	E																
F				F																

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
10102	0842	3
10104	2409	14
10116	1309	2, 3, 6, 7
10101	0820	3, 6
10125	2953	4
10102	1321	9, 15
10101	2431	2, 5

UNUSED TERMINATORS

LOCATION	PIN(S)
3253	2, 3, 4, 5
1142	3

UNUSED RESISTOR PACKS

LOCATION	PIN(S)
1642	5, 6, 7, 8
1609	2, 3, 6, 7, 8

FILTER CAPS <sup>2</sup>

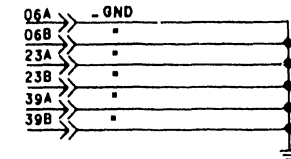
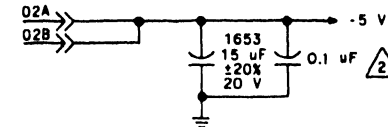
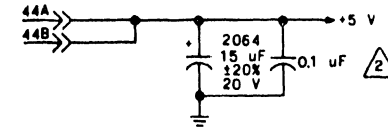
.1 uF		
.5 V	-5 V	
0754	0254	2820
2743	1154	1721
2854	1854	0721
1854	2754	1210
1154	0743	2210
3221	1131	2809
	2332	0243
	2731	1743
	1732	0233
		1710

NOTE:  
<sup>1</sup> TYPICAL TERMINATOR CONFIGURATION  
 PIN NO.



<sup>2</sup> SEE TABLE FOR .1 uF CAPACITOR LOCATIONS

REVISIONS						
REV	ECO	DESCRIPTION	DAFT	DATE	CHK'D	
A	PE23000	RELEASED	TM			
B	PE61483	ADD FTU CAPABILITY				
C	PE61480	ENABLES PROPER OPERATION WITH VARIABLE LENGTH I/O CABLES (A1A1A - P. 2.18.1)	MF	9-18-80		
D	PE6898	ALLOWS FTU WRITE OPERATIONS (NWR - P. 2.18.1)	CB	11-18-80		
E	PE61804	IMPROVE CLOCK CKT	JS	2-23-81		
F	DM02027	EXTNL/INTNL CLOCK FIX. CJSX TO DJSX	Dnt	1-18-82		



DRAWN	M. Long	S.F. 10
CHECKED		
ENGINEER	W.C. Roth	W. J. ...
APPROVED		

MAGNETIC PERIPHERALS INC.  
 A Division of  
 General Instrument Corporation

WRITE COMPENSATION  
 DIAGRAMS

TYPE: DJSX

LOC: A02

NORMANDALE  
 OPERATIONS

C

83323570

D

F

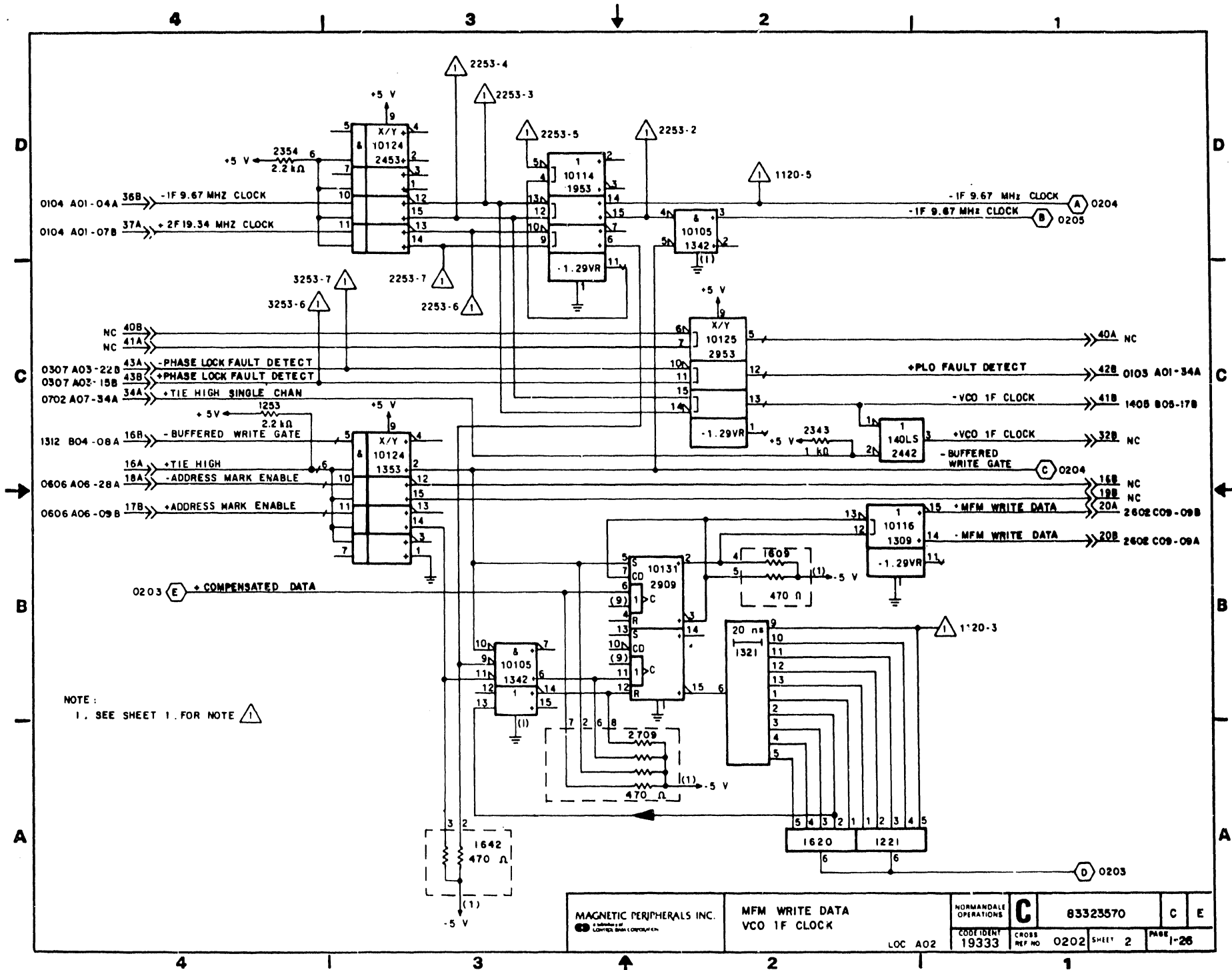
CODE IDENT  
 19333

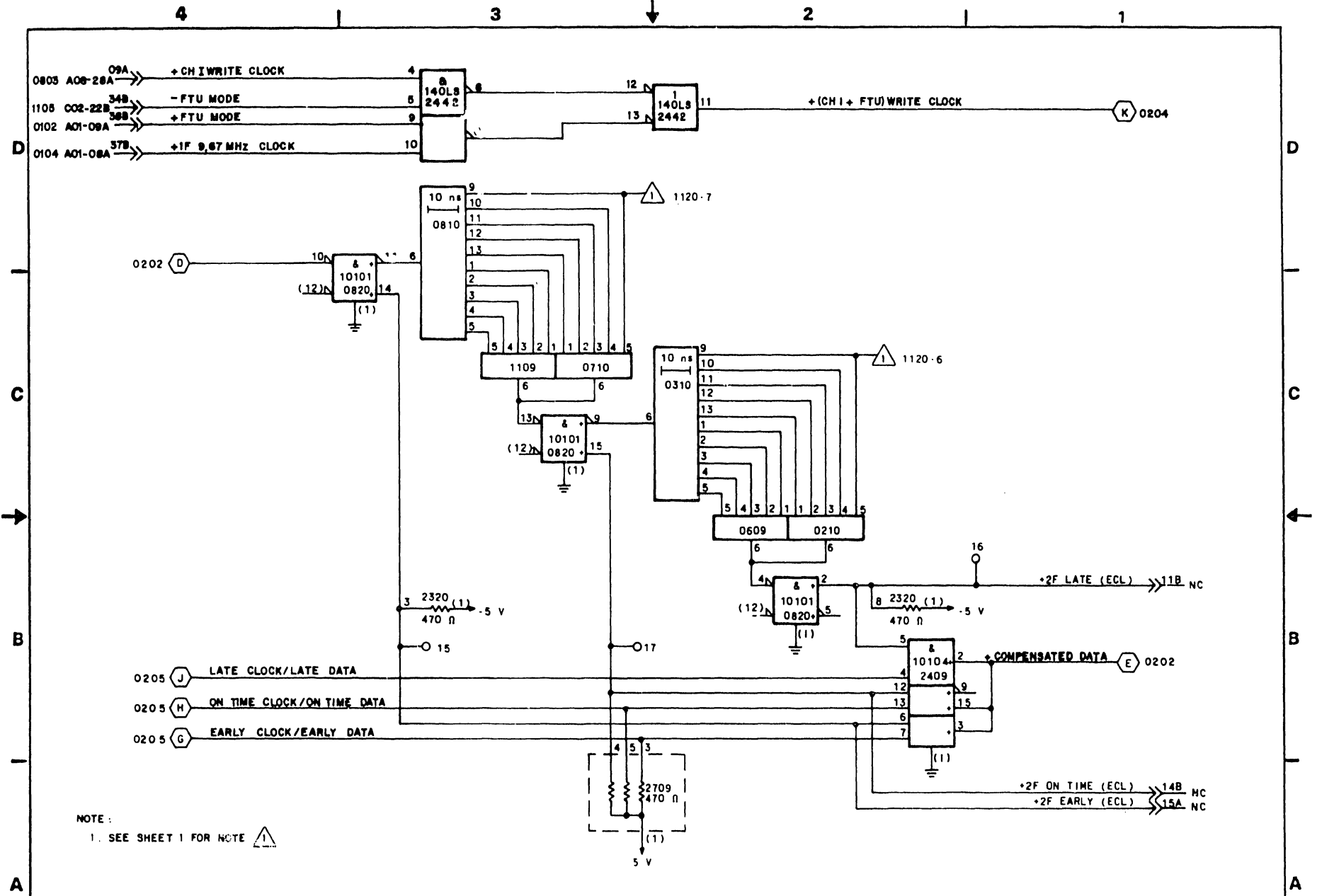
CROSS  
 REF NO 0201

SHEET  
 1 of 5

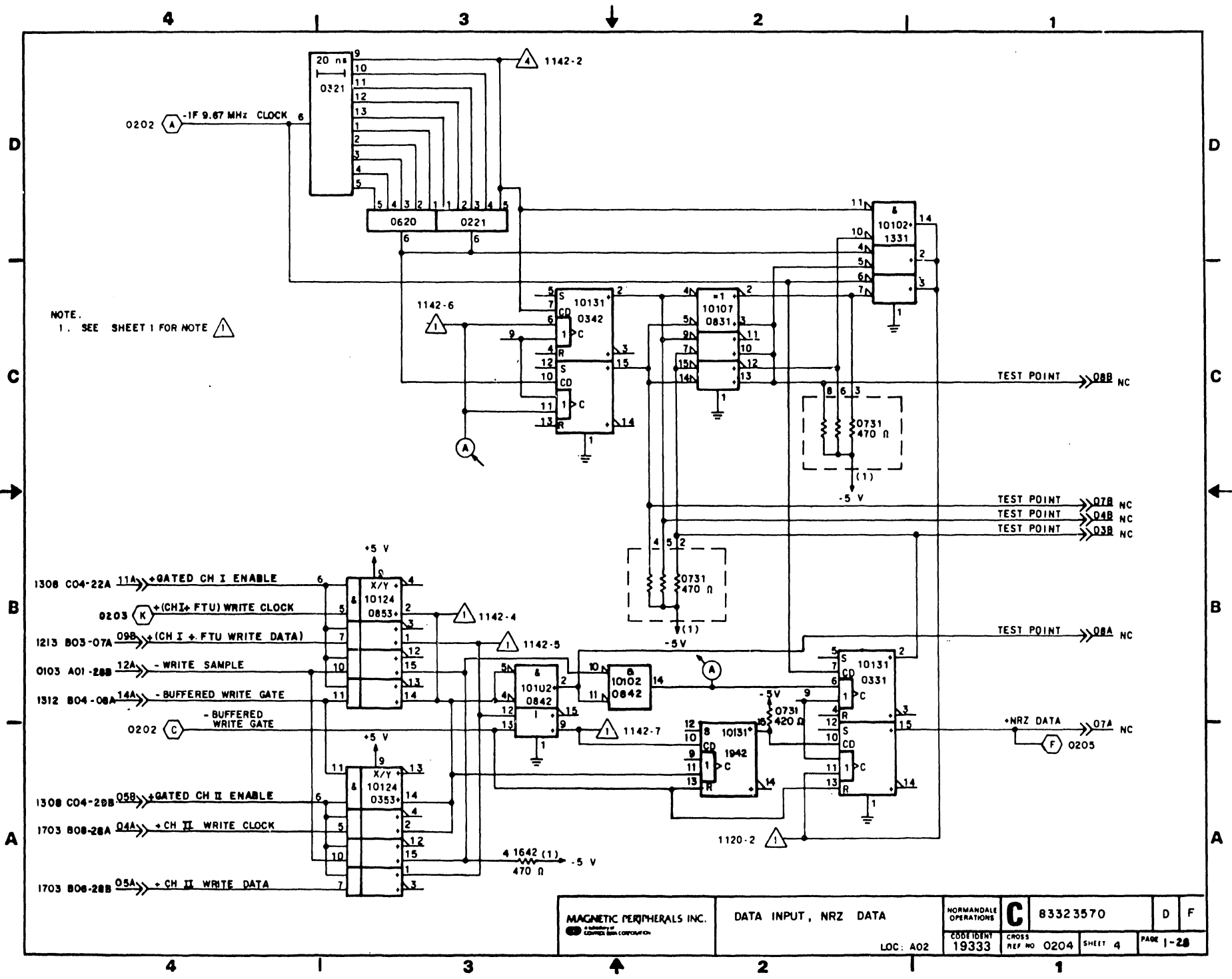
PAGE  
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REF: 20202





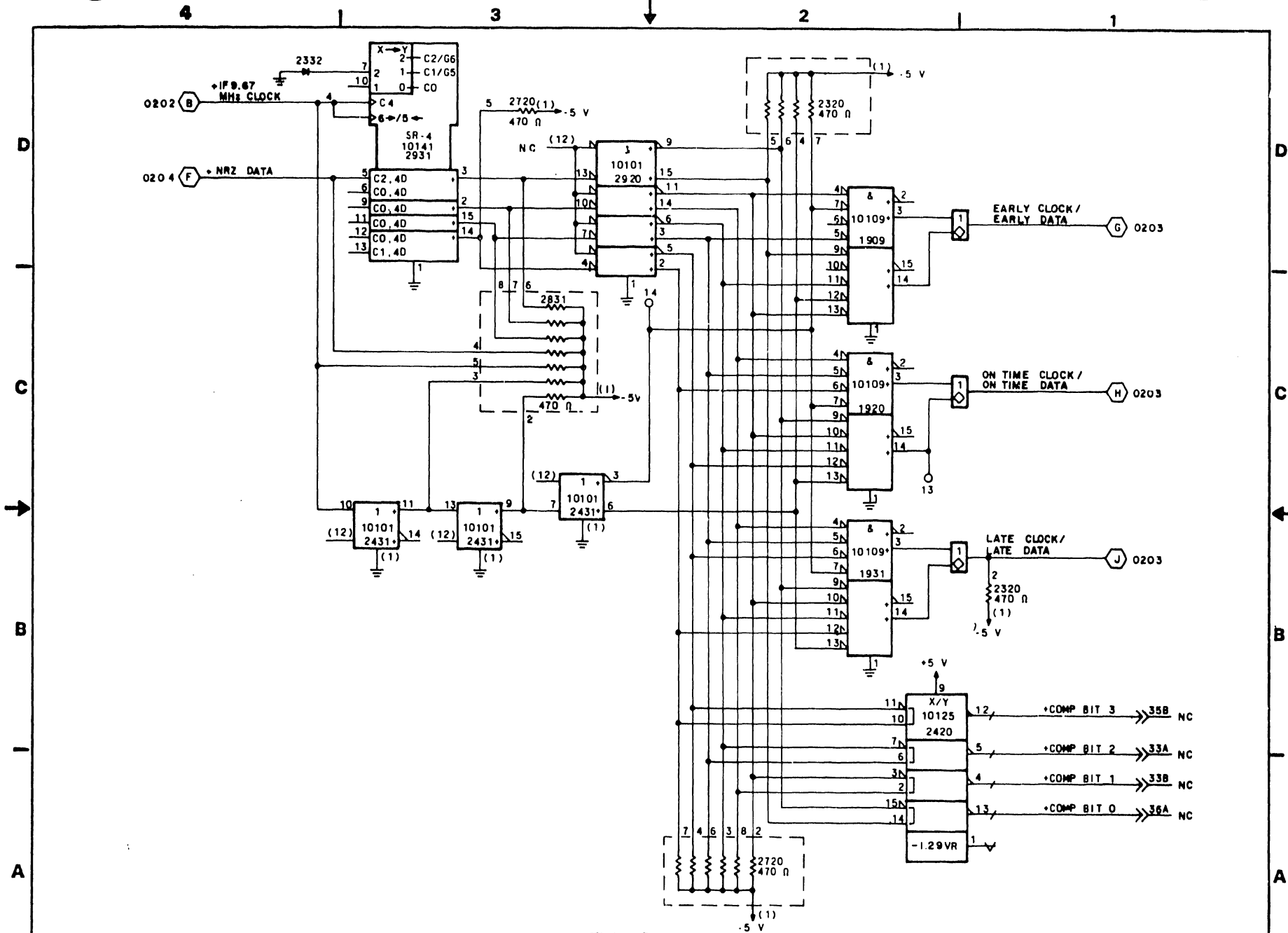
NOTE:  
1. SEE SHEET 1 FOR NOTE



NOTE.  
1. SEE SHEET 1 FOR NOTE  $\triangle$

<b>MAGNETIC PERIPHERALS INC.</b> <small>A subsidiary of</small> <small>CONCORD ELECTRONIC CORPORATION</small>	<b>DATA INPUT, NRZ DATA</b>		NORMANDALE OPERATIONS <b>C</b>	83323570	D	F
	LOC: A02	CODE IDENT 19333	CROSS REF NO 0204	SHEET 4	PAGE 1-28	





REVISION STATUS OF SHEETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	A	A	A	A	A	A												
B		B	B																
C						C													
D	D						D												
E				E			E												

FILTER CAPS

.01 uF		.1 uF	
+5 V	-5 V	+5 V	-5 V
1113	0643	0940	1416
1308	1014	1048	1713
1828	1314	1744	2331
1916	1908	2842	3047
3228	2347	1749	1860

REVISIONS

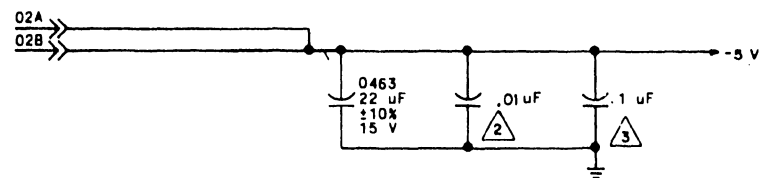
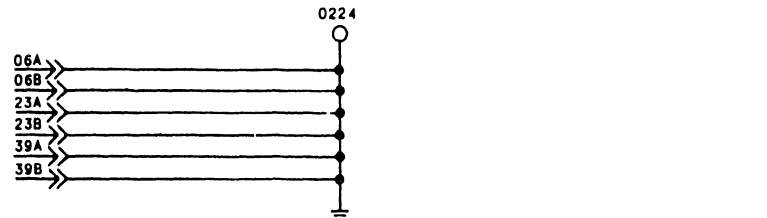
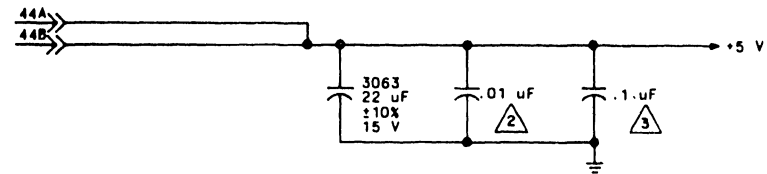
REV	ECU	DESCRIPTION	DRFT	DATE	CHK'D
A	PE23000	RELEASED	CB	11-10-80	
B	PE21438	IMPROVE RELIABILITY	MF	8-17-80	
C	PE21483	ADD FTU CAPABILITIES	CB	11-18-80	
D	PE21728	LOGIC DIAGRAM UPDATE	CB	11-18-80	
E	PE21804	IMPROVE CLOCK CKT	JS	2-23-81	JLK

NOTES: 1 TYPICAL TERMINATOR CONFIGURATION.



2 SEE TABLE FOR .01 uF CAPACITOR LOCATIONS

3 SEE TABLE FOR .1 uF CAPACITOR LOCATIONS



DRAWN	T. [unclear]
CHECKED	
ENGINEER	
APPROVED	

MAGNETIC PERIPHERALS INC.  
A subsidiary of  
 General Electric Company

SERVO PLO  
 DIAGRAMS  
 TYPE: AKDX

LOC: A03

NORMANDALE  
 OPERATIONS  
 CODE IDENT  
 19333

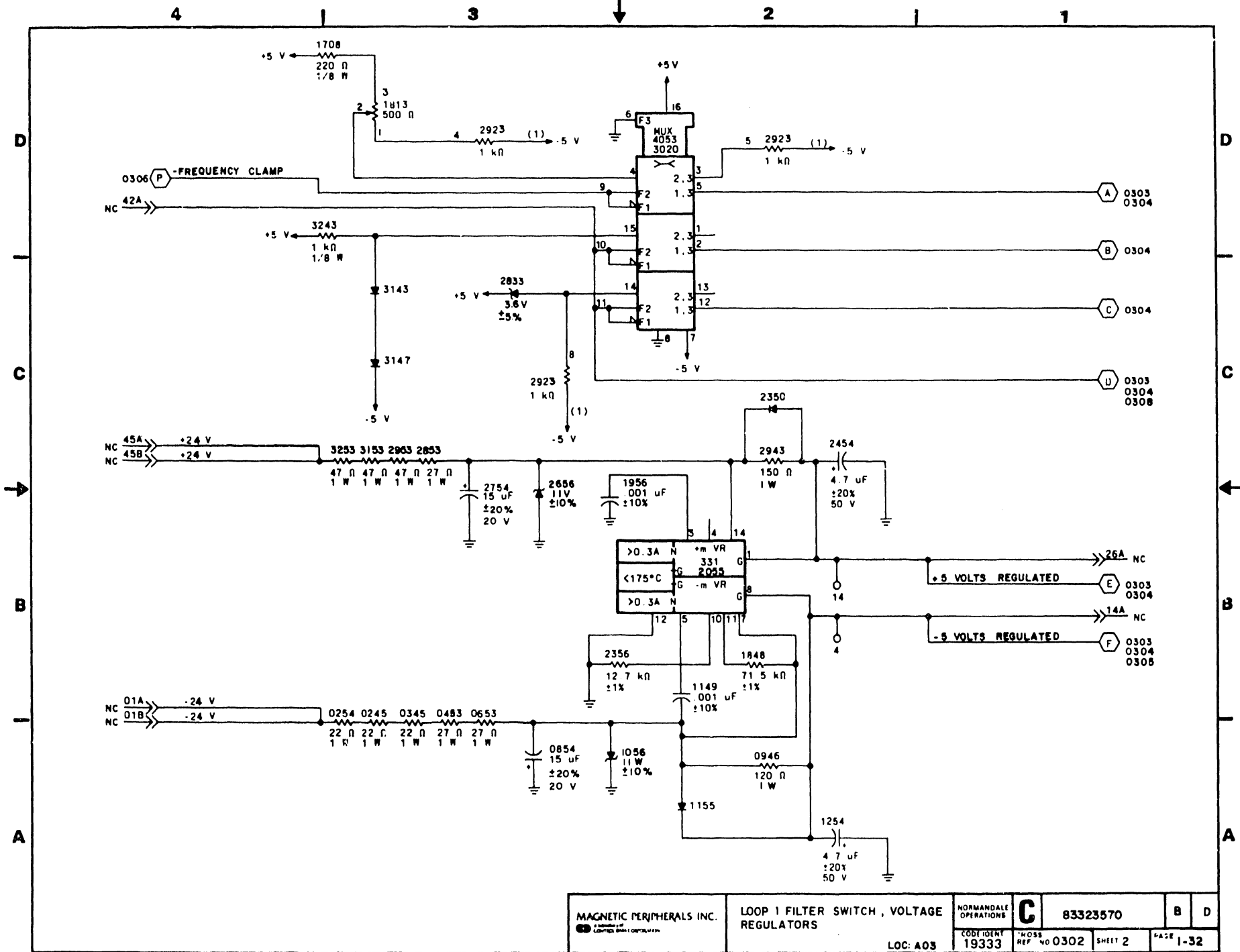
C

CROSS  
 REF. NO 0301

83323570

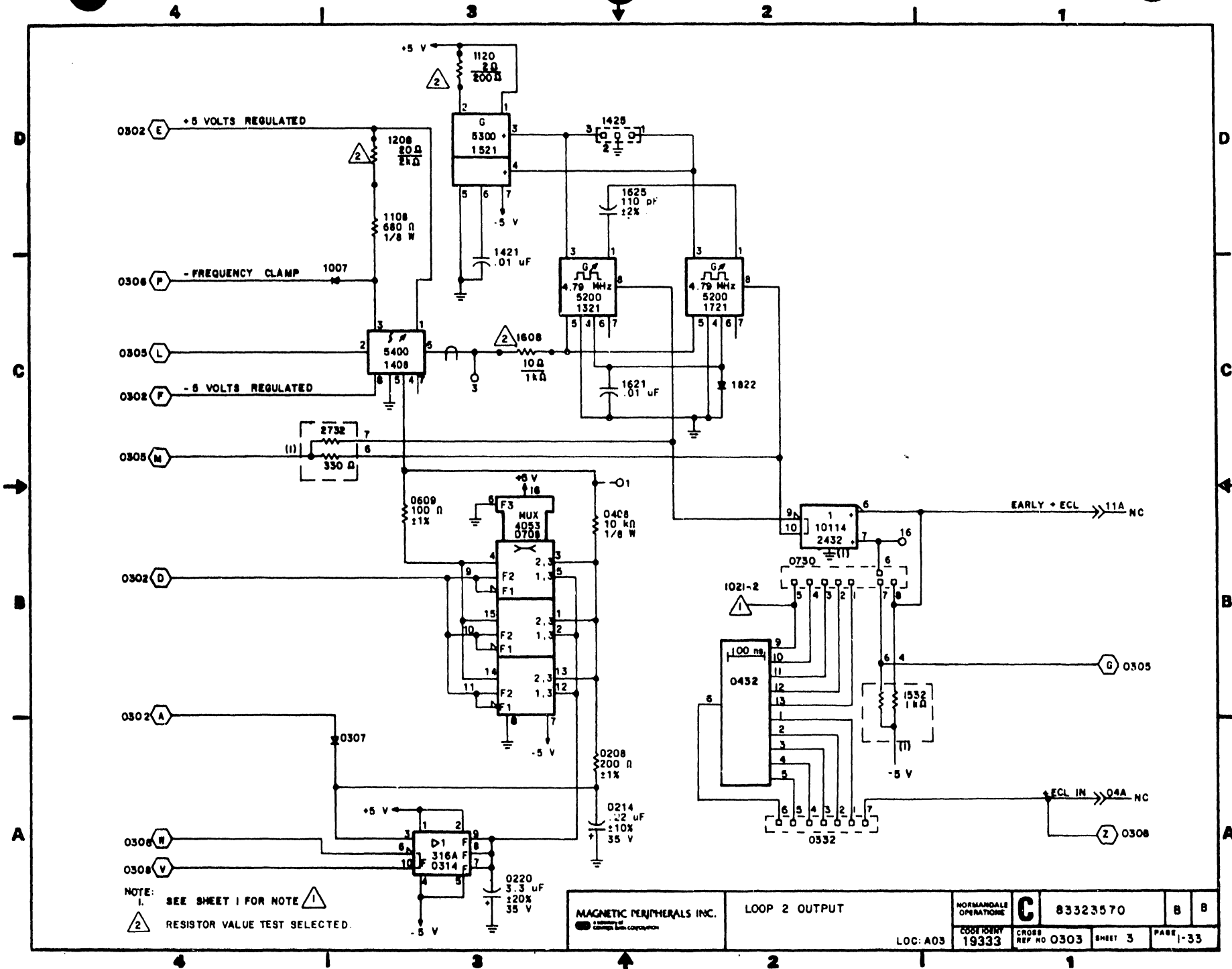
SHEET 1 of 8  
 PAGE 1-31

REF: 81200203

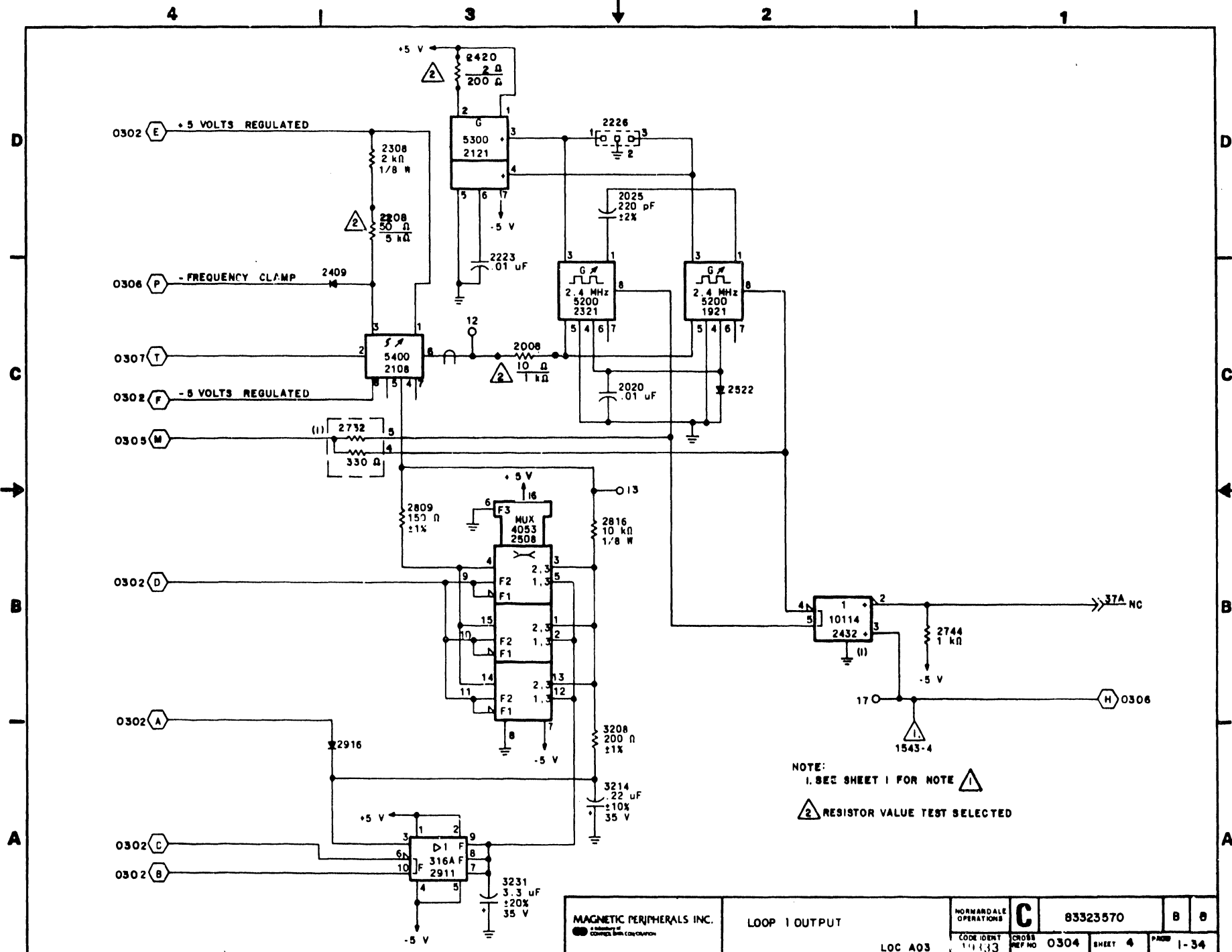


MAGNETIC PERIPHERALS INC. CORPORATION	LOOP 1 FILTER SWITCH, VOLTAGE REGULATORS	NORMANDALE OPERATIONS	C	83323570	B	D

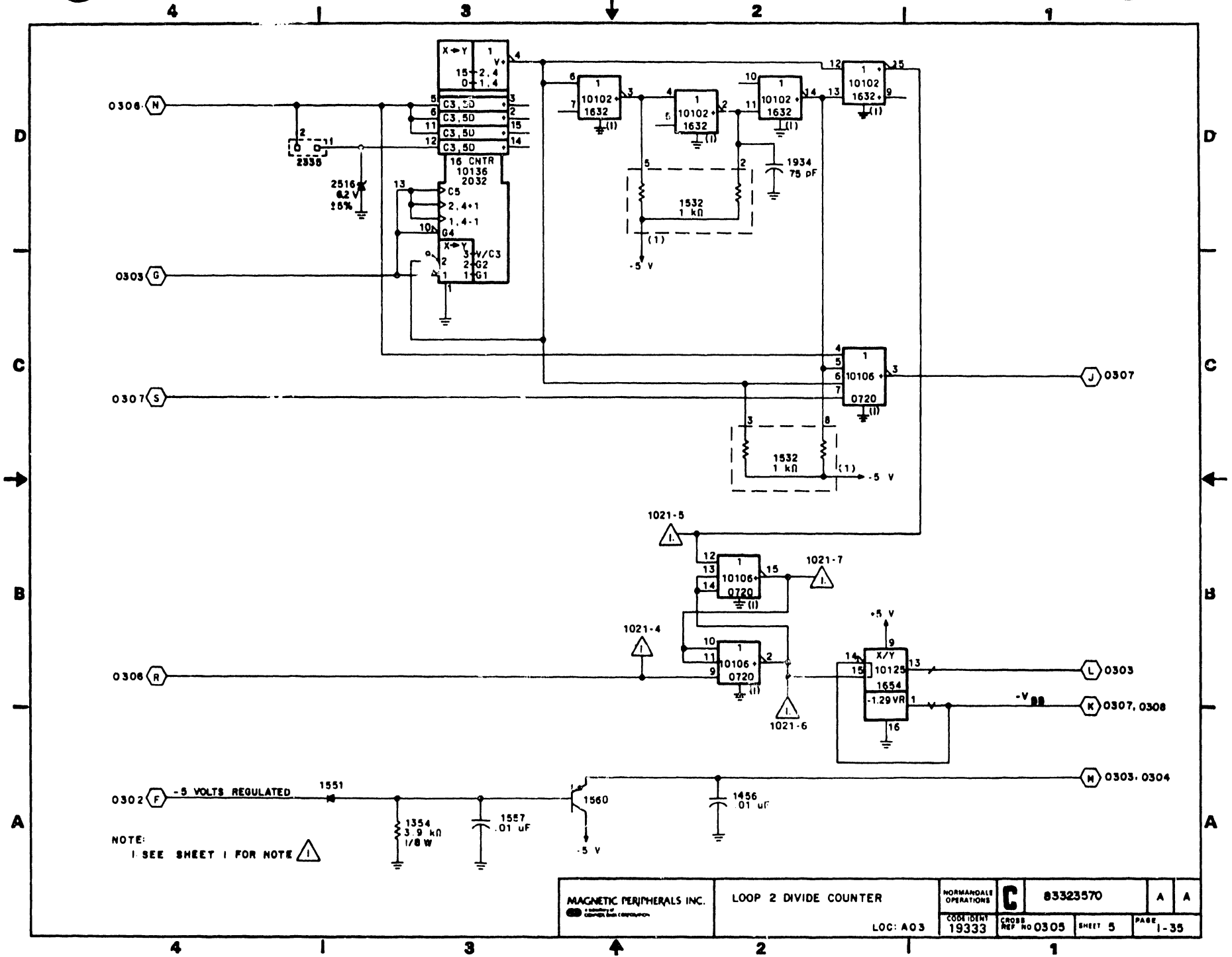
LOC: A03



NOTE:  
 1. SEE SHEET 1 FOR NOTE   
 2. RESISTOR VALUE TEST SELECTED.



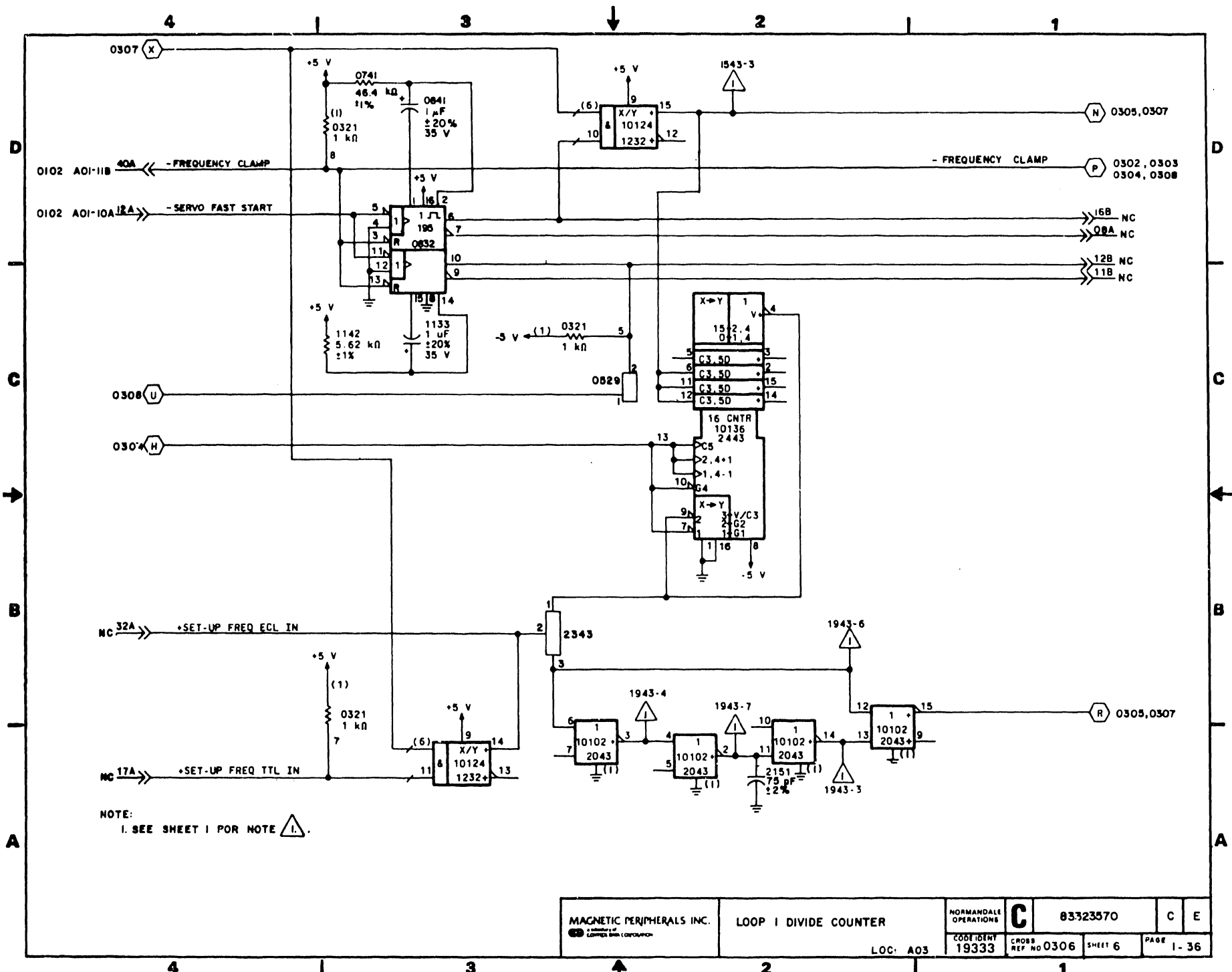
NOTE:  
 1. SEE SHEET 1 FOR NOTE 1  
 2. RESISTOR VALUE TEST SELECTED



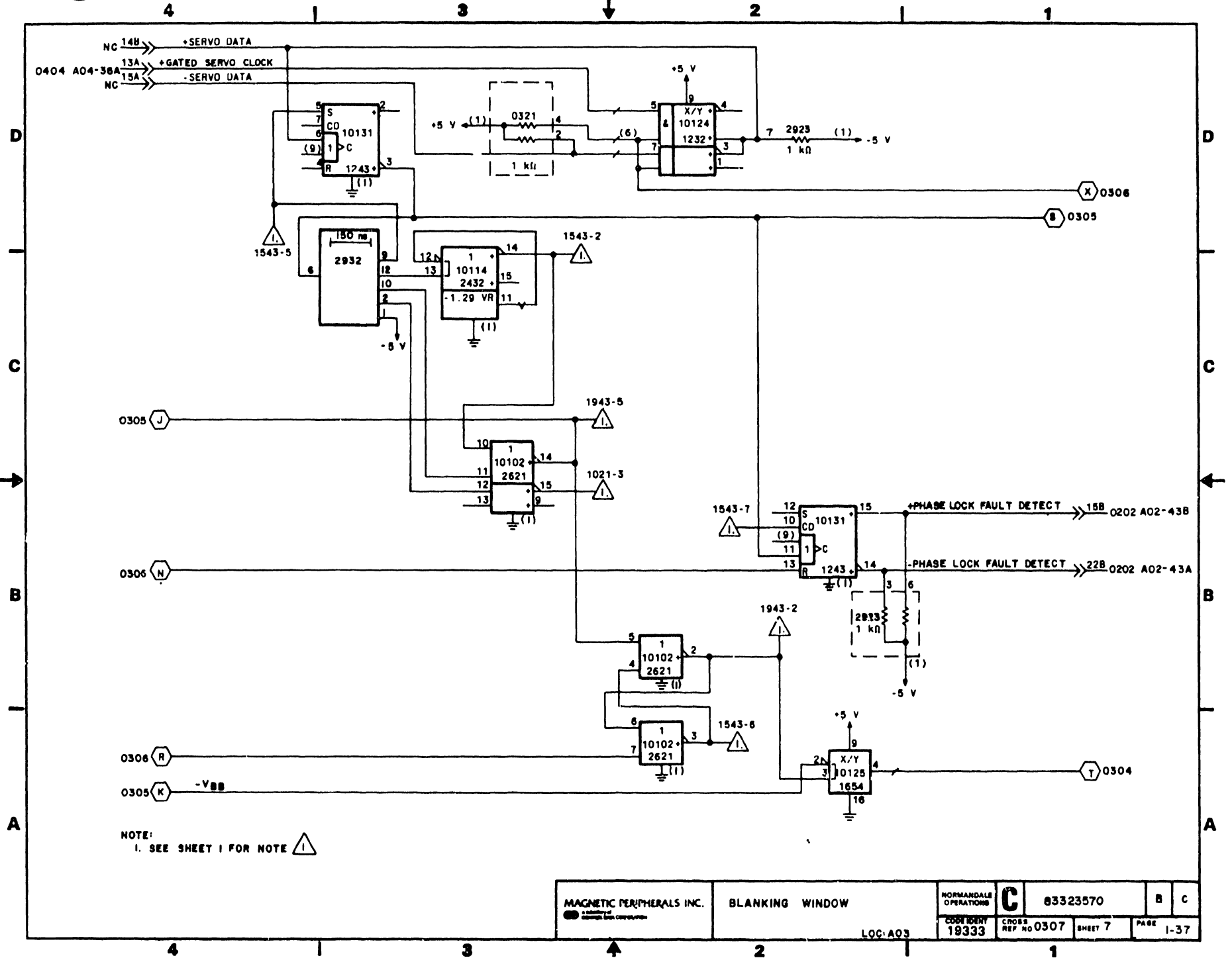
NOTE:  
1 SEE SHEET 1 FOR NOTE

MAGNETIC PERIPHERALS INC. <small>A subsidiary of General Electric Company</small>	LOOP 2 DIVIDE COUNTER	NORMANDALE OPERATIONS	<b>C</b> 83323570	A	A
		CODE IDENT 19333 CROSS REF No 0305		SHEET 5	PAGE 1-35

LOC: A03

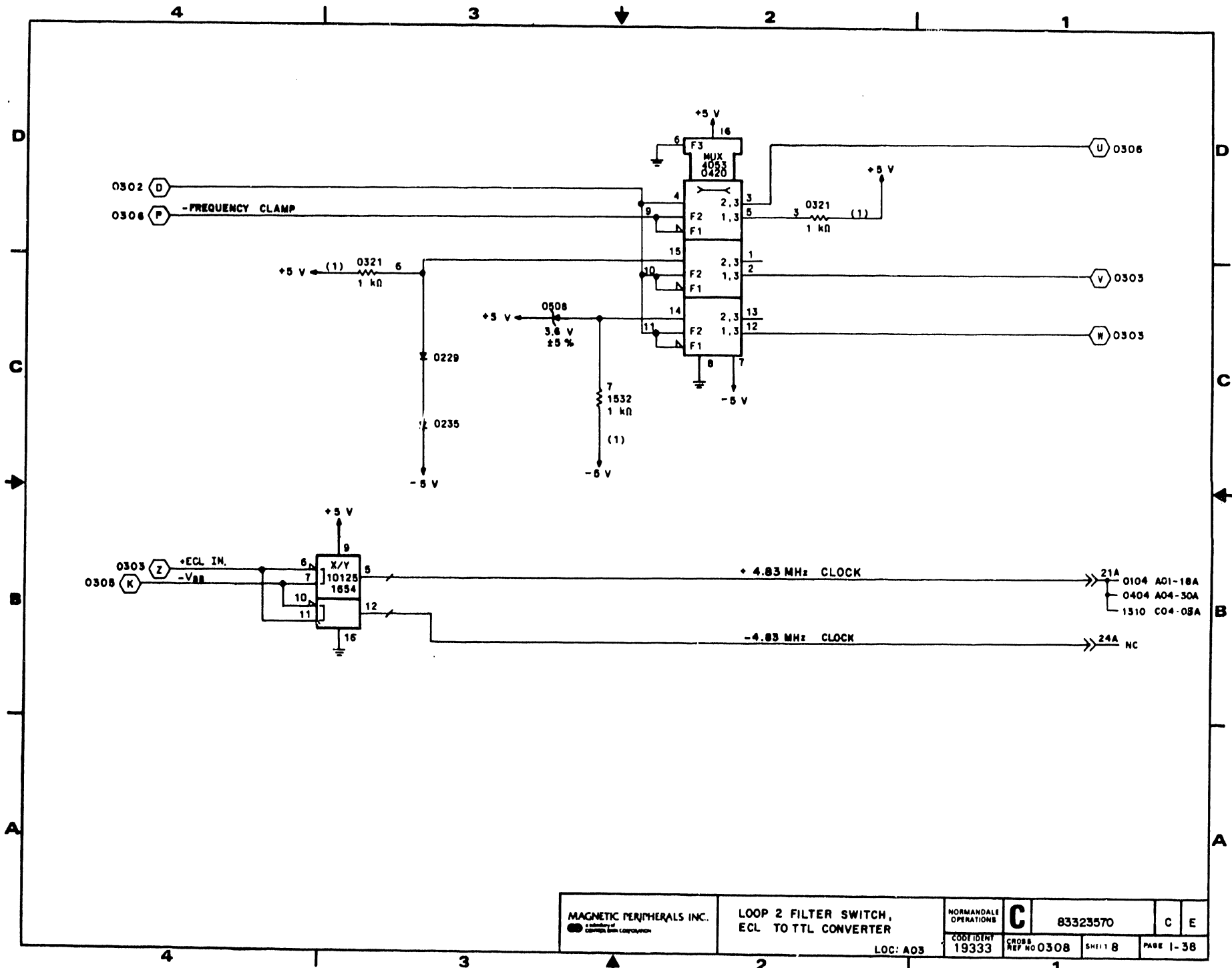


NOTE:  
1. SEE SHEET 1 FOR NOTE



NOTE:  
1. SEE SHEET 1 FOR NOTE 1





REVISION STATUS OF SHEETS

I	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A																
B	B	B	B	B																
C	C																			
D	D	D	D	D																
E			E	E																
F	F	F																		
G																				
H																				
J	J																			

UNUSED LOGIC ELEMENTS

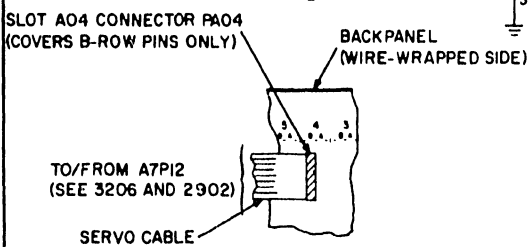
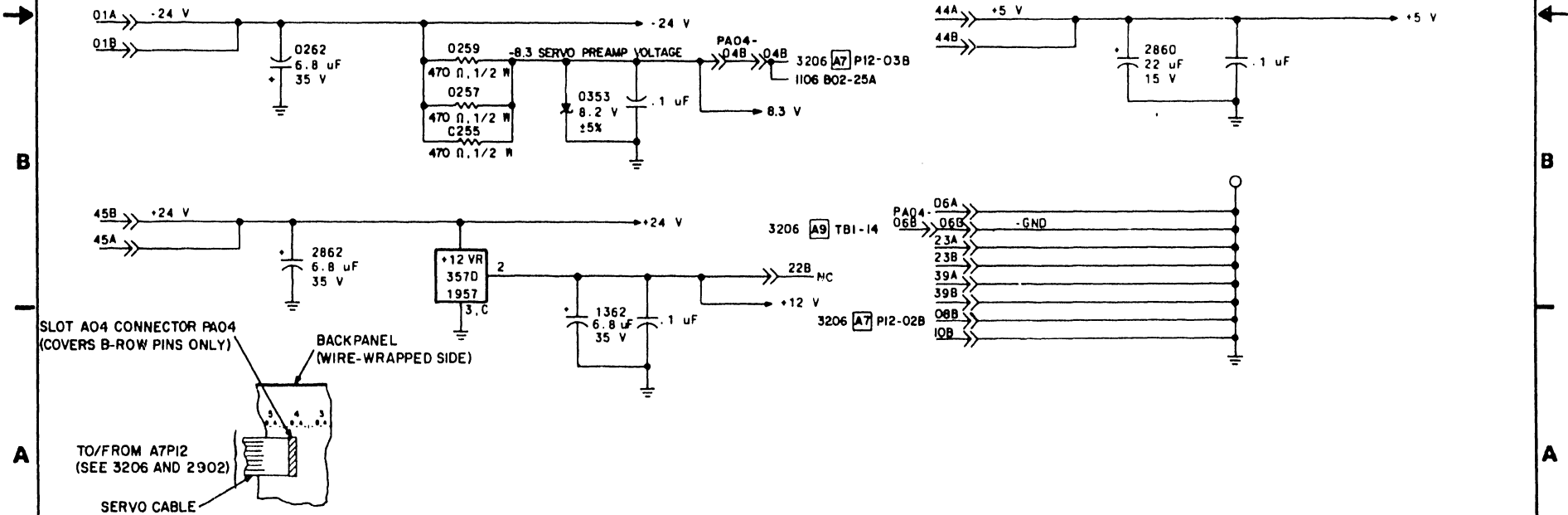
ELEMENT	LOCATION	OUTPUT PINS
146	142B	8, 12

FILTER CAPS

.1 uF		
+12 V	+5 V	-8.2 V
0320	1236	0254
0602	2416	1263
2216	2426	2208
	3227	
	3256	

REVISIONS

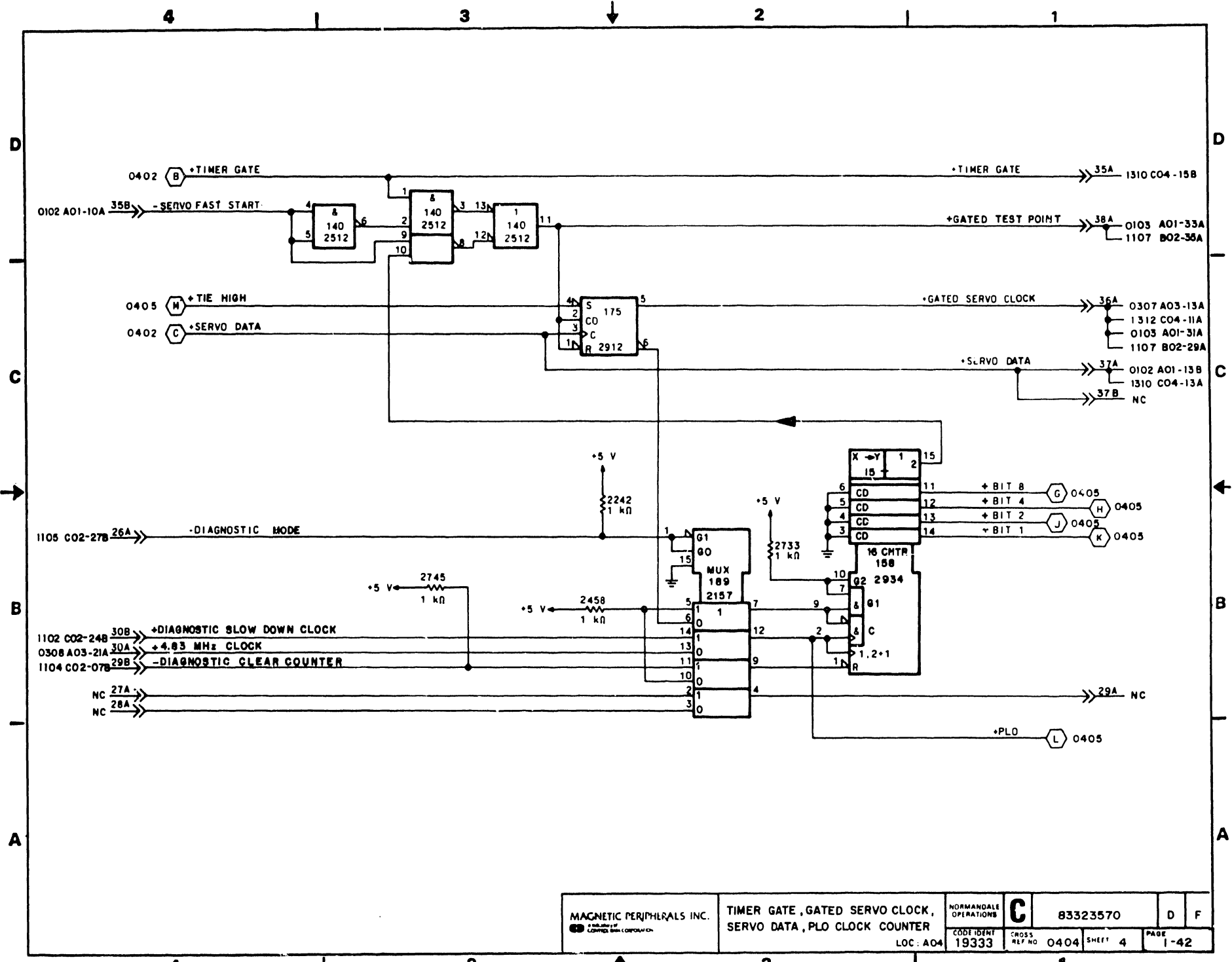
REV	ECO	DESCRIPTION	DRFT	DATE	CHK'D
A	M23000	RELEASED	TH		
B	PE61463	ADD FTU CAPABILITY	MF	4/17/80	
C	PE61726	LOGIC DIAGRAM UPDATE	CB	11/10/80	
D	PE61754	INT FTU MODE, PREVENTS DRIVE FROM INTERLUPTING CONTROLLER	JS	2/23/81	
E	PE61804	IMPROVE CLOCK CRT	JS	2/23/81	
F	DN02092	FAULTY ERROR FIX	Dnt	1/19/82	
G	DN02187	ADD TEST & DIAG INFO	Dnt	1/19/82	
H	DN02093	IMPROVE YIELD	Dnt	1/19/82	
J	DN02882	ELIMINATE OSCILLATION	CB	8-10-82	

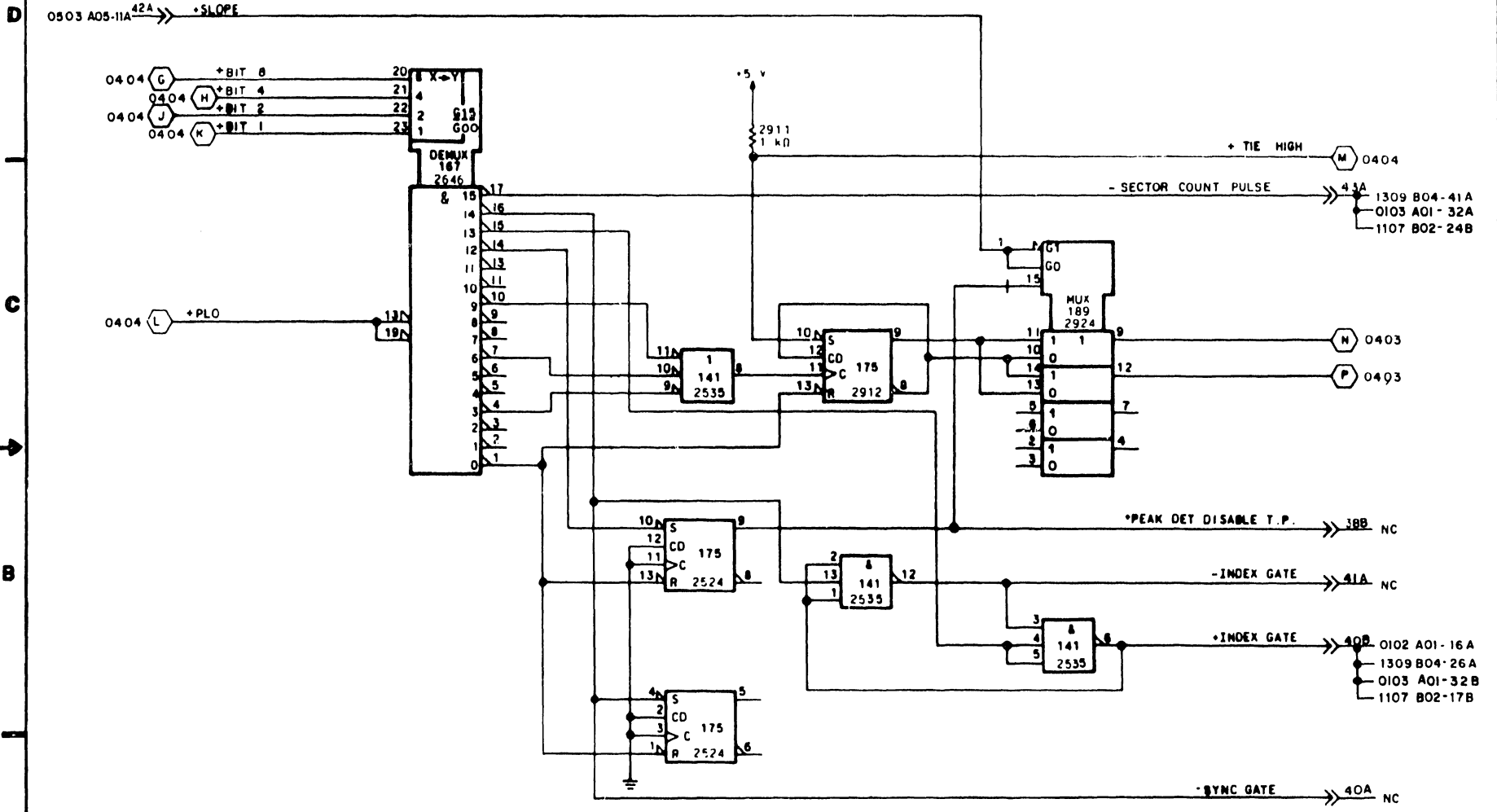


DRAWN	T. H. H. 11/17/80	... 430	MAGNETIC PERIPHERALS INC. A subsidiary of CAMPBELL, SERRA & COMPANY	QUADBIT SERVO DECODER DIAGRAMS TYPE-BJYX	NORMANDE OPERATIONS C	83323570	E	J
CHECKED								
ENGINEER	W.C. R. 11/17/80							
APPROVED								
				LOC A04	CODE IDENT 19333	CROSS REF. NO 0401	SHEET 1 of 5	PAGE 1-39









REVISION STATUS OF SHEETS

I	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	A	A	A	A	A													
B	B	B																	
C	C	C	C																
D			D																
E																			
F			F																
G		G			G														
H		H																	
J																			
K	K																		
L				L	L														
M																			
N	N																		

FILTER CAPS

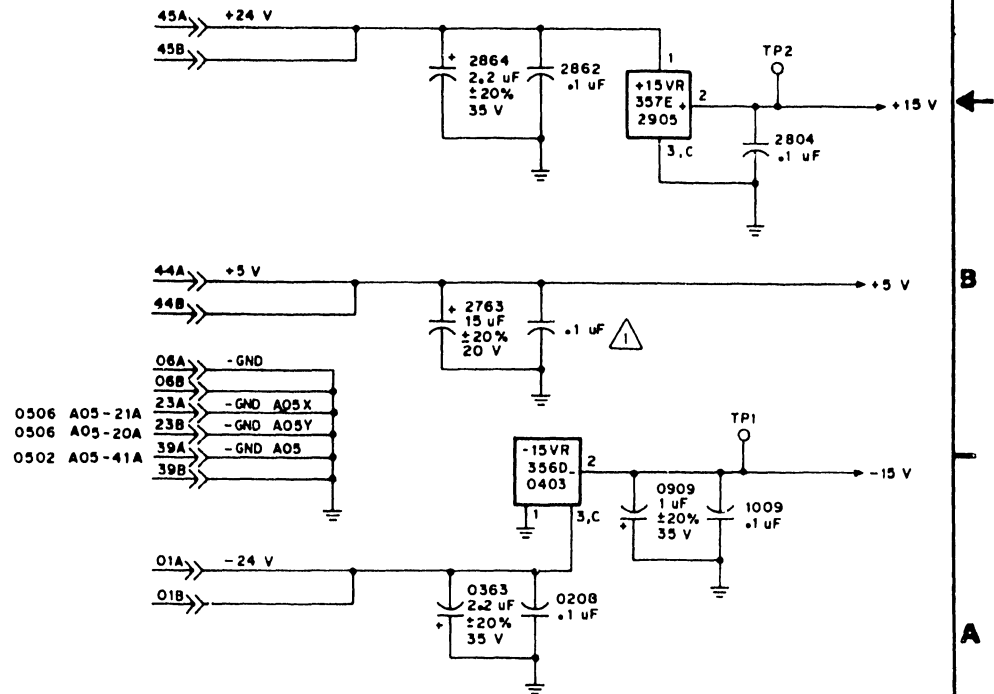
.1 uF
+5 V
0258
0310
1116
1463
1540
2415
2424
2452
2531
2824
2858
2860
2932

REVISIONS					
REV	ECO	DESCRIPTION	DRFT	DATE	CHKD
A	PE23000	RELEASED			
B	PE61281	OFFSET FIX (ALGX TO BLK X)	M/F	8-17-80	
C	PE61483	ADD FTU CAPABILITIES	CB	11-18-80	
D	PE61580	CORRECT ASST			
E	PE61588	F.PROM CHG; BLGX TO CLGX			
F	PE63556	ALLOW FTU WRITE OPERATIONS			
G	PE61728	LOGIC DIAGRAM UPDATE			
H	PE61340	GENERATES SEW ERROR FOR CYLS 899 & UP	JS	7-25-81	
J	PE61775	NEW PROM AT 0528; CLGX=DLGX	JS	8-23-81	
K	PE61818	CORRECTS LOGIC SYMBOLS	TF	6-2-81	
L	DM02082	FAULTY ERROR FIX; DLGX TO ELGX	Dmt	1-20-82	
M	DM04187	ADD TEST B; DIAG; HWD; ELGX TO FLGX	Dmt	1-20-82	
N	DM02539	CORRECTS LOGIC	CB	7-28-82	

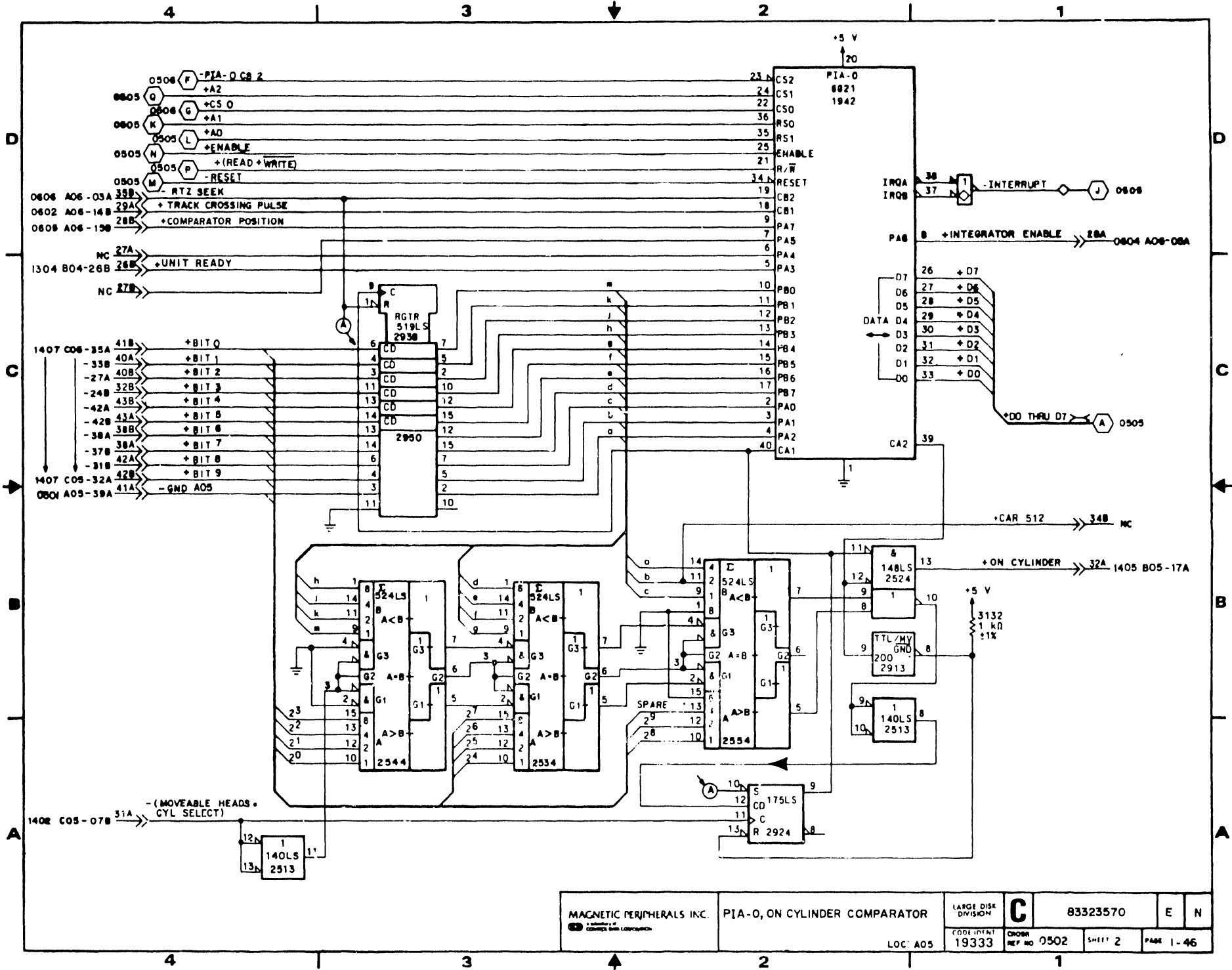
NOTE:



SEE TABLE FOR .1 uF CAPACITOR LOCATIONS



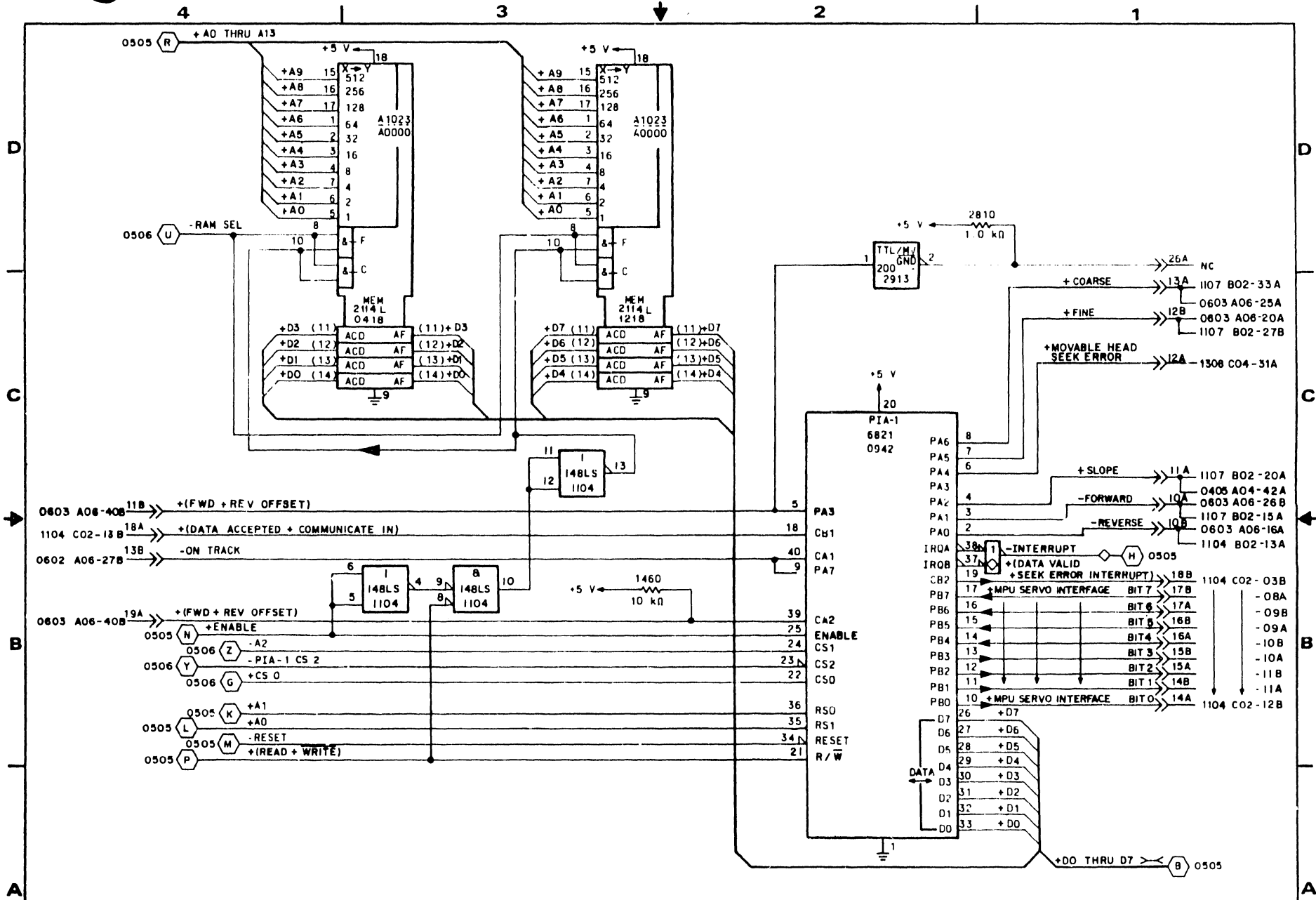
DRAWN	CHECKED	ENGINEER	APPROVED	MAGNETIC PERIPHERALS INC.	MPU SERVO DIAGRAMS	LARGE DISK DIVISION	C	83323570	E	N
				TYPE: FLGX	LOC: A3 A05	CODE IDENT 19333	CROSS REF. NO 0501	SHEET 1 of 7	PAGE 1-45	

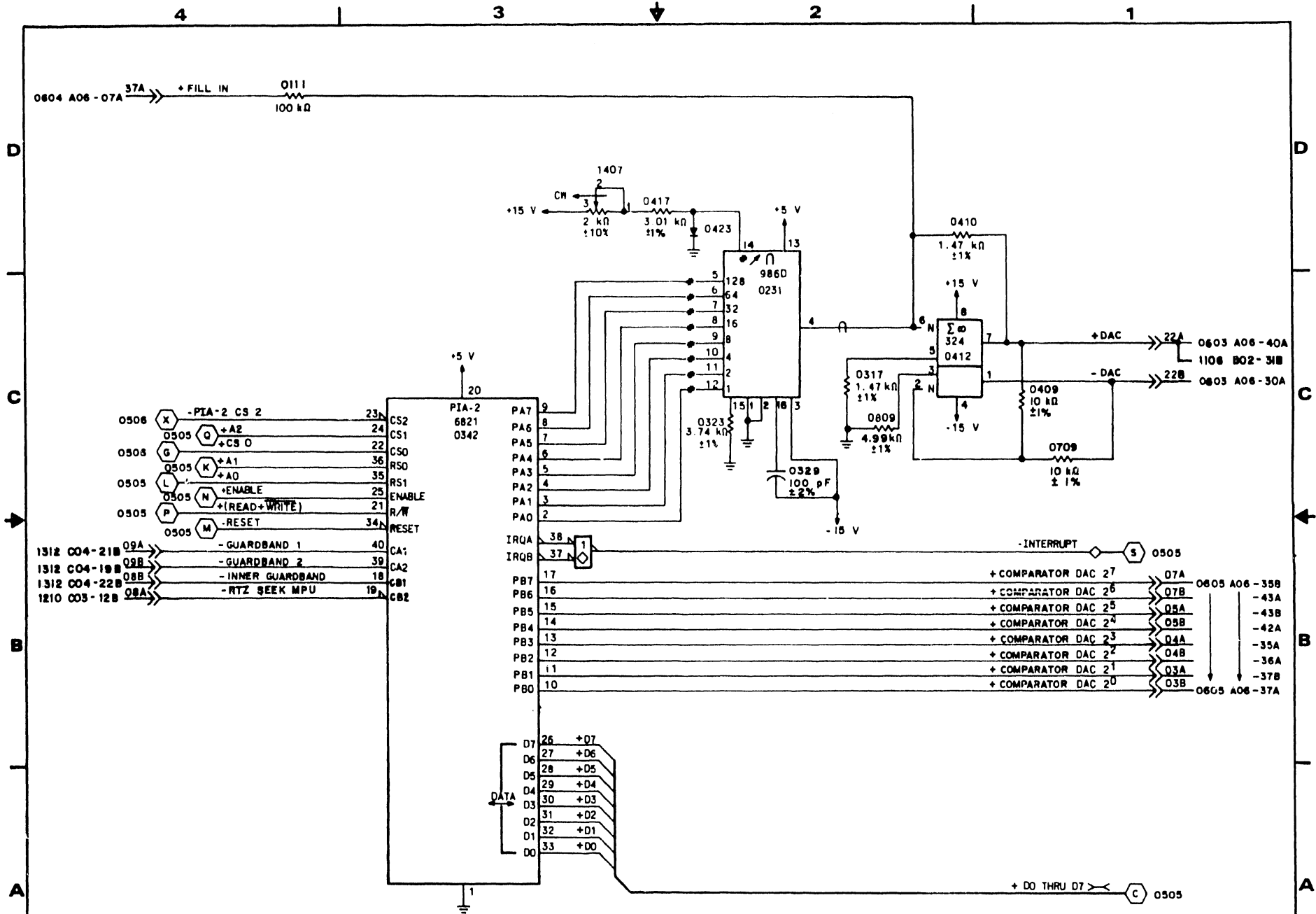


MAGNETIC PERIPHERALS INC. <small>COMMERCIAL EQUIPMENT DIVISION</small>	PIA-0, ON CYLINDER COMPARATOR	LARGE DISK DIVISION	<b>C</b>	83323570	E N

LOC: A05





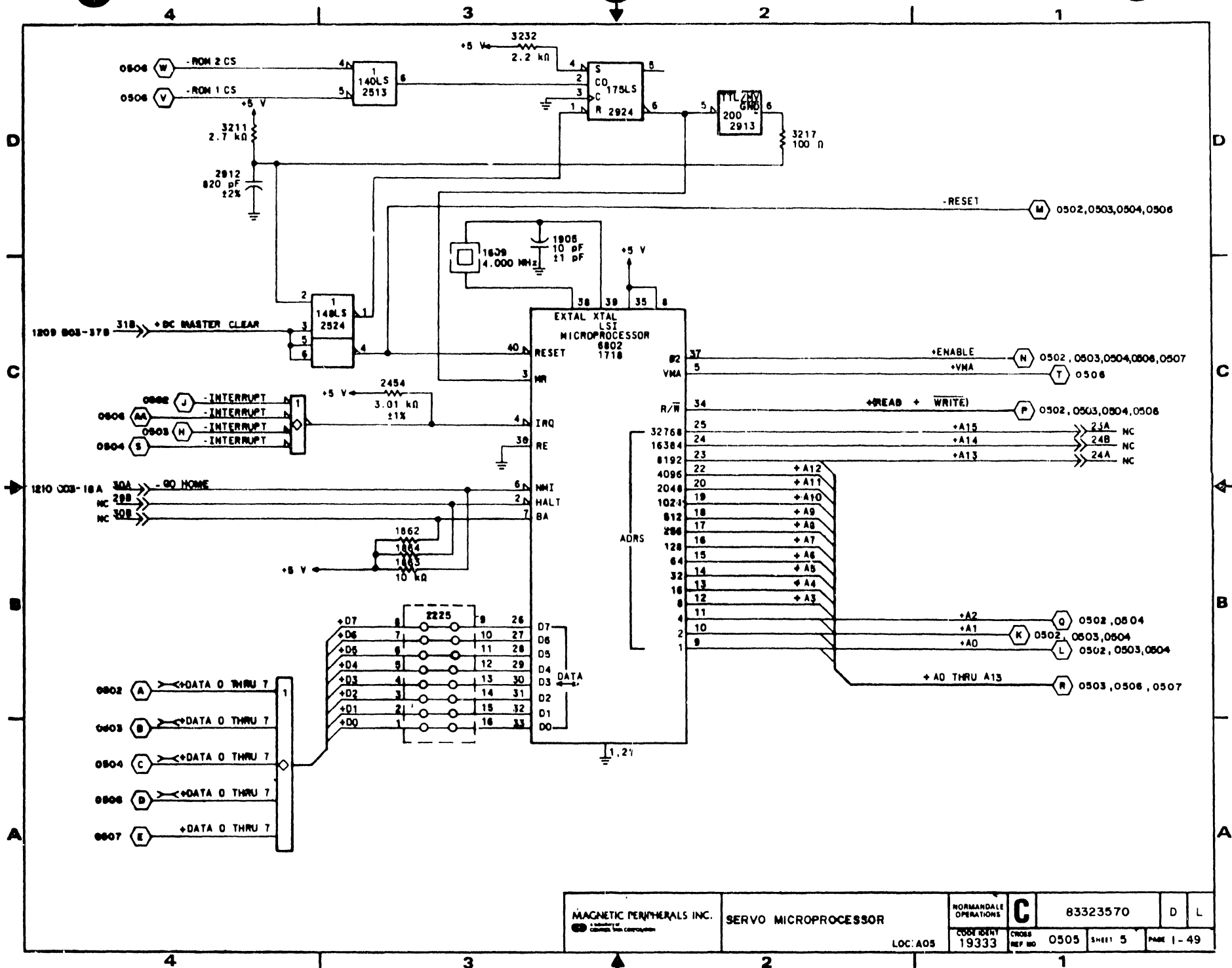


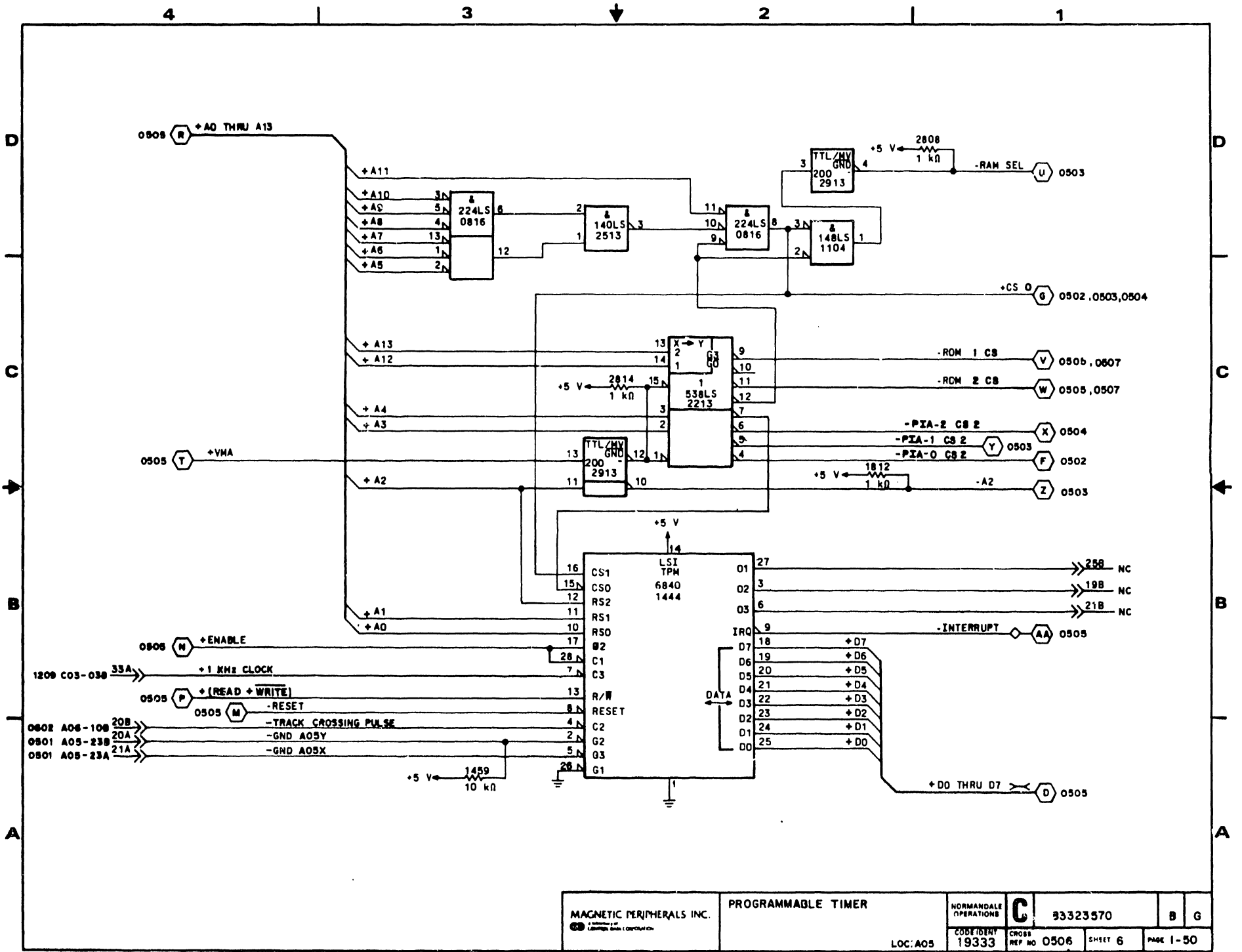
MAGNETIC PERIPHERALS INC. A subsidiary of CORNING GLASS CORPORATION	PIA-2, ± DAC	NORMANDALE OPERATIONS	<b>C</b>	83323570	B	F
		CODE IDENT 19333				

LOC: A05

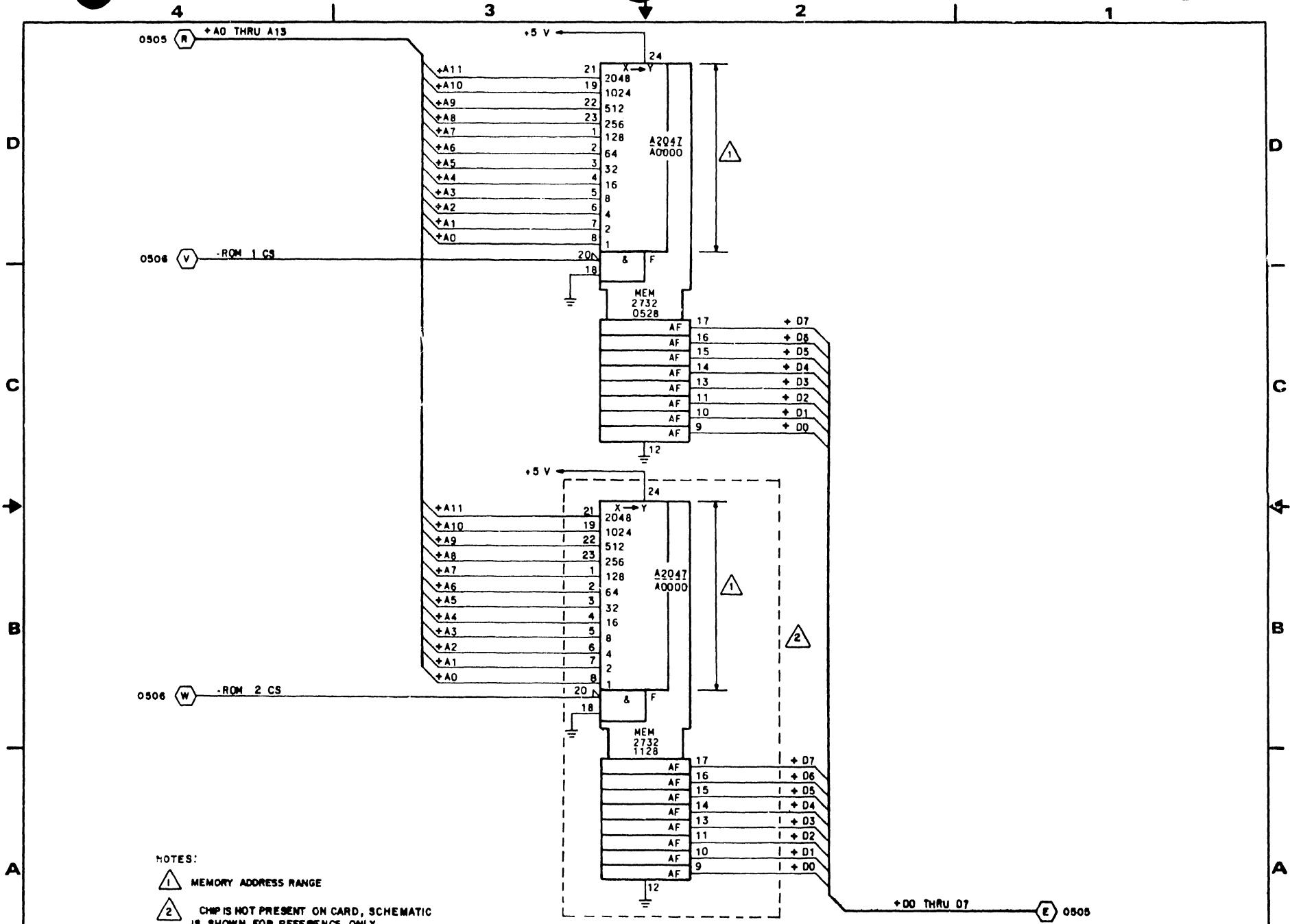
+ D0 THRU D7

0505





MAGNETIC PERIPHERALS INC.		PROGRAMMABLE TIMER		NORMANDALE OPERATIONS		C 33323570		B G	
LOC: A05		19333		CROSS REF NO 0506		SHEET 6		PAGE 1-50	



NOTES:  
 1 MEMORY ADDRESS RANGE  
 2 CHIP IS NOT PRESENT ON CARD, SCHEMATIC IS SHOWN FOR REFERENCE ONLY.

REVISION STATUS OF SHEETS

I	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A	A															
B	B	B	B																	
C			C																	
D	D	D	D																	
E	E	E		E	E															
F																				
G																				
H	H																			
J	J					J														
K	K	K																		
L		L																		
M						M														
N		N																		
P						P														
R																				
S							S													
T	T	T	T	T																
U			U	U																

FILTER CAPS

.1 uF	
+5 V	
1753	2146
0546	0235
0634	2434
3217	

UNUSED LOGIC ELEMENTS

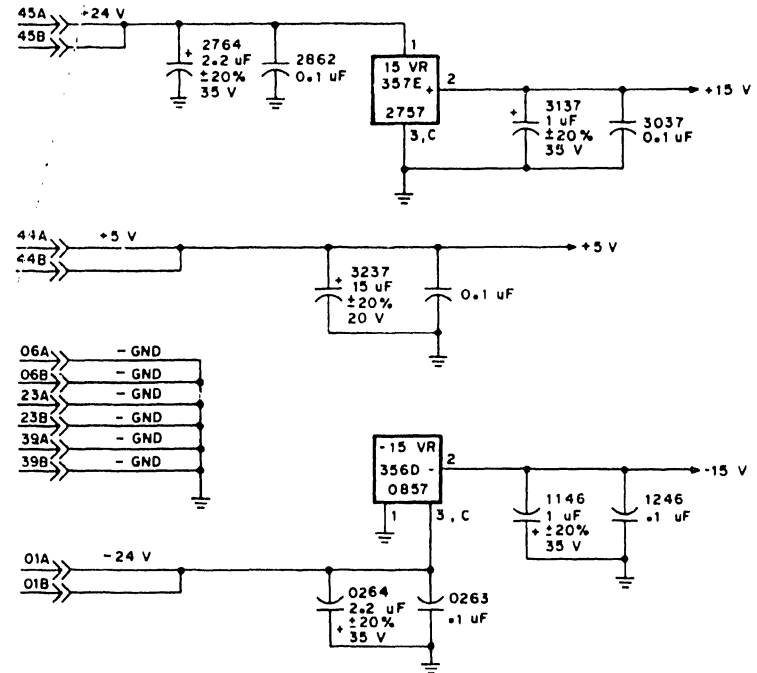
ELEMENT	LOCATION	OUTPUT PIN(S)
148L5	0335	13
339	1824	7
141L5	2724	12

UNUSED TRANSISTOR PACKS

LOCATION	PINS
1813	1,2,3,5,6,7,8,9,10

REVISIONS

REV.	EC	DESCRIPTION	DRAWN	DATE	CHK'D
A	PE23700	RELEASED			
B	PE61331B	NEW BD BLANK	CB	11-8-80	
C	PE61331B	ALHX - BLHX			
D	PE61281	OFFSET FIX			
E	PE61483	ADD FTU CAPABILITIES			
F	PE61228A	NEW BD BLANK			
G	PE61228B	E-PROM CHG, DLHX TO ELHX			
H	PE61340	GENERATES SEEK ERROR FOR CTS 89V D UP		12-15-81	
J	PE61734	IN FTU MODE, PREVENTS DRIVE FROM INTERRUPTING CONTROLLER	J5	2-23-81	
K	PE61804	IMPROVE CLOCK CKY	J5	2-23-81	
L	PE61881	HIGH FREQ NOISE FIX, ELHX TO FLHX	J5	2-23-81	
M	DH02180	LOW AMPLITUDE HEAD FIX	Dmf	1-20-82	
N	PE61642	CLARIFY DIAG	Dmf	1-20-82	
P	PE61777	AIDS SETUP OF L.T.C.A. CONVERTER	Dmf	1-20-82	
R	DH0222E	CORRECTION	Dmf	1-20-82	
S	DH02187	ADD TEST & DIAG INFO	Dmf	1-20-82	
T	DH02580	MINIMIZE SEEK ERRORS	CB	7-28-82	
U	DH0235M	CORRECTION			

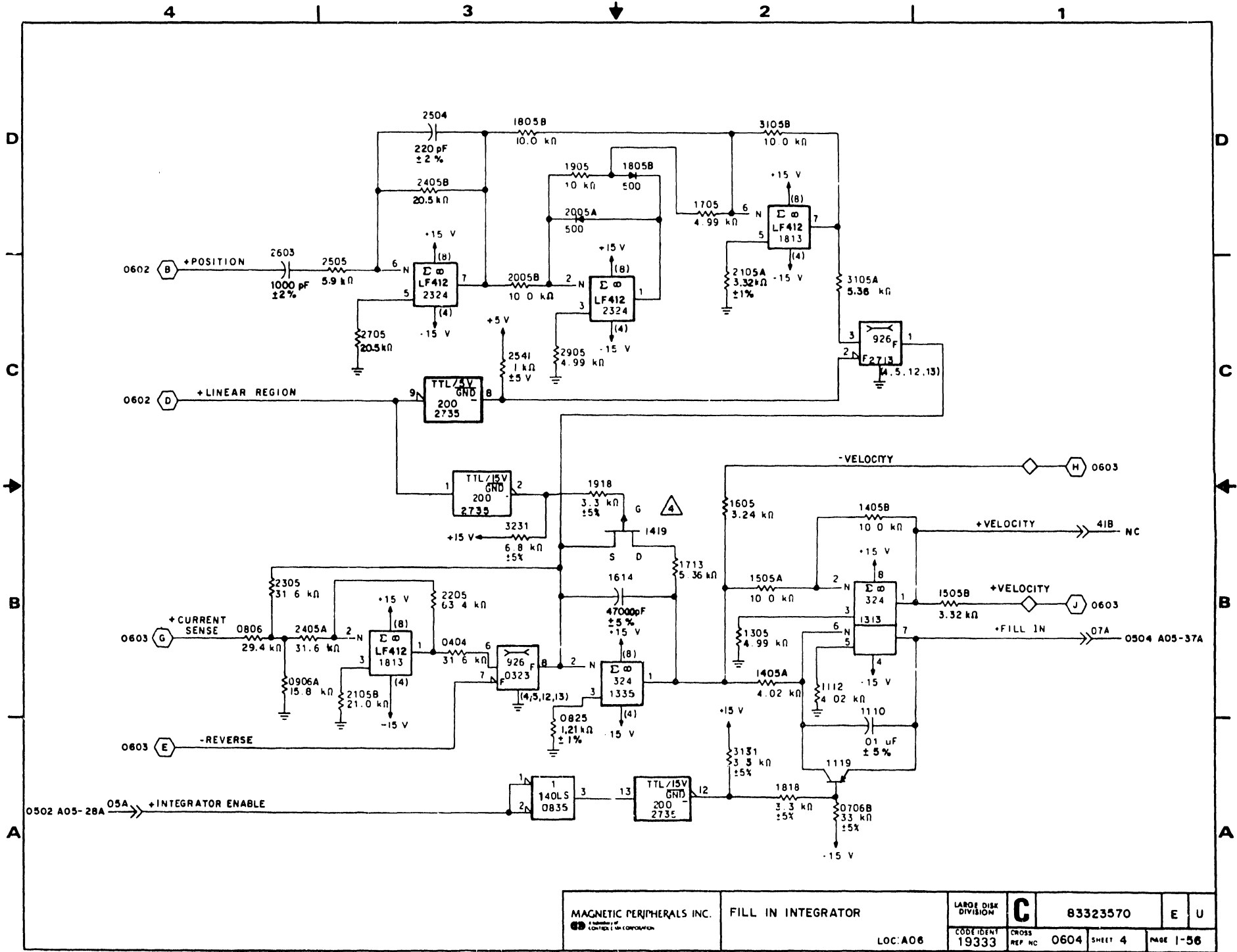


<table border="1"> <tr><td>DRAWN</td><td></td><td>60</td></tr> <tr><td>CHECKED</td><td></td><td></td></tr> <tr><td>ENG. WFO</td><td><i>W.S. R. 4/1/80</i></td><td></td></tr> <tr><td>DATE</td><td></td><td></td></tr> </table>	DRAWN		60	CHECKED			ENG. WFO	<i>W.S. R. 4/1/80</i>		DATE			MAGNETIC PERIPHERALS INC. <small>AN IBM COMPANY</small>	ANALOG SERVO DIAGRAMS TYPE: GLHX	LARGE DISK DIVISION <b>C</b>	83323570	E U
DRAWN		60															
CHECKED																	
ENG. WFO	<i>W.S. R. 4/1/80</i>																
DATE																	
CODE IDENT 19333	CROSS REF NO 0601	SHEET 1 of 6	PAGE 1-53	REF: 81200208													

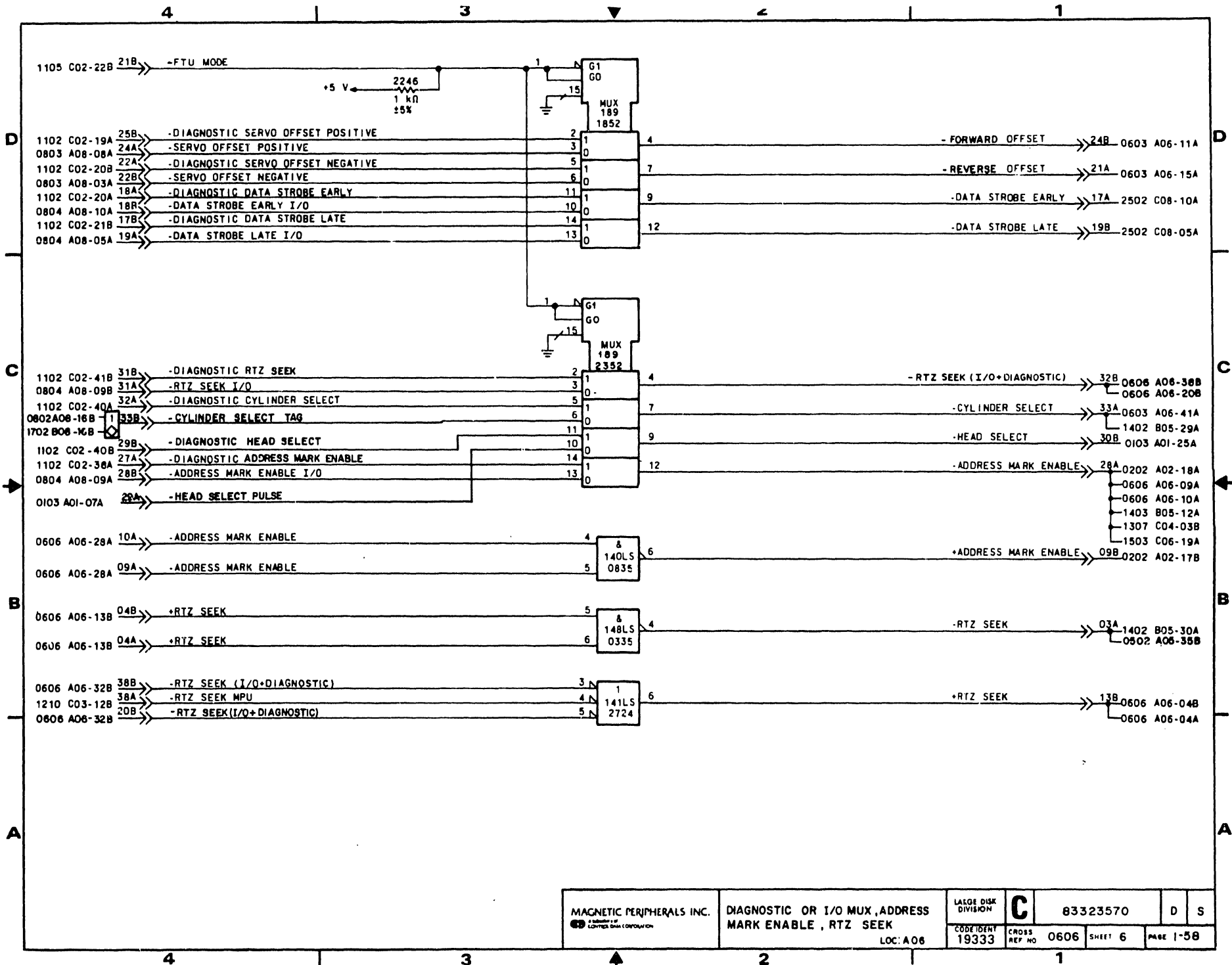












REVISION STATUS OF SHEETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A																	
B	B																			
C			C																	
D	D	D	D																	
E	E																			

REVISIONS

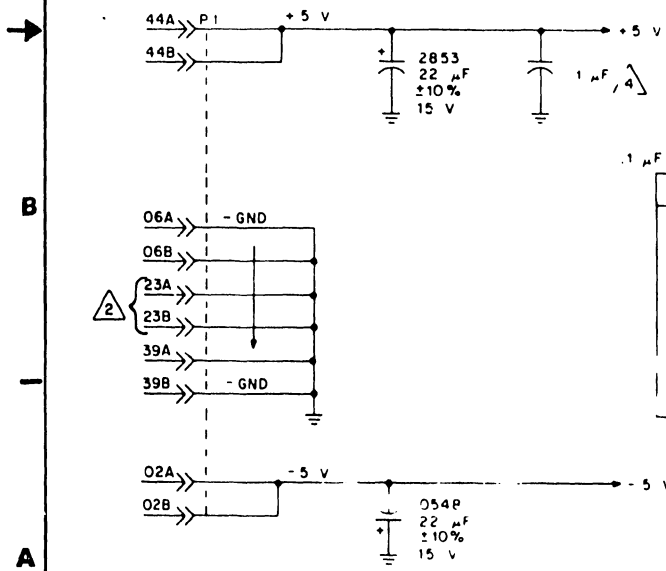
REV	ECO	DESCRIPTION	DRFT	DATE	CHK'D
PER1500		RELEASE			
B	PER1443	ADD FTU CAPABILITY	MF	9-29-80	
C	PER1734	INFTU MODE, PREVENTS DRIVE FROM INTERRUPTING CONTROLLER	JS	2-23-81	
D	PER1804	IMPROVE CLOCK CKT	JS	2-23-81	
E	DN02947	REMOVE DIODES	CB	7-27-8	

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
193	1842	5,12
146LS	2321	10
202LS	2821	6

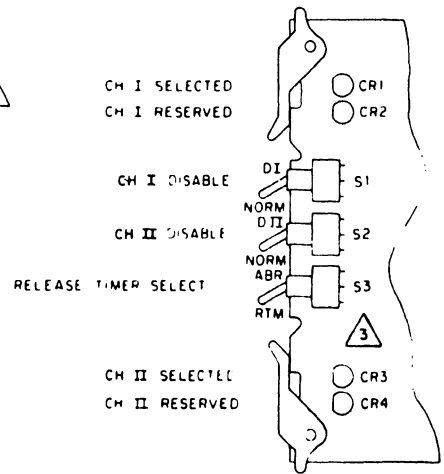
NOTES

- 1 UNUSUED LOGIC ELEMENT INPUT PINS ARE GROUNDED EXCEPT PINS 9 AND 10 OF 193 ARE OPEN.
- 2 ON SINGLE CHANNEL UNITS A07 IS REPLACED BY A JUMPER PLUG ON THE W/W SIDE OF THE BACKPANEL. THESE LINES ARE JUMPED TOGETHER  
 0704 A07 - 15B → 0704 A07 - 20B  
 0704 A07 - 17A → 0704 A07 - 18B  
 0701 A07 - 23B → 0702 A07 - 30B  
 0703 A07 - 30A → 0703 A07 - 31B  
 0701 A07 - 23A → 0703 A07 - 24B  
 0702 A07 - 32A → 0702 A07 - 34A
- 3 SWITCH POSITIONS ARE:  
 FOR S1 OR S2:  
 DI = DISABLE CHANNEL1 (DII FOR CHANNEL 2)  
 FOR S3:  
 ABR = ABSOLUTE RESERVE  
 RTM = RESERVE TIMEOUT
- 4 SEE TABLE FOR .1 μF CAPACITOR LOCATIONS



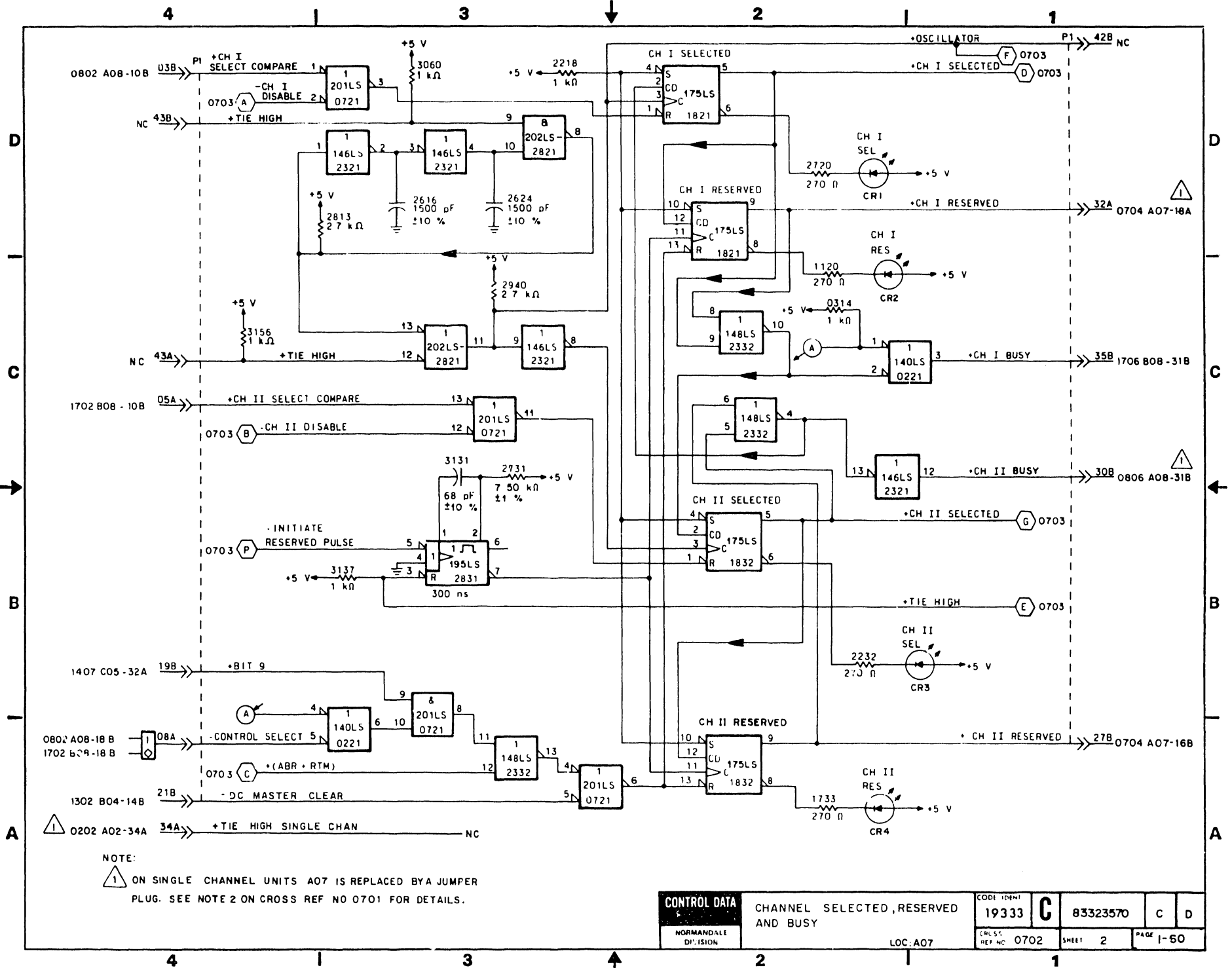
.1 μF FILTER CAPS

Location
+5 V
0121
1033
1042
1055
2110
2122
2133
2143
0154



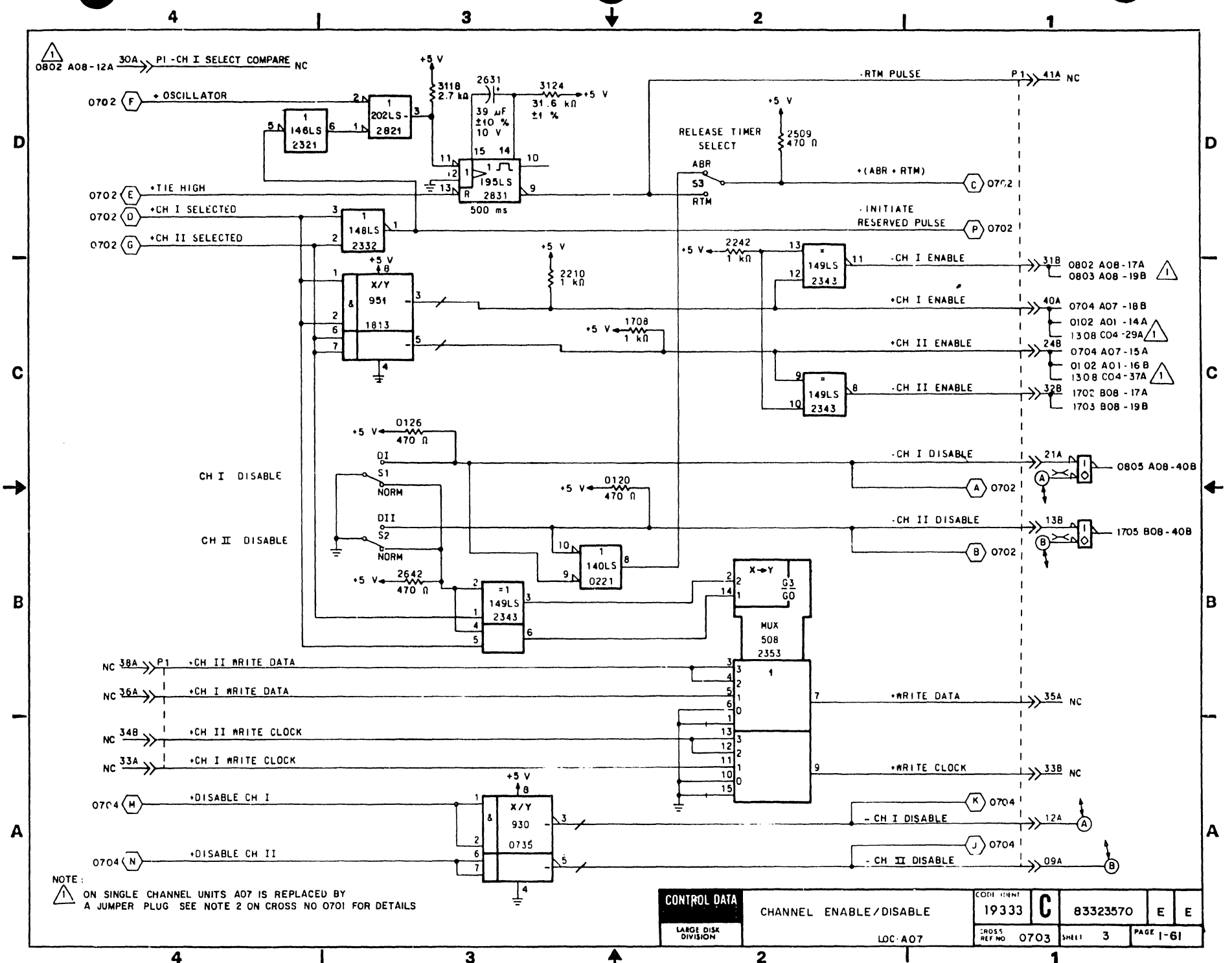
APPLICABLE ONLY TO DUAL CHANNEL UNITS 2

DESIGN	C. B. ...	DATE	5-1-80	CONTROL DATA	DUAL CHANNEL STEERING DIAGRAMS	CODE IDENT	19333	C	83323570	E	E
EX. NBR	...			LARGE DISK DIVISION	TYPE AFBX	CROSS REF NO	0701	SHEET	1 OF 4	PAGE	1-59



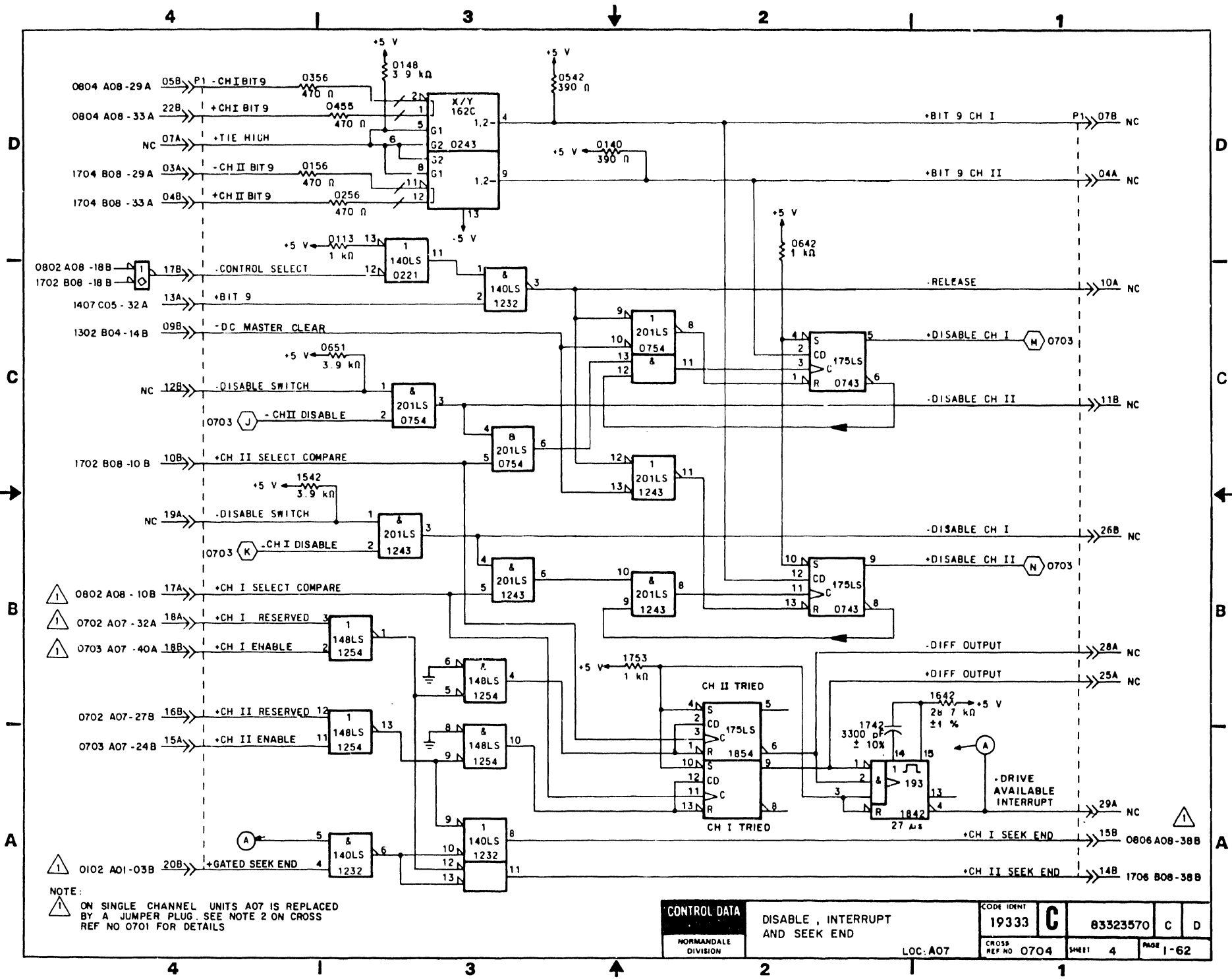
NOTE:  
 ⚠ ON SINGLE CHANNEL UNITS A07 IS REPLACED BY A JUMPER PLUG. SEE NOTE 2 ON CROSS REF NO 0701 FOR DETAILS.

CONTROL DATA NORMANDALE DIVISION	CHANNEL SELECTED, RESERVED AND BUSY		CODE 10441 19333	C	83323570	C	D
	LOC: A07		CLASS. REF. NO. 0702	SHEET 2	PAGE 1-50		



NOTE:  
 ON SINGLE CHANNEL UNITS A07 IS REPLACED BY  
 A JUMPER PLUG SEE NOTE 2 ON CROSS NO 0701 FOR DETAILS

CONTROL DATA LARGE DISK DIVISION	CHANNEL ENABLE/DISABLE		CODE IDENT 19333	C	83323570	E	E
	LOC. A07		CROSS REF NO 0703	SHEET 3	PAGE 1-61		



NOTE:  
 ⚠ ON SINGLE CHANNEL UNITS A07 IS REPLACED BY A JUMPER PLUG. SEE NOTE 2 ON CROSS REF NO 0701 FOR DETAILS

CONTROL DATA NORMANDEALE DIVISION	DISABLE, INTERRUPT AND SEEK END		CODE IDENT 19333	C	83523570	C	D
	LOC: A07		CROSS REF NO 0704	SHEET 4	PAGE 1-62		

REVISION STATUS OF SHEETS

I	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A	A															
B	B	B		B																
C		C		C																
D	D	D																		
E				E																
F	F	F	F	F	F															
G				G																
H	H																			
J	J																			
K	K	K																		

UNUSED RESISTOR PACKS

LOCATION	PINS
0264	4,7
1014	4,7,8
1026	6
1044	5,7,8
1054	3,7,8

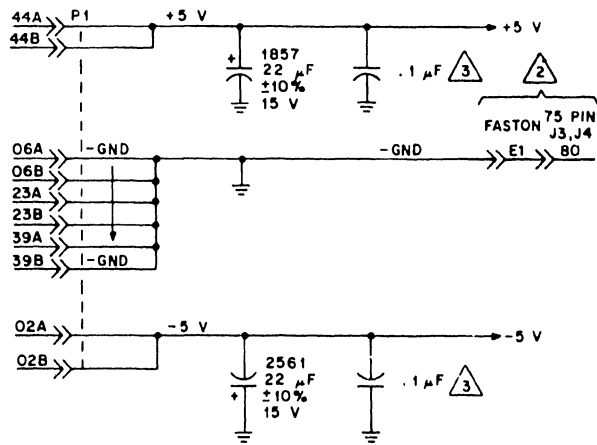
UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
175H	0228	5,6

REVISIONS					
REV	ECO	DESCRIPTION	DRPT	DATE	CHK'D
A	PE23000	RELEASED	CB	1-5-80	
B	PE61281	OFFSET FIX			
C	PE61483	ADD FTU CAPABILITY			
D	PE61558	ALLOWS FTU WRITE OPERATIONS	CB	11-20-80	
E	PE61540	GENERATES SEEK ERROR FOR CYLS 899-904	JS	2-23-81	
F	PE61727	ADDS INDEX & SECTOR TO B CABLE (BZTEI-J,K)	JS	2-23-81	
G	PE61804	IMPROVE CLOCK CRT	JS	2-23-81	
H	PE61823	CORRECTS LOGIC	JJ	6-17-81	
J	DH0247	DO TEST & DIAG INFO	DW	1-20-82	
K	DH02408	FIX SELECT TAB PROB, REDUCE NOISE; CMAX TO TMAX, DMAX TO UMAX	CB	7-27-82	

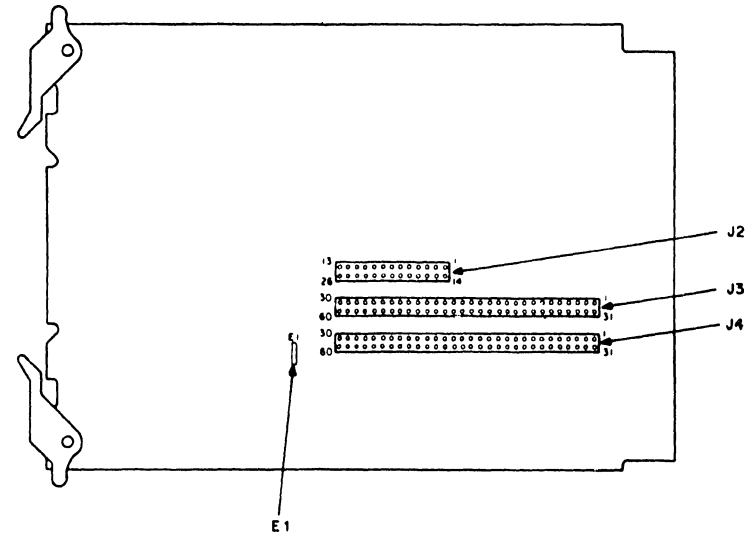
NOTES:

- 1 UNUSED LOGIC ELEMENT INPUT PINS ARE GROUNDED.
- 2 FLAT TO ROUND CABLE ADAPTER ACCESSORY.
- 3 SEE TABLE FOR .1μF CAPACITOR LOCATIONS



.1 μF FILTER CAPS

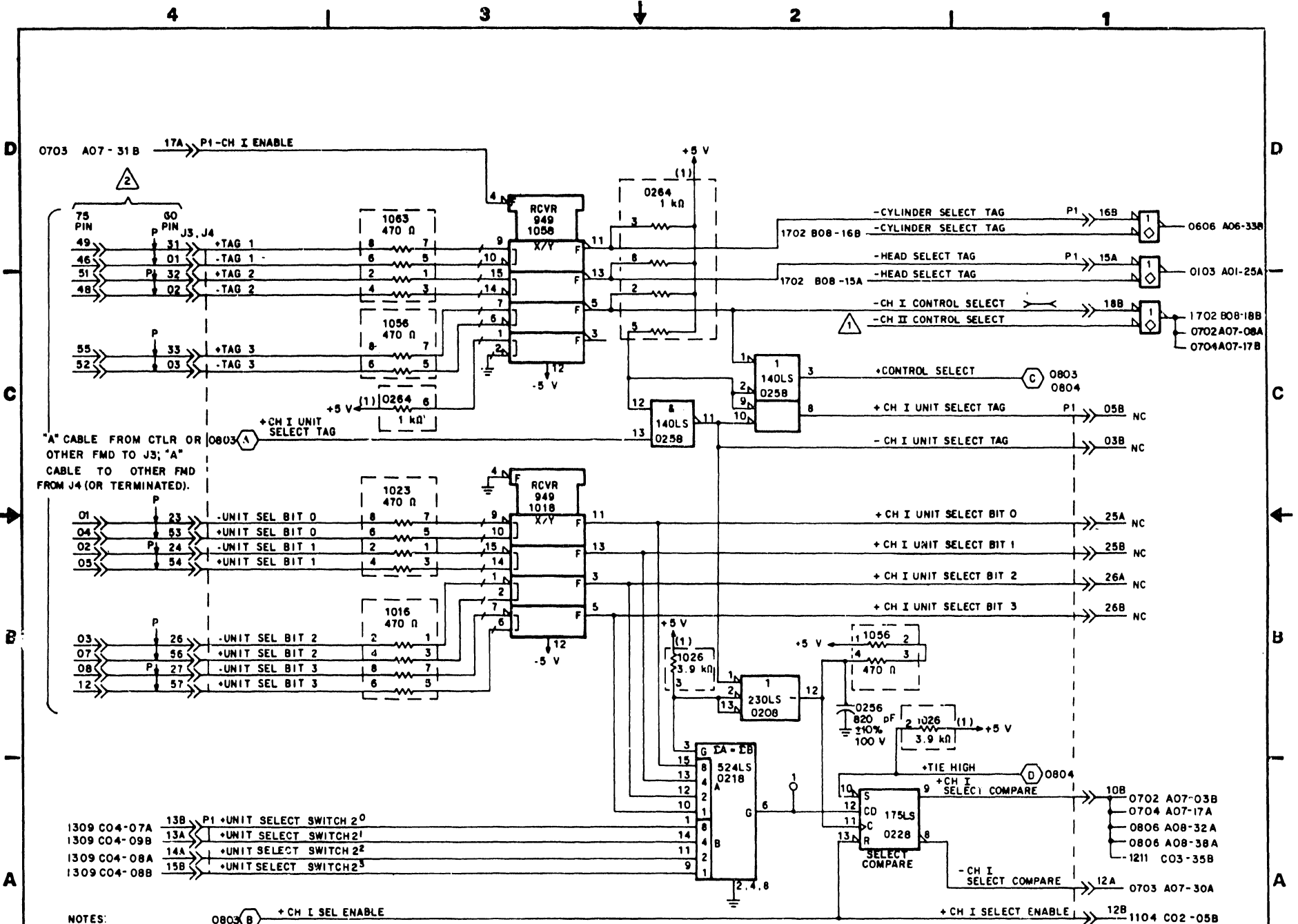
+5 V	-5 V
0214	1012
0226	1122
0235	1032
0245	1042
0255	1147
1015	1262
1025	2812
1035	2822
1145	2830
1155	2837
2814	2845
2823	2855
2831	
2838	
2846	
2854	



CFAX CARD APPLICABLE ONLY TO UNITS WITH INDEX AND SECTOR IN THE "A" CABLE  
 DFAX CARD APPLICABLE ONLY TO UNITS WITH INDEX AND SECTOR IN THE "B" CABLE

DRAWN	<i>C. Burr</i>	5-80	CONTROL DATA	CHANNEL I I/O	CODE IDENT	19333	C	83323570	E	K
CHECKED				DIAGRAMS(SERIES CODES 01-06)	CROSS REF NO	0801	SHEET	1 of 6	PAGE	1-63
ENGINEER	<i>W. J. ...</i>	4/29/80	LARGE DISK DIVISION	TYPE:TFAX/UFAX	LOC:A0B					
APPROVED										



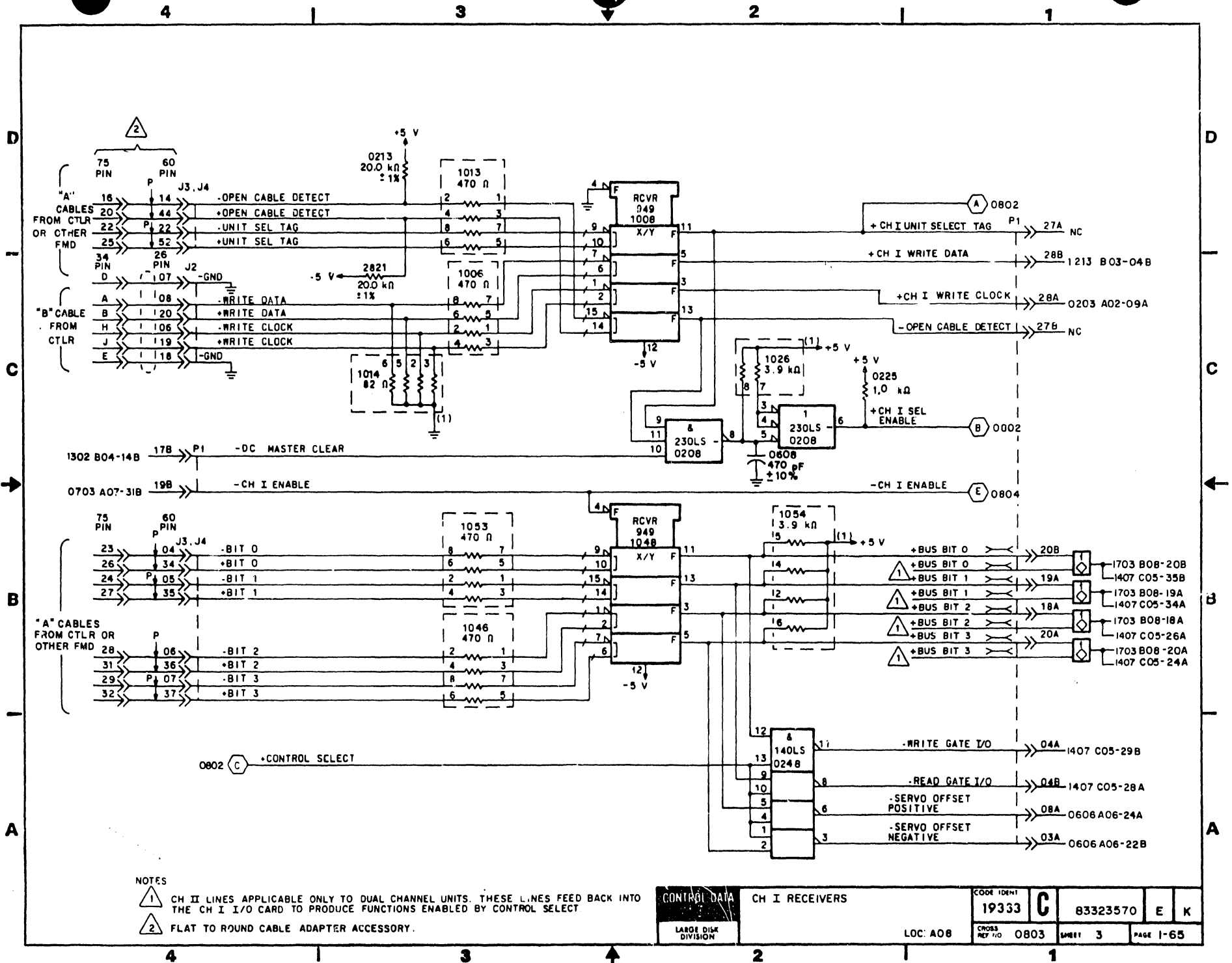


NOTES:

0803 B +CH I SEL ENABLE

- ① CH II LINE APPLICABLE ONLY TO DUAL CHANNEL UNITS. THIS LINE FEEDS BACK INTO THE CH I I/O CARD TO PRODUCE CONTROL SELECT.
- ② FLAT TO ROUND CABLE ADAPTER ACCESSORY.

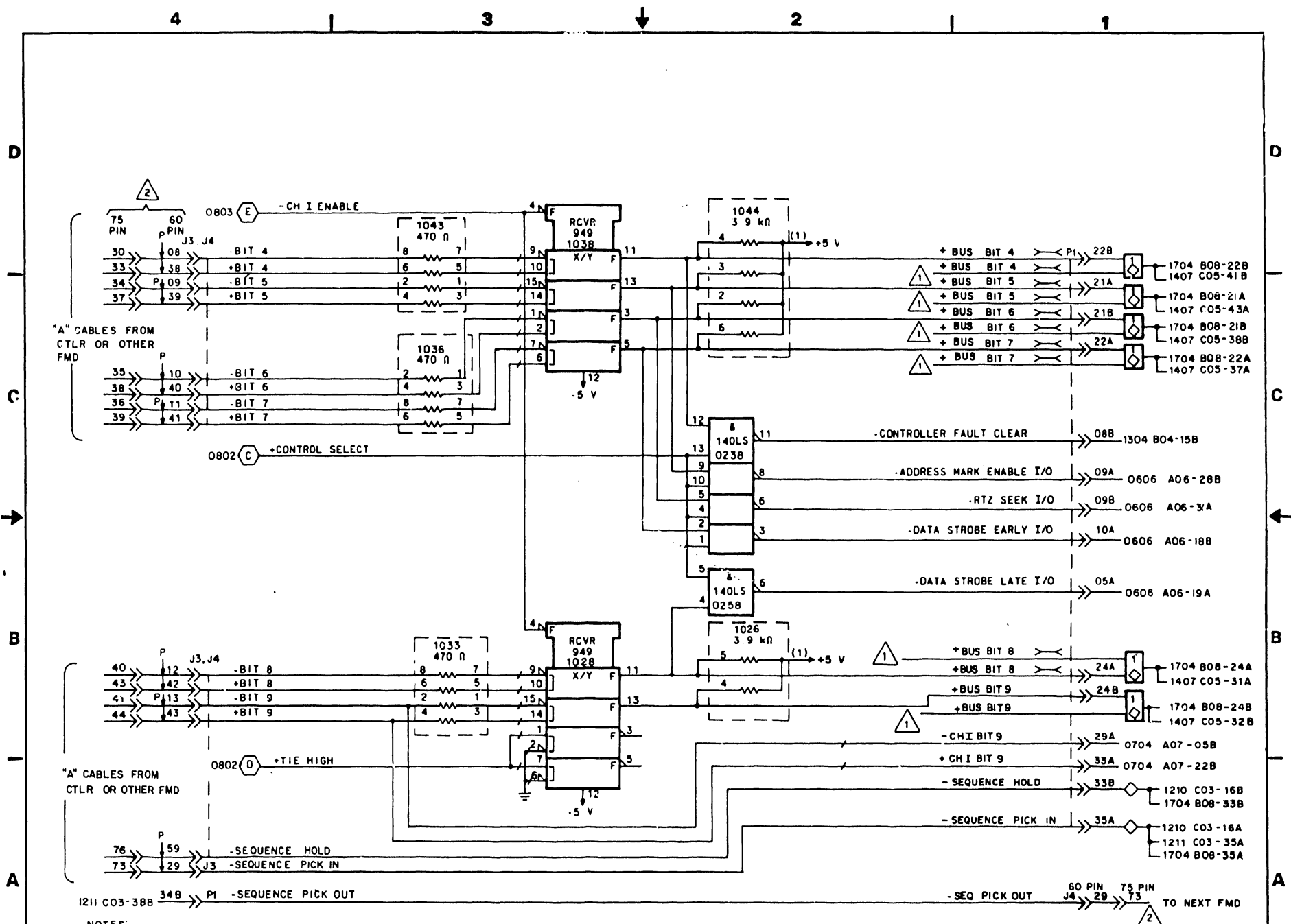
CONTROL DATA LARGE DISK DIVISION	CH I RECEIVERS AND UNIT SELECT		CODE IDENT 19333	G	9332357C	E	K
	LOC: A0B		CROSS REF NO 0802		SHEET 2	PAGE 1-64	



NOTES

- 1 CH II LINES APPLICABLE ONLY TO DUAL CHANNEL UNITS. THESE LINES FEED BACK INTO THE CH I I/O CARD TO PRODUCE FUNCTIONS ENABLED BY CONTROL SELECT
- 2 FLAT TO ROUND CABLE ADAPTER ACCESSORY.

CONTROL DATA LARGE DISK DIVISION	CH I RECEIVERS		CODE IDENT	C	83323570	E	K
			19333				
LOC: A08		CROSS REF NO	0803	SHEET	3	PAGE 1-65	

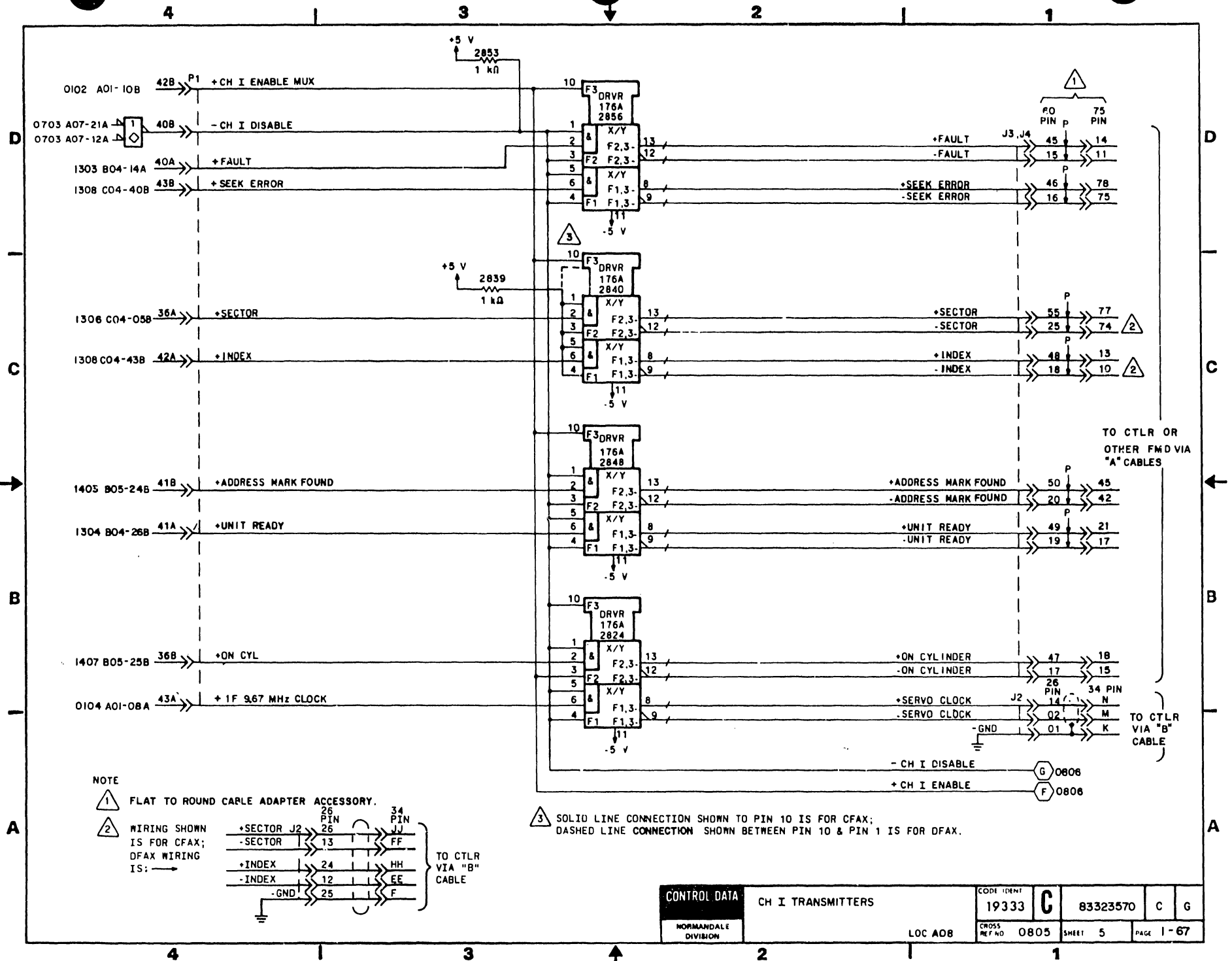


NOTES:

1 CH II LINES APPLICABLE ONLY TO DUAL CHANNEL UNITS. THESE LINES FEED BACK INTO THE CH I I/O CARD TO PRODUCE FUNCTIONS ENABLED BY CONTROL SELECT.

2 FLAT TO ROUND CABLE ADAPTER ACCESSORY.

CONTROL DATA	CH I RECEIVERS AND SEQ POWER		CODE IDENT	C	83323570	C	F
			19333				
NORMANDEALE DIVISION	LOC A08		0804	SHEET 4	PAGE 1-66		



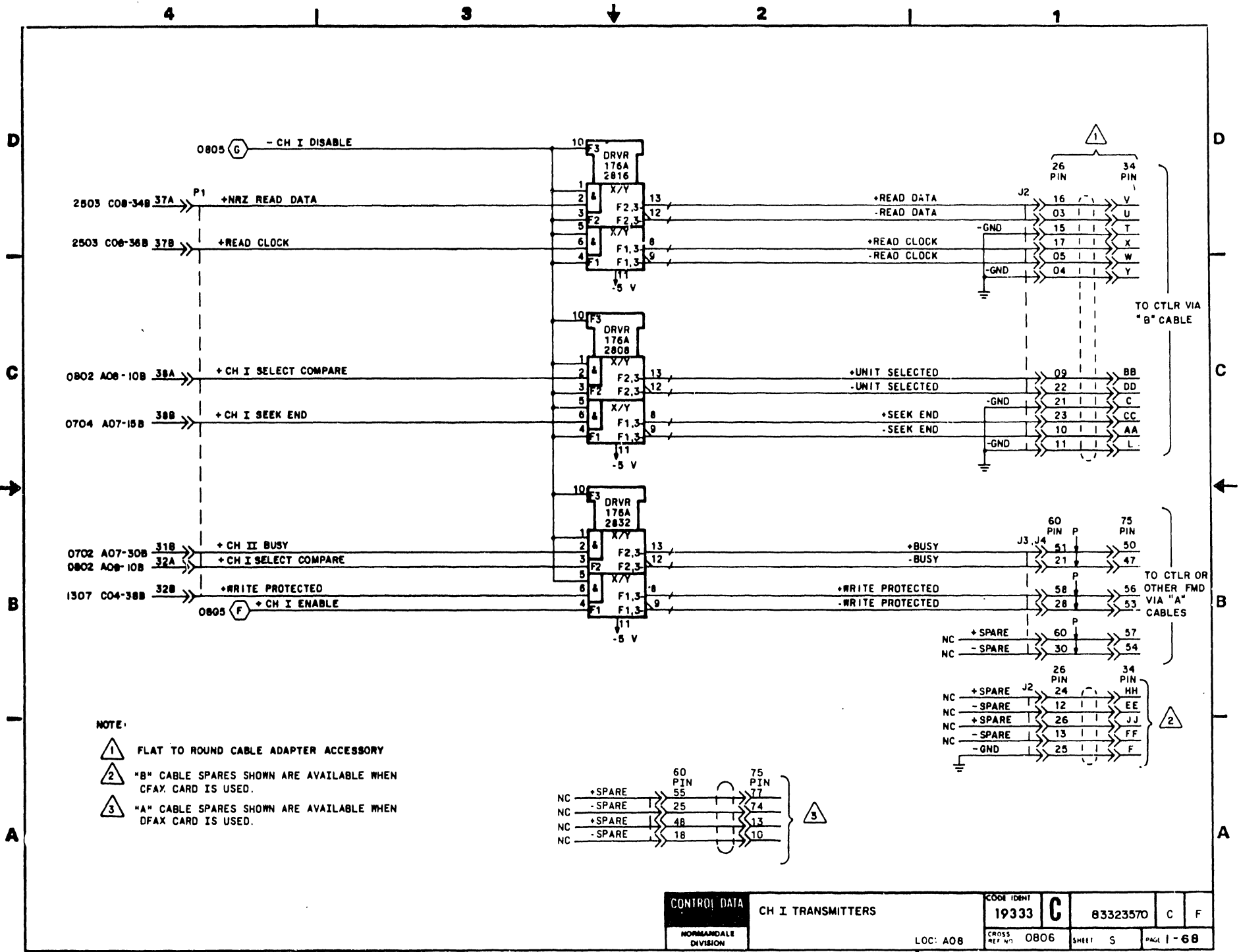
**CONTROL DATA**

CH I TRANSMITTERS

NORMANDEALE DIVISION

LOC A08

CODE IDENT	19333	C	83323570	C	G
CROSS REF NO	0805	SHEET	5	PAGE	1-67



REVISION STATUS OF SHEETS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	A	A	A	A															
B	B	B		B	B															
C		C																		
D	D																			
E	E	E																		

UNUSED RESISTOR PACKS

LOCATION	PINS
0264	4,7
1014	4,7,8
1026	6
1044	5,7,8
1054	3,7,8

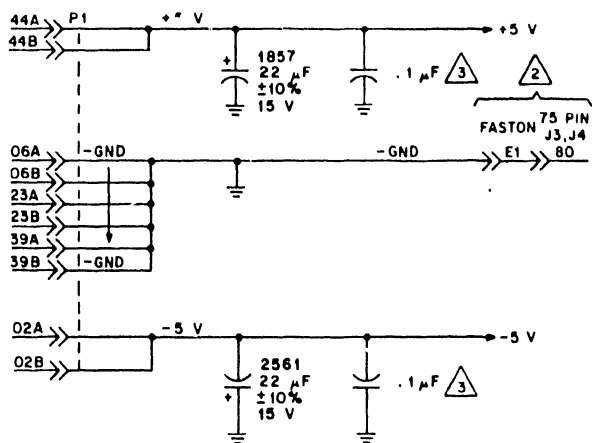
UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
175H	0228	5,6

REVISIONS					
REV	ECO	DESCRIPTION	DRFT	DATE	CHK'D
A	PE23040	RELEASE	CB	5-11-81	
B	PE617454	WFAK TO WFAK	DLM	120 82	
C	DM02226	CORRECTIONS	Dnt	120 82	
D	DM02187	ADD TEST & DIAG INFO	Dnt	120 82	
E	DM02408	FIX SELECT TAG PROB, REDUCE NOISE, WFAK TO WFAK	CB	7-27-88	

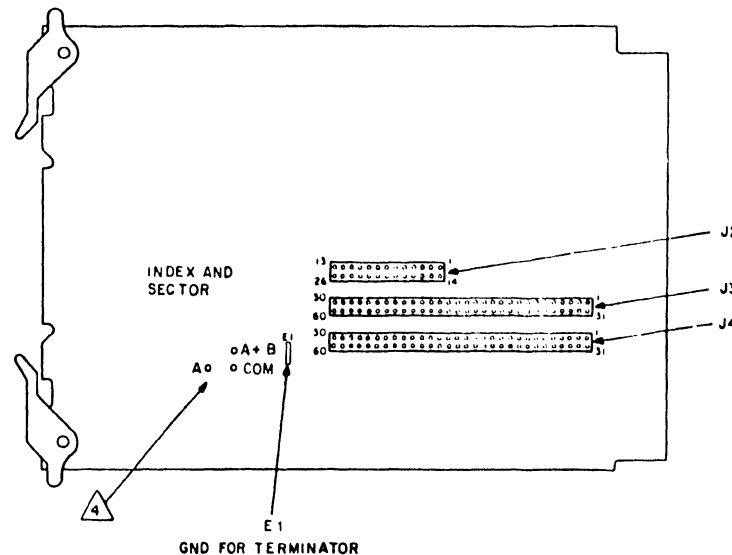
NOTES:

- 1 UNUSED LOGIC ELEMENT INPUT PINS ARE GROUNDED
- 2 FLAT TO ROUND CABLE ADAPTER ACCESSORY.
- 3 SEE TABLE FOR 1μF CAPACITOR LOCATIONS
- 4 INDEX/SECTOR DETERMINATION JUMPER

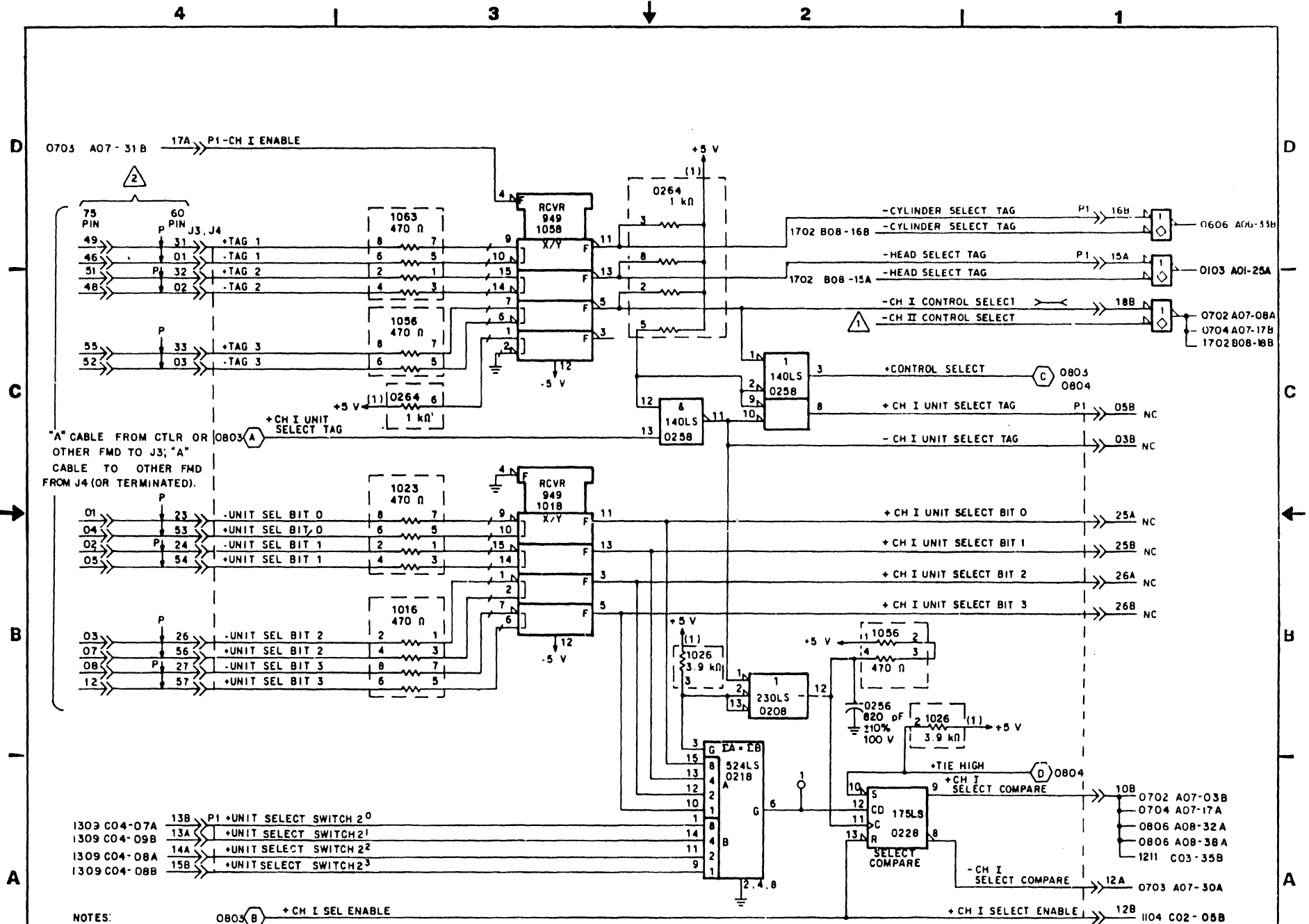


.1 μF FILTER CAPS

+5 V	-5 V
0214	1012
0226	1122
0235	1032
0245	1042
0255	1147
1015	1262
1025	2812
1035	2822
1145	2830
1155	2837
2814	2845
2823	2855
2831	
2838	
2846	
2854	



DRAWN	01780	CONTROL DATA	CHANNEL I I/O	CODE IDENT	19333	83323570	E	E
CHECKED		LARGE DISK DIVISION	DIAGRAMS (SC 07 AND ABOVE)	CROSS REF NO	0801	SHEET 1 of 6	PAGE 1-68.1	
ENGINEER		TYPE WFAK	LOC: BOB					
APPROVED								



NOTES:

ⓐ + CH I SEL ENABLE

ⓑ CH II LINE APPLICABLE ONLY TO DUAL CHANNEL UNITS. THIS LINE FEEDS BACK INTO THE CH I I/O CARD TO PRODUCE CONTROL SELECT.

ⓒ FLAT TO ROUND CABLE ADAPTER ACCESSORY.

CONTROL DATA

CH I RECEIVERS AND  
UNIT SELECT

CODE IDENT

19333

C

83323570

E

E

CROSS REF NO

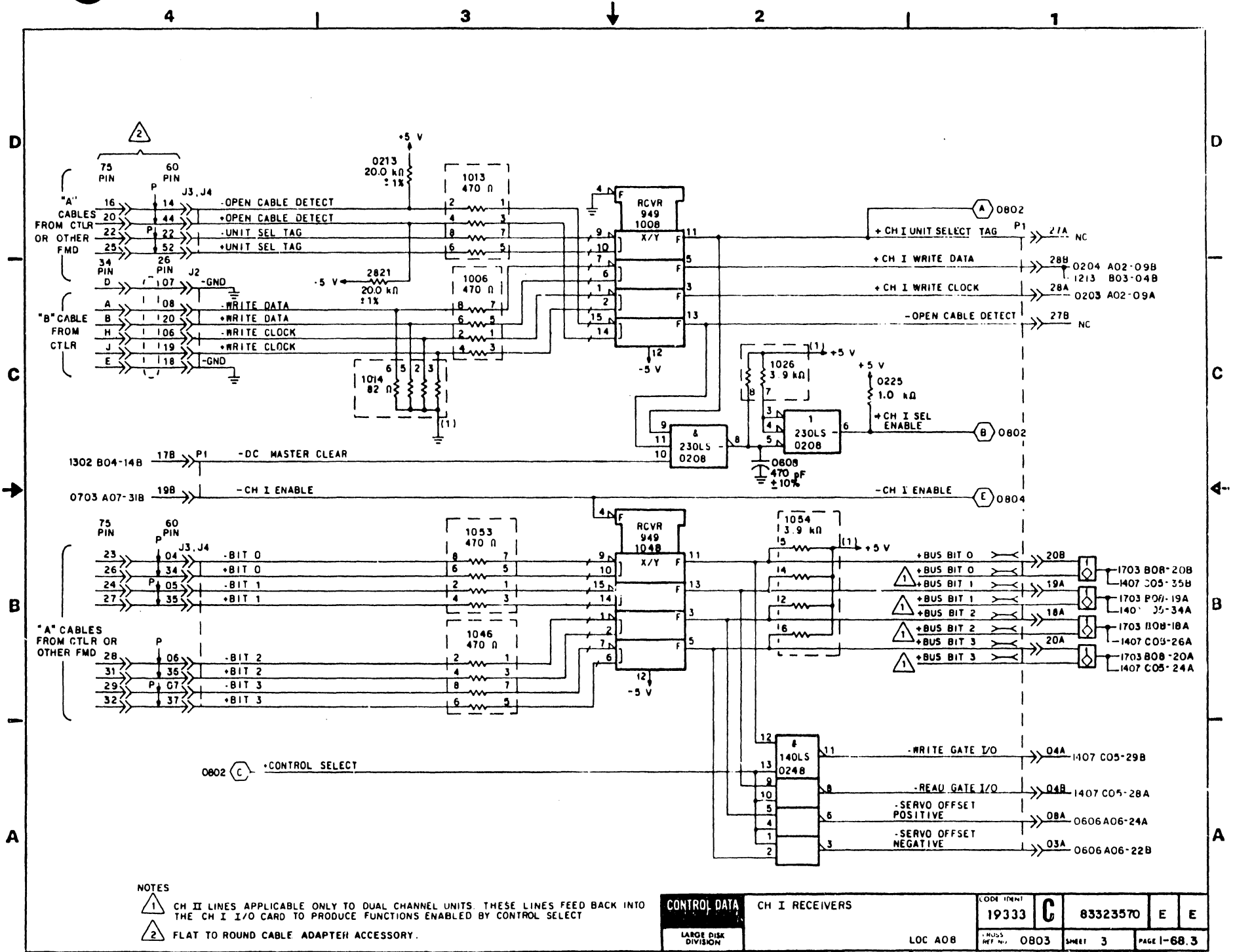
0802

SHEET 2

PAGE 1-68.2

LOC: A08

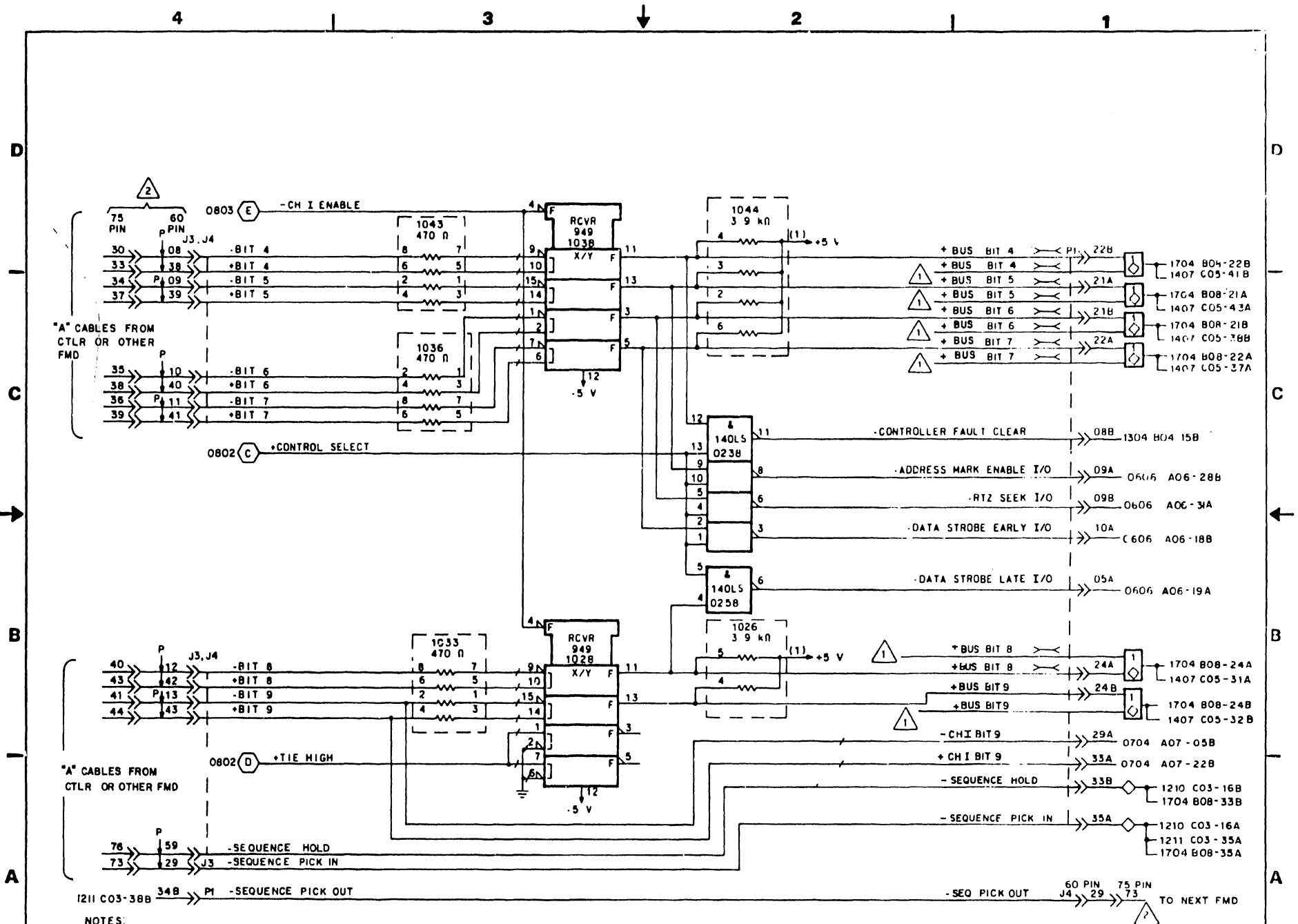
LARGE DISK  
DIVISION



NOTES  
 1 CH II LINES APPLICABLE ONLY TO DUAL CHANNEL UNITS. THESE LINES FEED BACK INTO THE CH I I/O CARD TO PRODUCE FUNCTIONS ENABLED BY CONTROL SELECT  
 2 FLAT TO ROUND CABLE ADAPTER ACCESSORY.

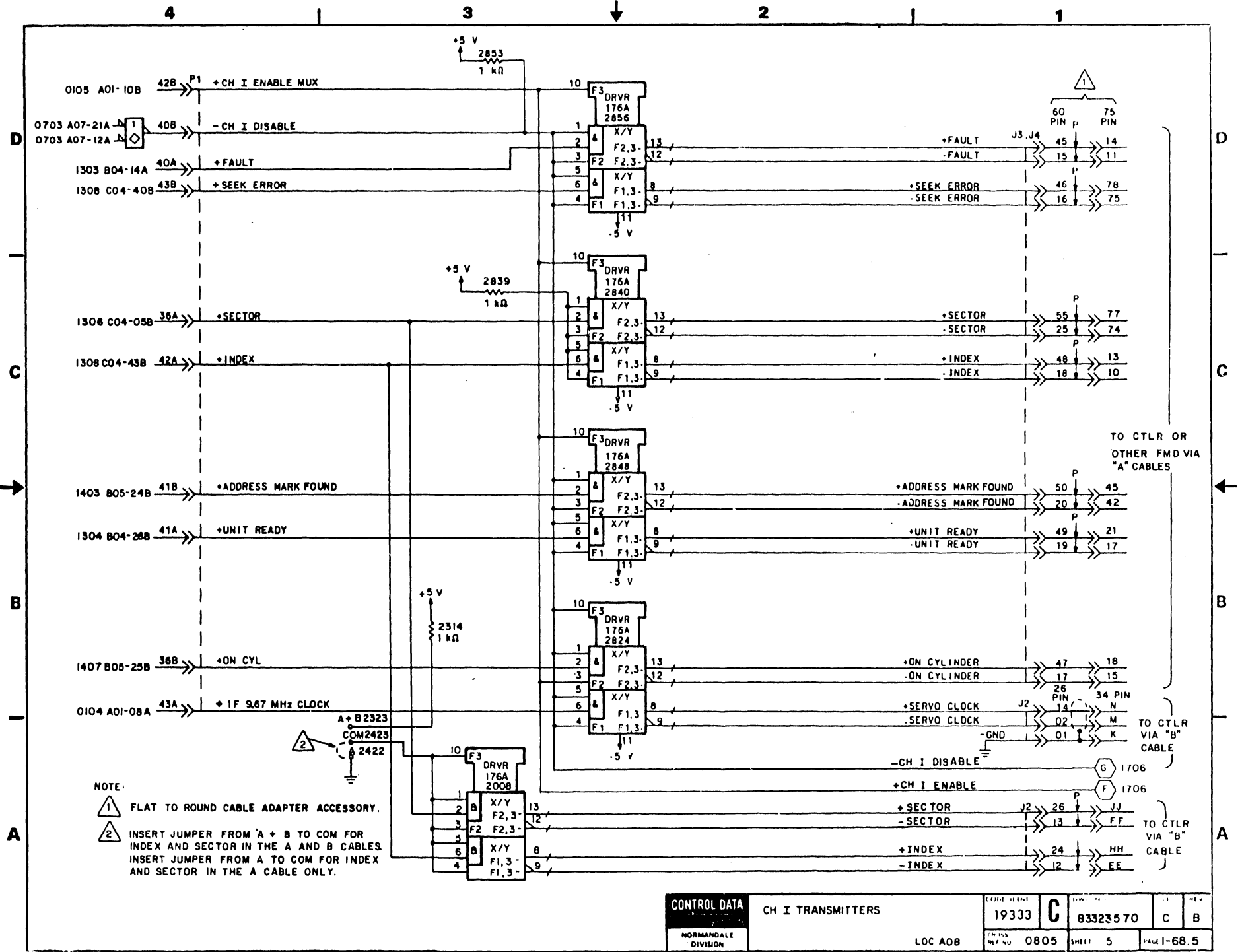
CONTROL DATA		CH I RECEIVERS		CODE IDENT	C	83323570	E	E
LARGE DISK DIVISION		LOC A08		19333				

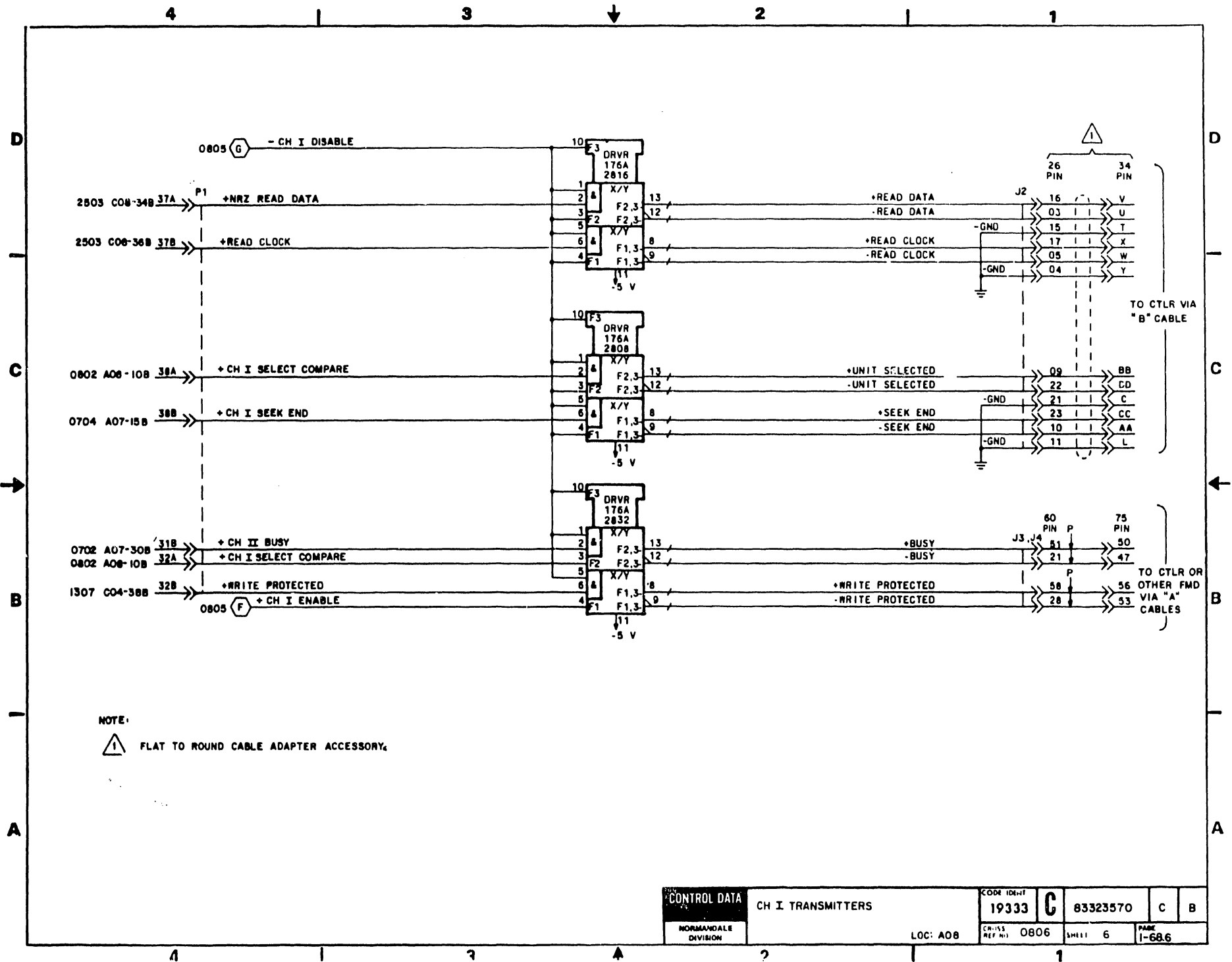




NOTES:  
 1 CH II LINES APPLICABLE ONLY TO DUAL CHANNEL UNITS. THESE LINES FEED BACK INTO THE CH I I/O CARD TO PRODUCE FUNCTIONS ENABLED BY CONTROL SELECT.  
 2 FLAT TO ROUND CABLE ADAPTER ACCESSORY.

<b>CONTROL DATA</b>		CH I RECEIVERS AND SEQ POWER		CODE IDENT	C	DWG NO	83323570	CC	REV
NORMANDEALE DIVISION		LOC A0B		19333	C	83323570	C	A	
				O804	SHEET	4	-REV- 1-68.4		





NOTE:  
 FLAT TO ROUND CABLE ADAPTER ACCESSORY.

CONTROL DATA NORMANDEALE DIVISION	CH I TRANSMITTERS	CODE 104-#	C	83323570	C	B
		19333				
LOC: A08	CR-153 REF NO: 0806	SHEET 6	PAGE 1-68.6			

REVISION STATUS OF SHEETS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A																			
B	B																			
C	C																			
D	D																			
E	E																			
F	F																			
G	G																			
H	H																			
J	J																			
K	K																			

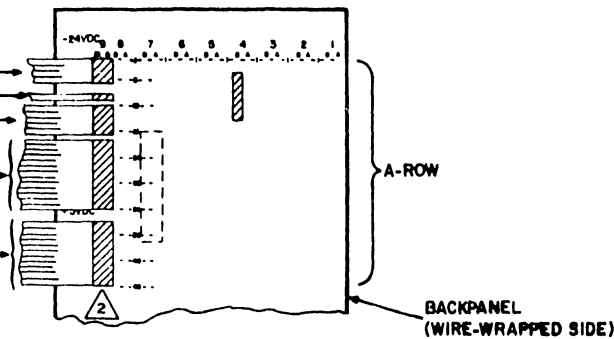
REVISIONS					
REV.	ECO	DESCRIPTION	DRFT	DATE	CHK D
A	PE23000	RELEASED			
B	PE61488	GROUNDING CHANGE	MF	9-18-80	
C	PE61483	ADD FTU CAPABILITIES	MF	"	
D	PE61728	LOGIC DIAGRAM UPDATE	CB	11-20-80	
E	PE61831	ADD LOCK TO DATA SIGNAL	DPS	6-3-81	(11.1)
F	PE61835	ADD SHIELDED CABLE	DPS	6-3-81	(11.1)
G	PE61920	CORRECT DIAGRAMS	DPS	6-3-81	(11.1)
H	DH02082	FAULTY ERROR FIX	Dwt	1-20-82	
J	DH02228	CORRECTIONS	Dwt	1-20-82	
K	DH02187	ADD TEST & DIAG WFO	Dwt	1-20-82	

NOTES:

- ① DENOTES THAT PIN IS CONNECTED TO BACKPANEL GROUND.
- ② LABELS ON CONNECTORS SHOW BACKPANEL PINS WHICH THE CONNECTORS COVER.
- ③ \* AN ASTERISK DENOTES THAT A WIRE WRAP PIN HAS BEEN OMITTED AT THAT POINT TO ESTABLISH PROPER KEYING OF CONNECTOR.

TO/FROM:  
SENSE AMP, POWER AMP

- DC CIRCUIT BREAKERS
- AC POWER DISTRIBUTION
- DRIVE MOTOR & CONTROL
- FRAME WIRING
- OPERATOR PANEL
- POWER SUPPLY
- DIAGNOSTIC INTERFACE BOARD
- TEST & DIAGNOSTIC CONTROL PANEL



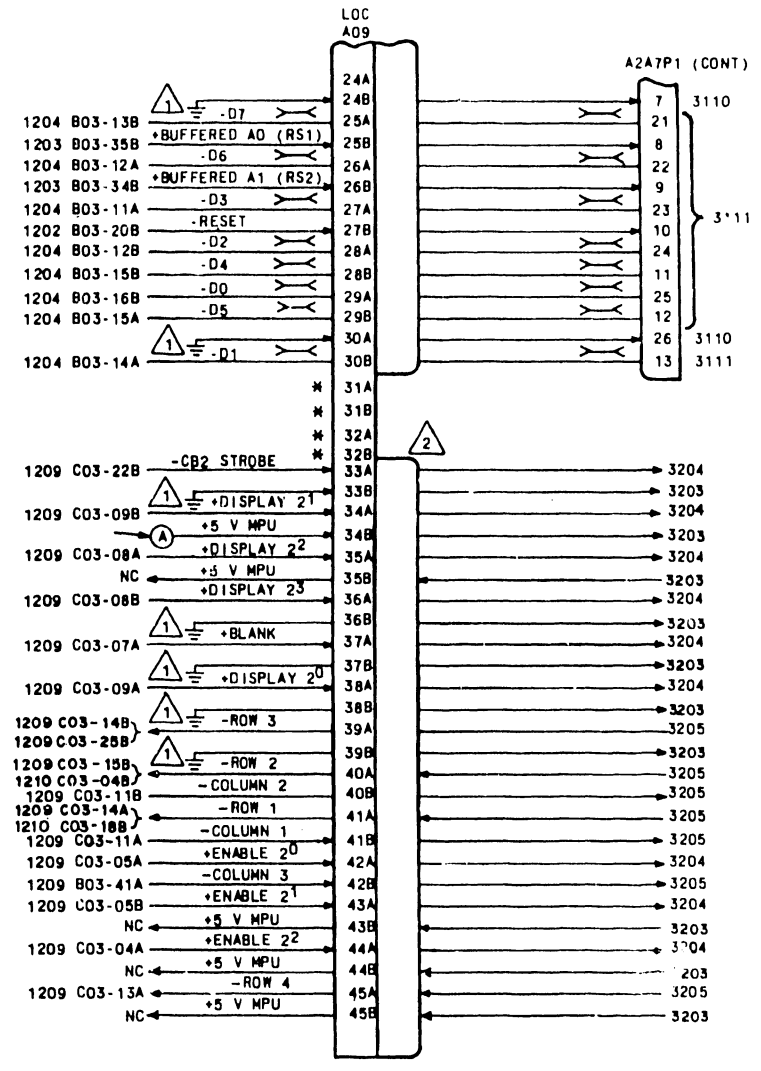
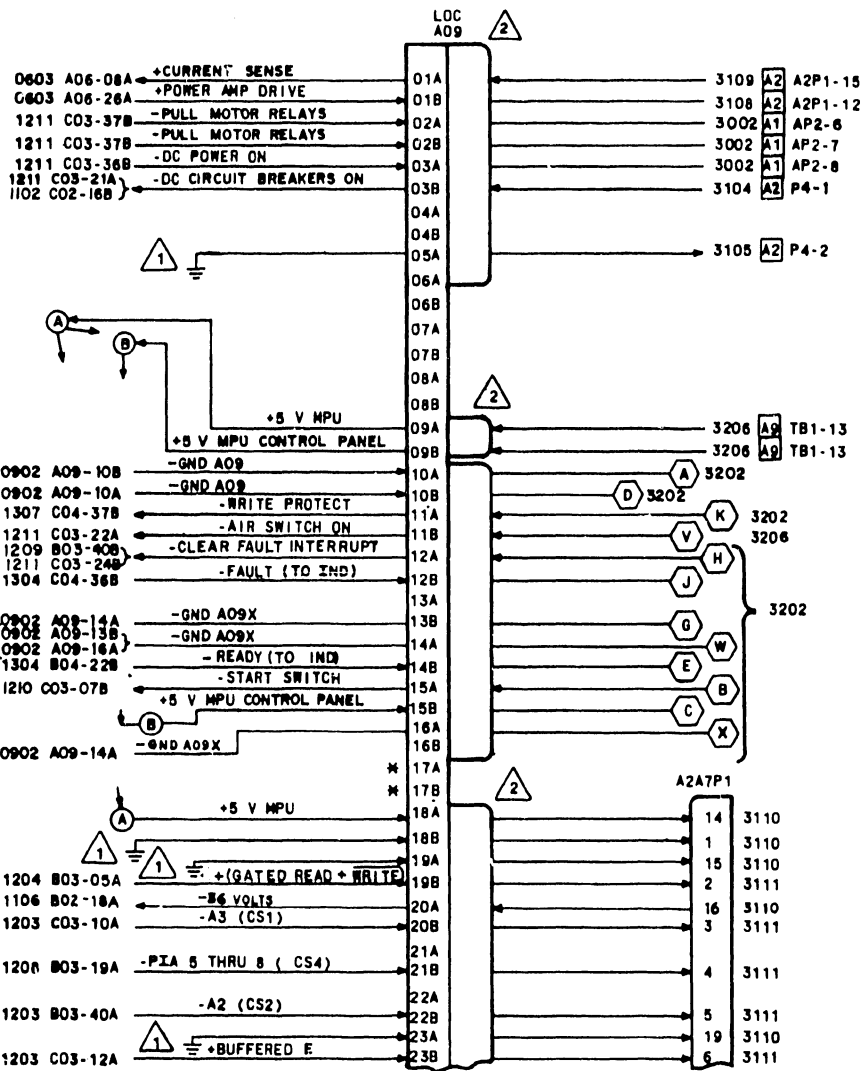
DRAWN	CHECKED	ENGINEER	APPROVED	MAGNETIC FERROPERALS INC. A Division of General Electric Company	A-ROW LOGIC CHASSIS TIE POINTS DIAGRAMS	NORMANDALE OPERATIONS <b>C</b>	83323570	D	K
CODE IDENT 19333	CROSS REF. NO 0901	SHEET 1 of 2	PAGE 1-69						

BACKPANEL WIRING RIBBON CABLING

BACKPANEL WIRING RIBBON CABLING

D  
C  
B  
A

D  
C  
B  
A

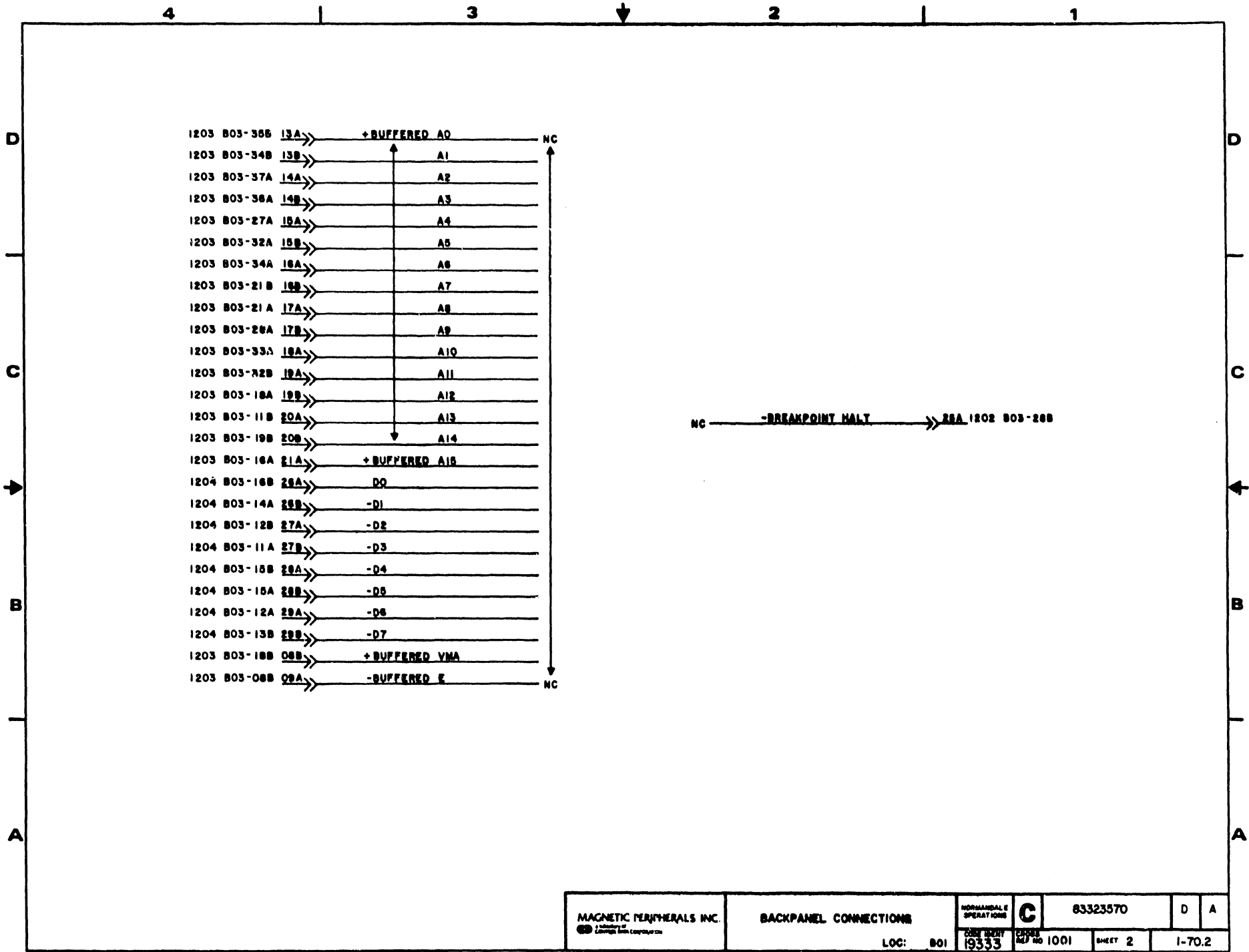


NOTES:  
 \* WIRE WRAP POSTS OMITTED AT THESE POINTS TO ESTABLISH PROPER KEYING OF CONNECTOR.  
 1 DENOTES BACKPANEL GROUND.  
 2 ALL BACKPANEL CONNECTORS ARE LABELLED PA09; HOWEVER, THOSE LABELS ALSO SHOW BACKPANEL PINS WHICH THE CONNECTORS COVER.

CONTINUED NEXT COL.

MAGNETIC PERIPHERALS INC. A Division of General Electric Company	A - ROW LOGIC CHASSIS TIE POINTS		NORMANDEALE OPERATIONS	C 83323570	D	K
	LOC: A09	CODE IDENT 19333	CROSS REF NO 0902	SHEET 2	PAGE 1-70	





4 | | | 3 | | | 2 | | | 1

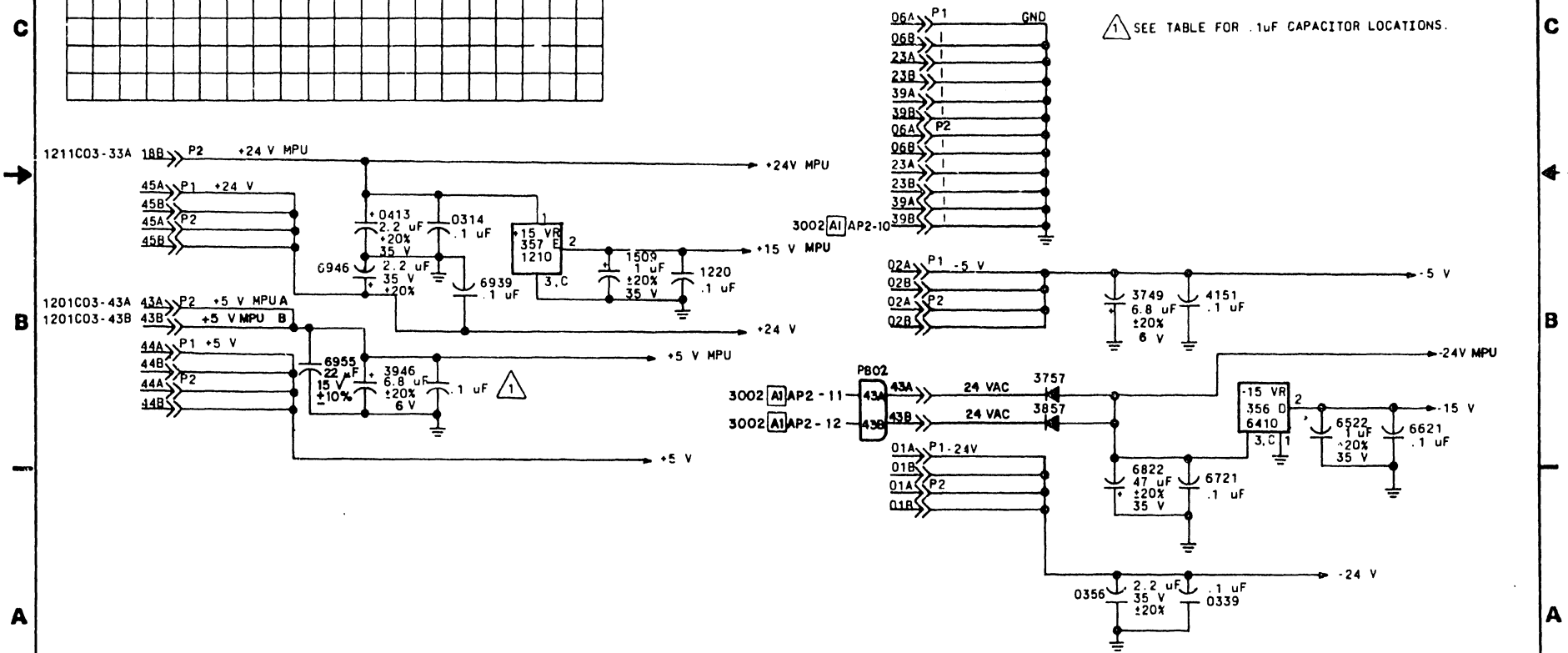
REVISION STATUS OF SHEETS																				
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A	A	A	A	A	A	A	A													
B	B	B	B	B	B	B	B													
C			C	C																
D	D																			
E			E	E	E	E														
F	F		F	F																
G	G			G	G															
H			H		H															
J				J																
K						K														
L				L																

FILTER CAPS <sup>1</sup>	
.1 uF	
+5 V MPU	
2647	3847
2047	4948
1447	5948
0847	5922
0432	5322
3247	4722

UNUSED LOGIC ELEMENTS		
ELEMENTS	LOCATION	OUTPUT PIN
MC1413	4308	10,11,12

REVISIONS					
REV	ECO	DESCRIPTION	DWFT	DATE	CHKD
A	PE23000	RELEASED	TH		
B	PE61483	ADD FTU CAPABILITIES	TH	8-3-80	
C	PE69008	ALLOWS FTU WRITE OPERATION	CB	4-20-80	
D	PE67128	LOGIC DIAGRAM UPDATE			
E	PE61734	IN FTU MODE, PREVENTS DRIVE FROM INTERRUPTING CONTROLLER	CB	4-15-80	
F	PE61804	IMPROVE CLOCK CKT	CB	4-19-81	
G	DHO2092	FAULTY ERROR FIX, BLFX TO CLFX	DwT	1-21-82	
H	DHO2187	ADD TEST & DIAG INFO, CLFX TO DLFX	DwT	1-21-82	
J	DHO2048	CORRECTIONS	DwT	1-21-82	
K	DHO2353	REDUCE NOISE-INCREASE READ DATA MARGINS DLFX TO PLFX	CB	7-28-82	
L	DHO2687	CARD IMPROVEMENT FLFX TO HLFX	CB	7-28-82	

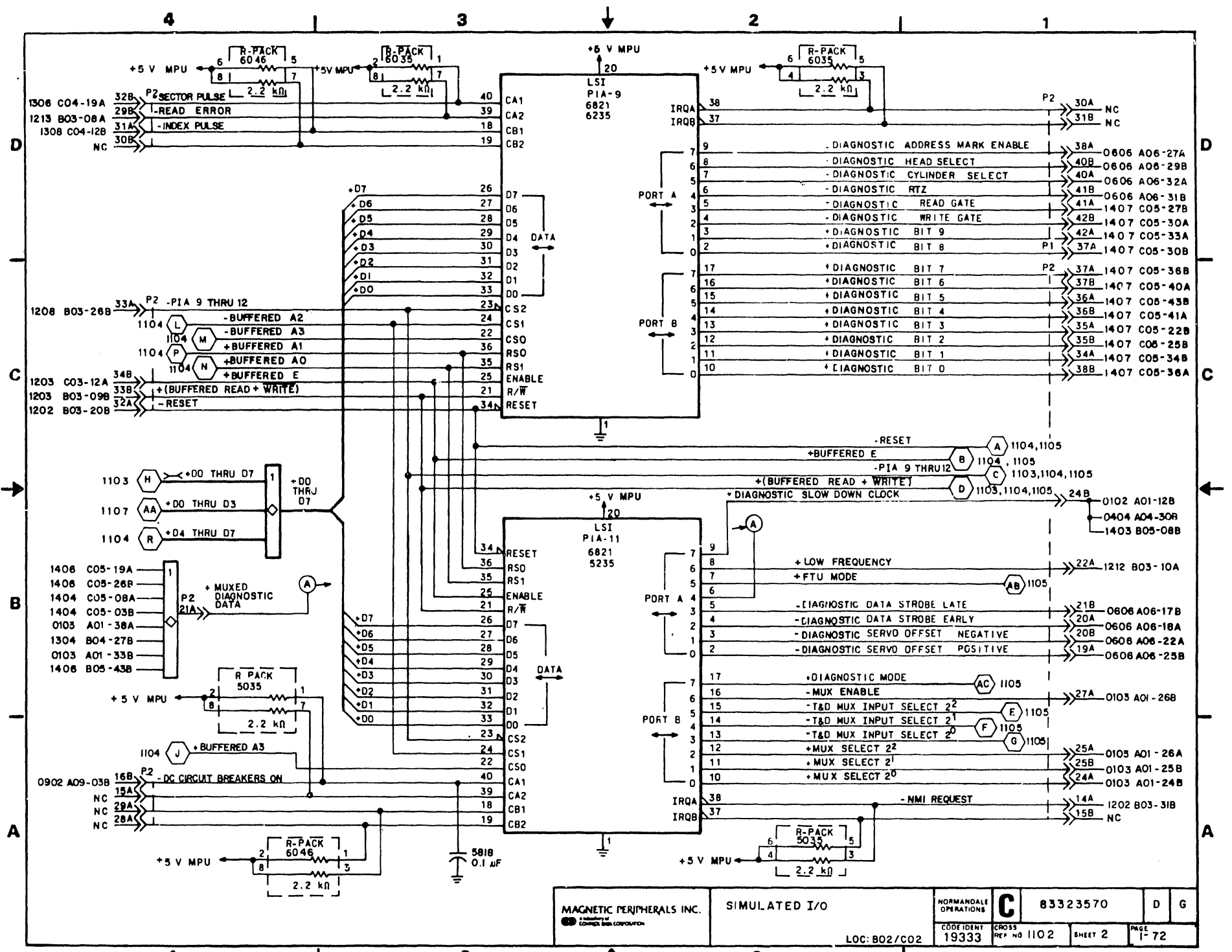
NOTES:  
<sup>1</sup> SEE TABLE FOR .1uF CAPACITOR LOCATIONS.

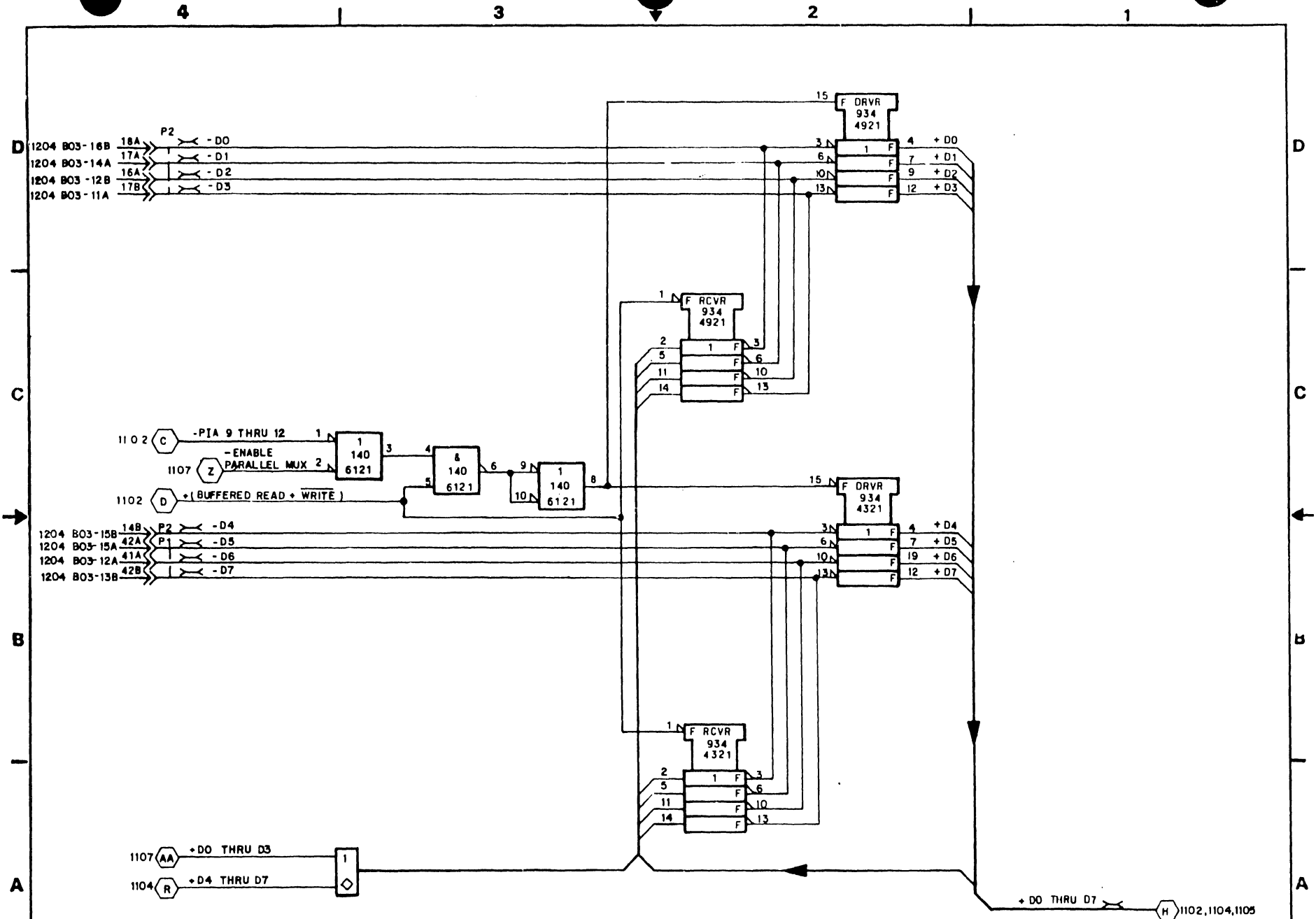


DRAWN	T. J. ...	DATE	6/19/80	MAGNETIC PERIPHERALS INC. <small>a subsidiary of</small> CONTROL DATA CORPORATION	TEST AND DIAGNOSTIC INTERFACE DIAGRAMS TYPE:HLFX	LARGE DISK DIVISION	C	83323570	E	L
CHECKED										
ENGINEER	A. ...									
APPROVED										
CODE IDENT	19333	CROSS REF NO	1101	SHEET	1 of 7	PAGE	1-71	REF: 81200210 1-BY FMD		

4 | | | 3 | | | 2 | | | 1

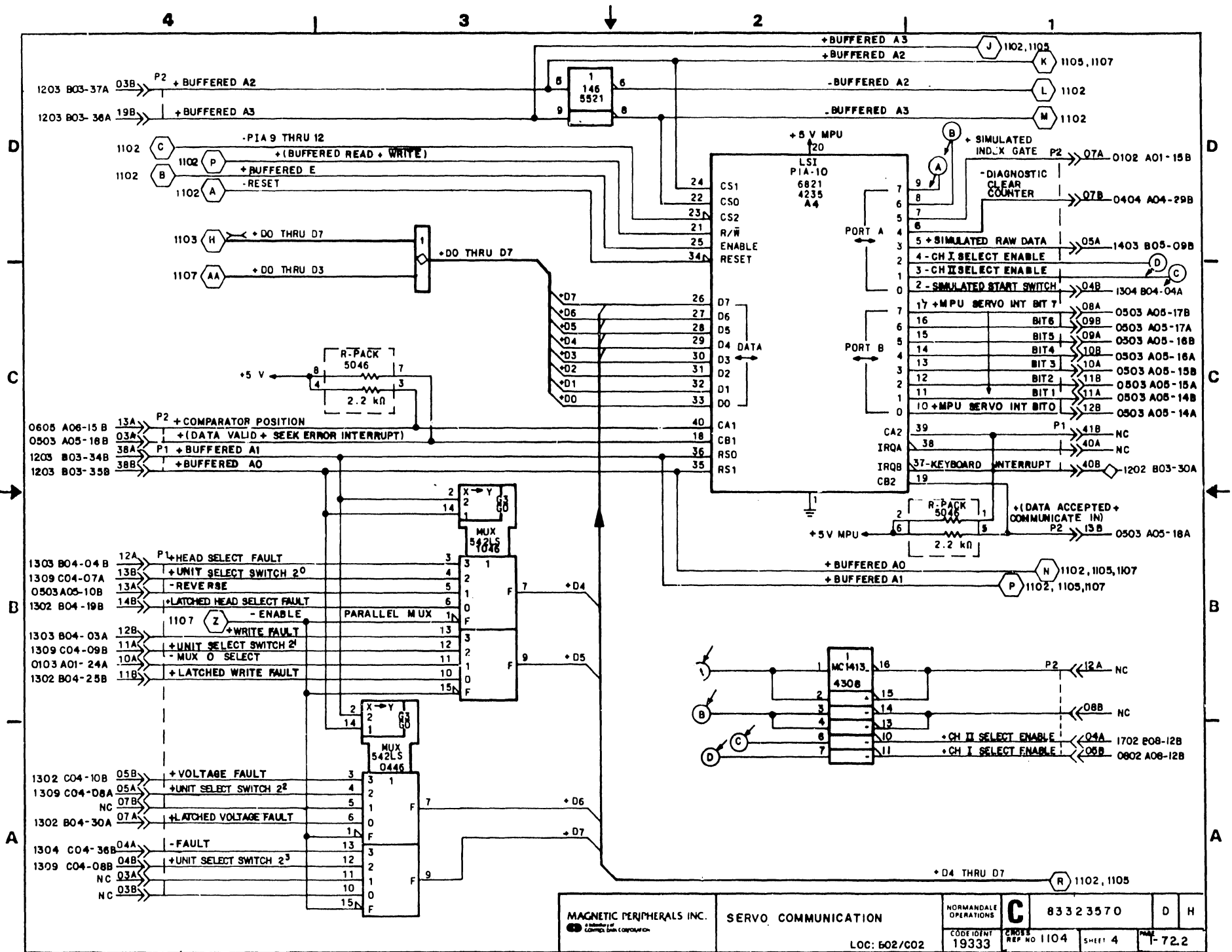


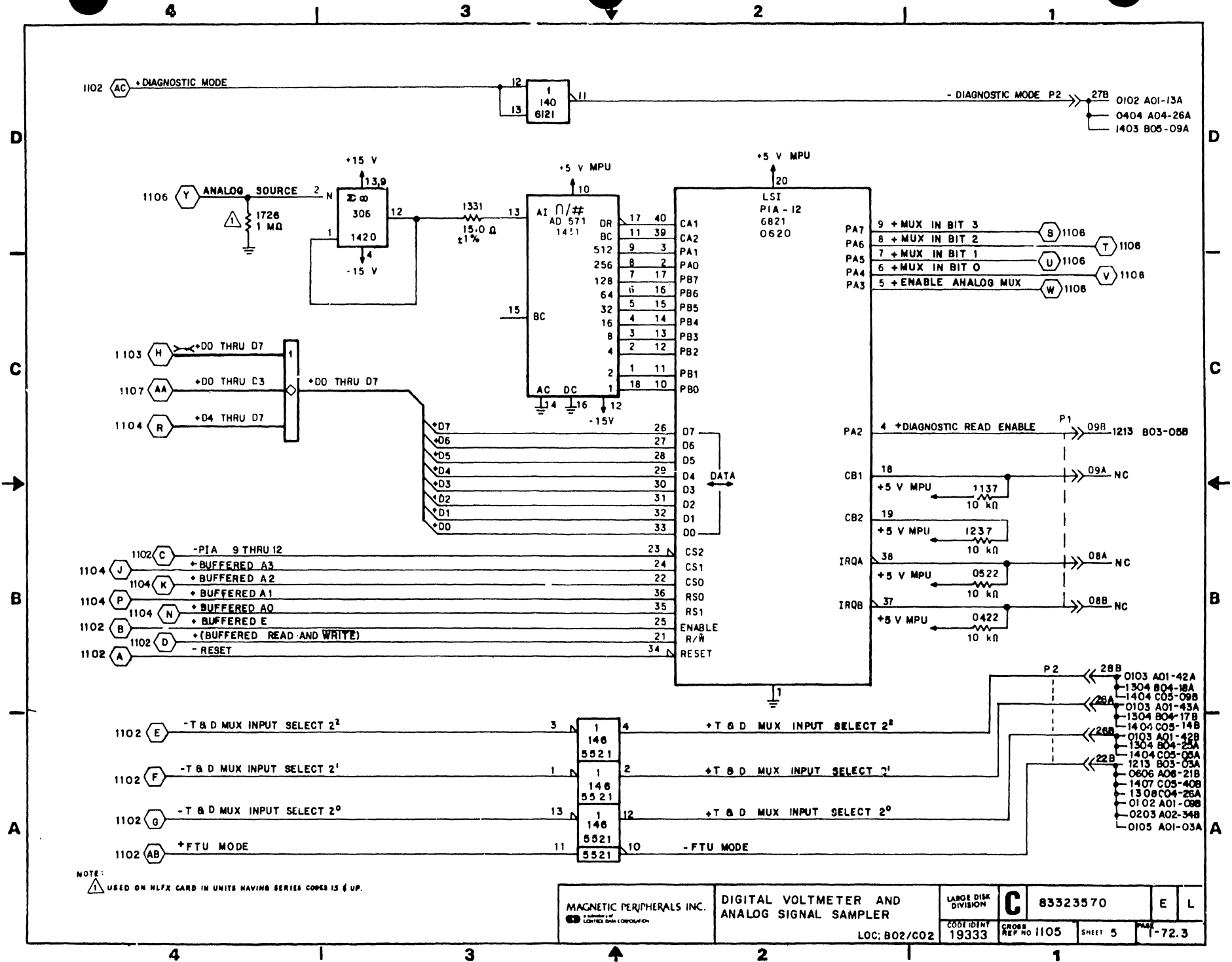




MAGNETIC PERIPHERALS INC. <small>A DIVISION OF</small> <small>COMPTON DATA COMPUTATION</small>	BIDIRECTIONAL DATA PORT		NORMANDALE OPERATIONS	<b>C</b> 83323570	B B
	LOC: B02/02		CODE IDENT 19333	CROSS REF NO 1103	SHEET 3

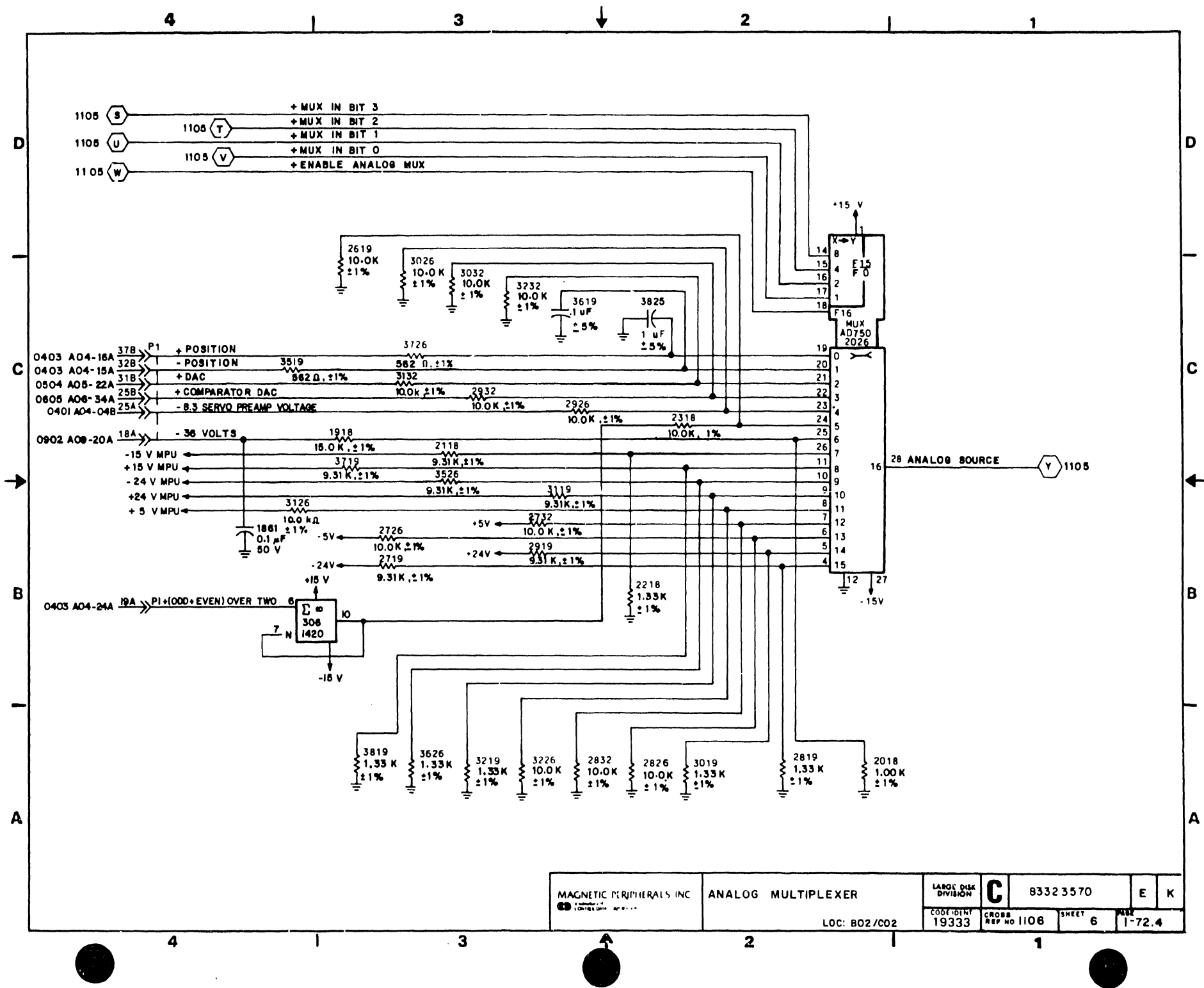
1-72.1





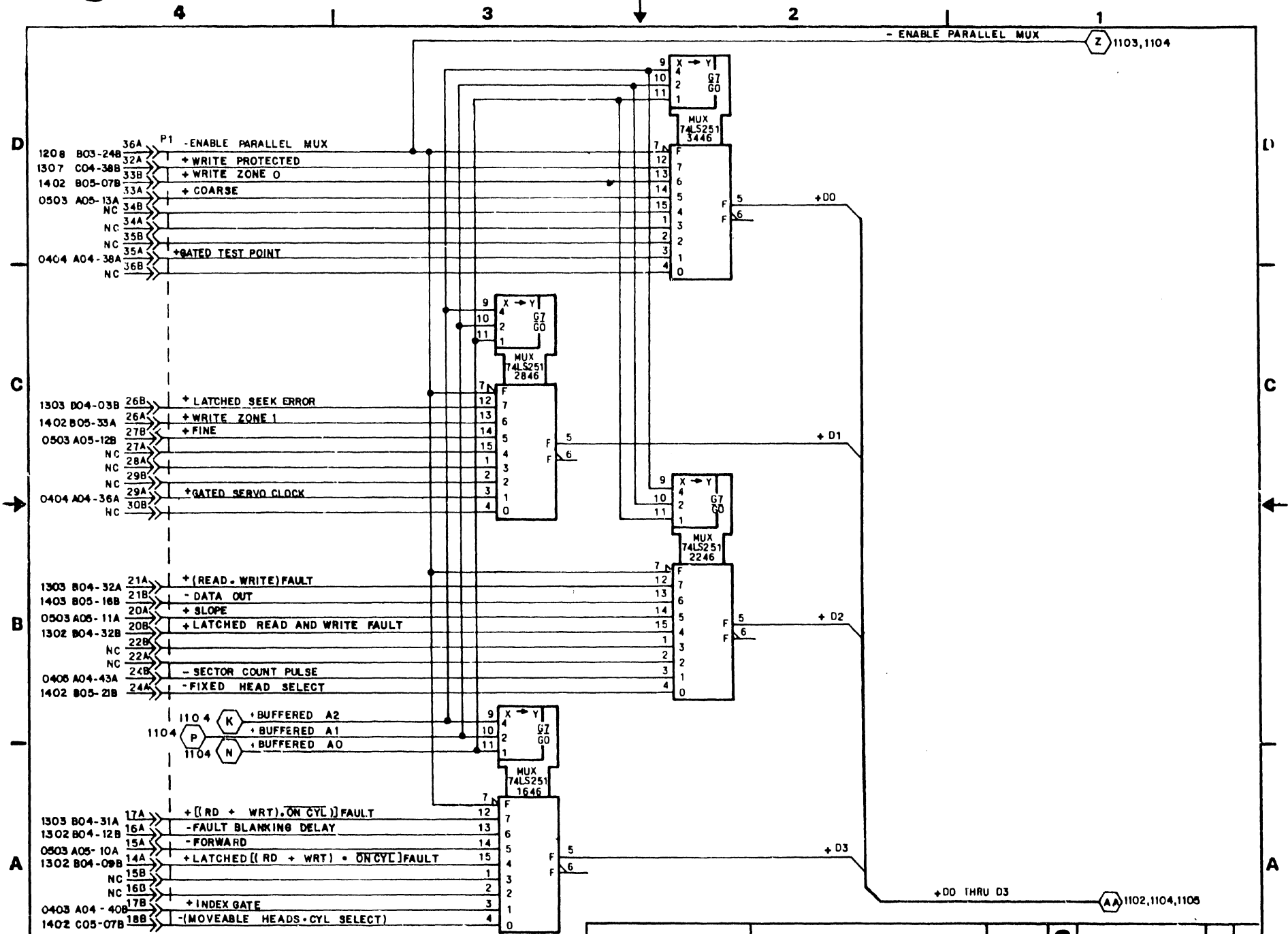
NOTE:  
 ⚠ USED ON MLFX CARD IN UNITS HAVING SERIES COVER 15 & UP.

MAGNETIC PERIPHERALS INC. <small>a subsidiary of</small> CONTROL DATA CORPORATION	DIGITAL VOLTMETER AND ANALOG SIGNAL SAMPLER		LARGE DISK DIVISION <b>C</b>	83323570	E L
	LOC: B02/CO2	CODE IDENT 19333			



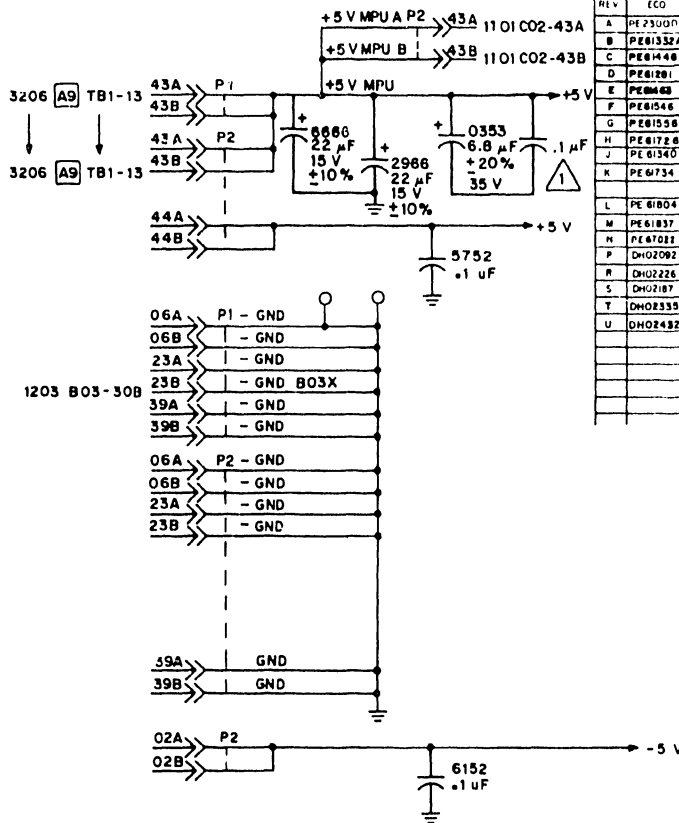
MAGNETIC PERIPHERALS INC CORPORATION	ANALOG MULTIPLEXER	LARGE DISK DIVISION	C	8332 3570	E	K
		COORDINATOR 19333				

LOC: B02/C02



REVISION STATUS OF SHEETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A	A	A	A	A	A	A	A									
B						B														
C																				
D																				
E	E	E	E	E	E		E	E	E	E	E	E								
F												F	F							
G										G										
H	H	H										H	H							
J													J							
K	K						K	K												
L							L	L												
M																				
N	N																			
P	P	P	P																	
R										R	R	R								
S							S	S												
T																				
U																				



REVISIONS					
REV	ECO	DESCRIPTION	DRAFT	DATE	CHK'D
A	PE2300D	RELEASED		4/7/80	
B	PE6132A	DOCUMENT E FROM		4/22/80	C.B.
C	PE6144B	E FROM CHANGE; AKTX TO BKTX			
D	PE6180I	OFFSET FIX			
E	PE6180B	ADD FTU CAPABILITY; BKTX TO CKTX			
F	PE6154E	MODIFY CKTX (FTU R/W FUNCTION)			
G	PE6155B	ALLOWS FTU WRITE OPERATIONS			
H	PE6172B	LOGIC DIAGRAM UPDATE			
J	PE6154D	GENERAL'S SEEK ERROR FOR CYLS 899 UP	GT	2-23-81	
K	PE6173A	IN FTU MODE, PREVENTS DRIVE FROM INTERRUPTING CONTROLLER			
L	PE6180A	IMPROVE CLOCK CKT	GT	2-23-81	
M	PE6183T	NEW PROM, CKTX TO ERTX	DFS	6-3-81	
N	PE6182I	CORRECTE LOGIC	JJ	6-17-81	
P	DH0209Z	ADD BREAKPOINT PROVISION	DWT	1-21-82	
R	DH0222E	CORRECTIONS			
S	DH0218T	AID TEST B DIAG INFO; PKTX TO KRTX			
T	DH0233S	REDUCE NOISE	CB	7-28-82	
U	DH0249Z	AVOIDS SHORTING OF CAP	CB	7-28-82	

FILTER CAPACITORS

.1 uF +5 V			
0411	1321	2751	5729
0421	1411	3113	6010
0439	1910	3210	6720
		1949	3251
		0821	2013
		0839	2510
		0852	2613
		1240	2641
		1251	2742
			5126
			5540

UNUSED RESISTOR PACKS

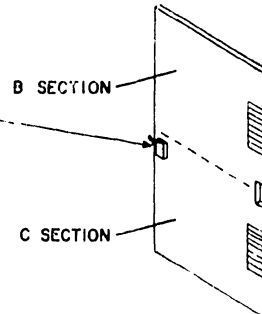
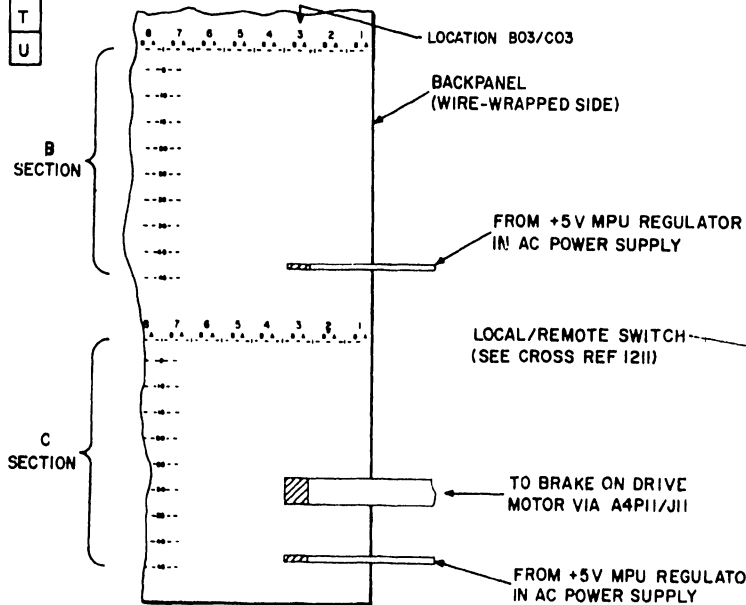
LOCATION	PINS
5023	2, 6
5039	6, 7, 8
5439	7
4323	2, 3, 6

UNUSED TRANSISTOR PACKS

LOCATION	PINS
5328	1, 2, 3, 5, 6, 7, 12, 13, 14

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
141LS	0539	6
146LS	6110	4, 6, 10, 12
148LS	0921	10, 13
146	0551	10, 12



NOTE: SEE TABLE FOR .1uF CAPACITOR LOCATION

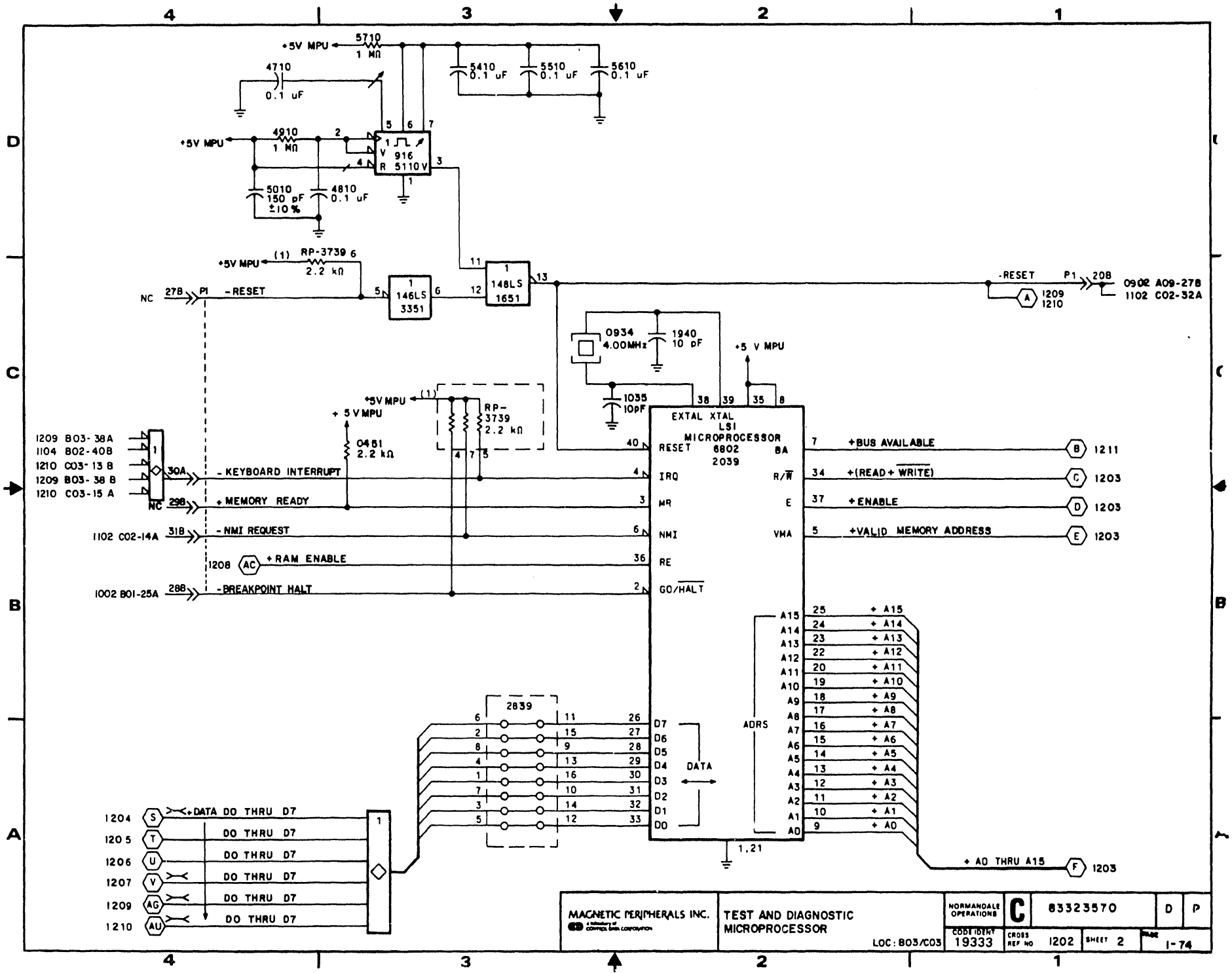
THE CARD IN THIS LOCATION SPANS ROWS B AND C OF THE LOGIC CHASSIS. THEREFORE, I/O INFORMATION MAY BE SPECIFIED BY BXX OR CXX. INFORMATION ON PINS IDENTIFIED WITH A "P1" RELATE TO THE B OR UPPER SECTION OF THE CARD WHEREAS "P2" RELATES TO PINS ON THE C OR LOWER SECTION OF THE CARD. CROSS REFERENCE NUMBERS ARE NOT AFFECTED.

DRAWN	<i>for [signature]</i>	6/1/80
CHECKED		
ENGINEER	<i>W.S. [signature]</i>	5/6/80
APPROVED		

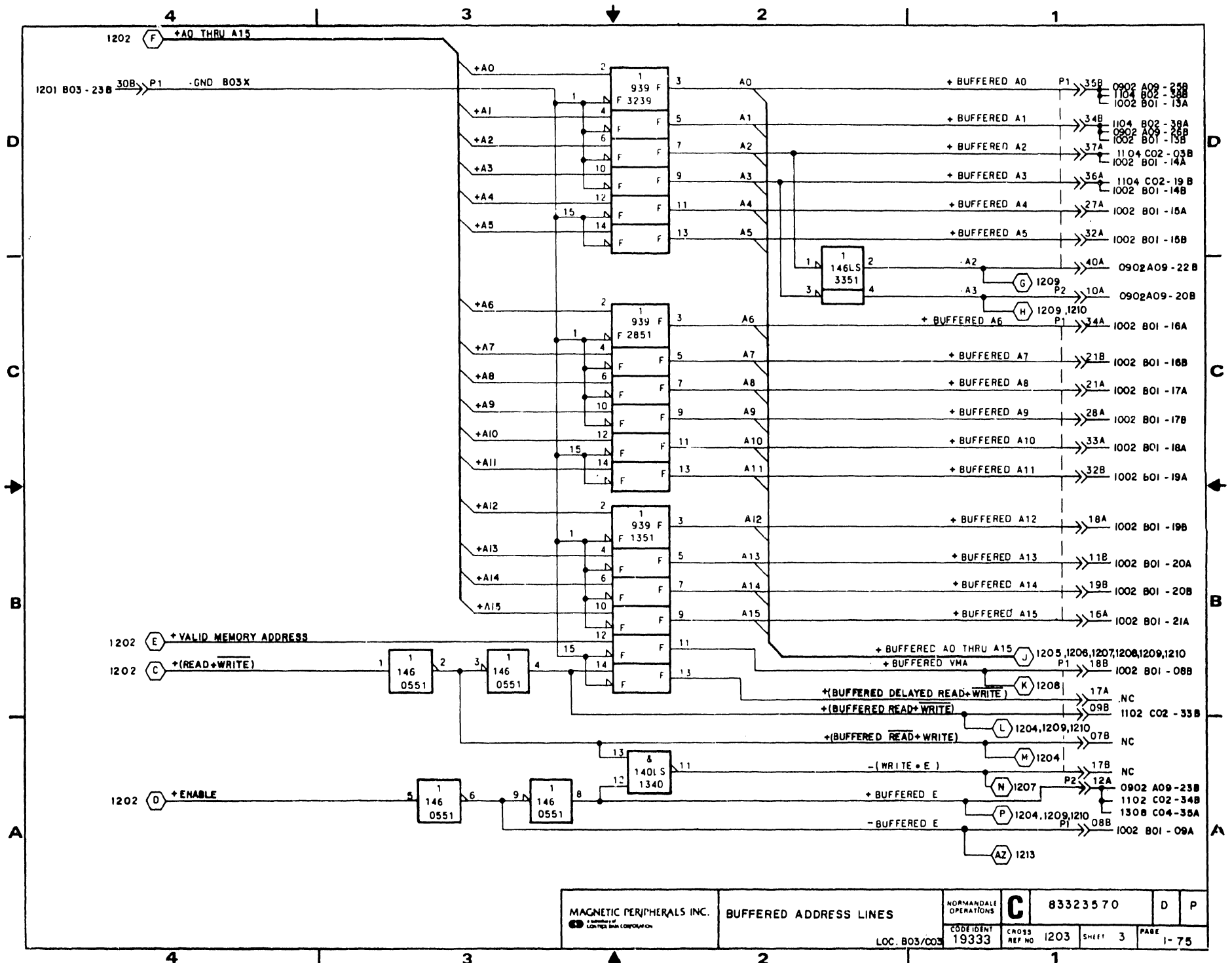
MAGNETIC PERIPHERALS INC.  
COMMERCIAL CORPORATION

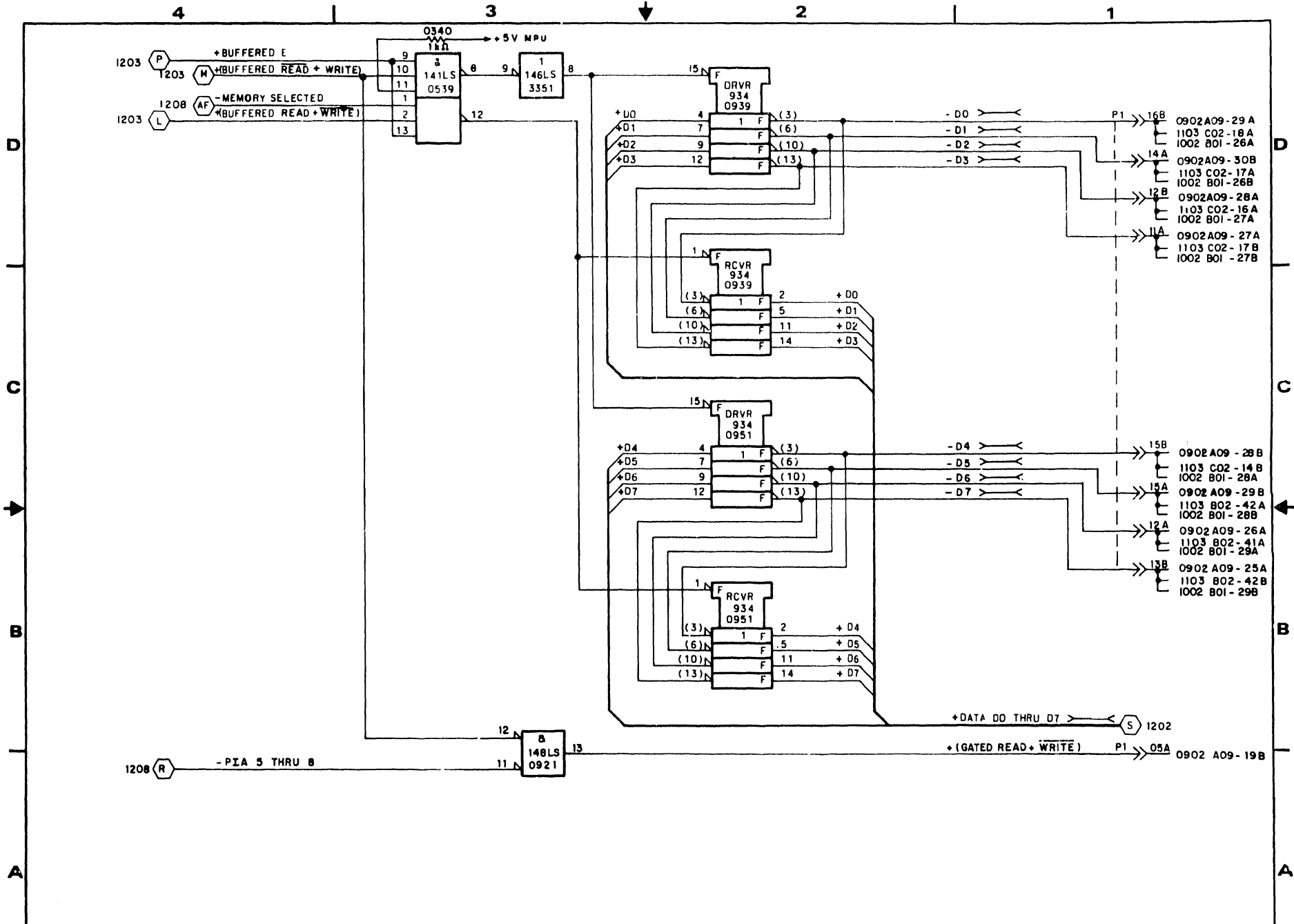
MPU TEST AND DIAGNOSTIC  
 MEMORY DIAGRAMS  
 TYPE-KKTX LOC: B03/CO3

LARGE DISK DIVISION	<b>C</b>	83323570	E	U
CODE IDENT	CROSS REF NO	SHEET	PAGE	
19333	1201	1 of 13	1-75	

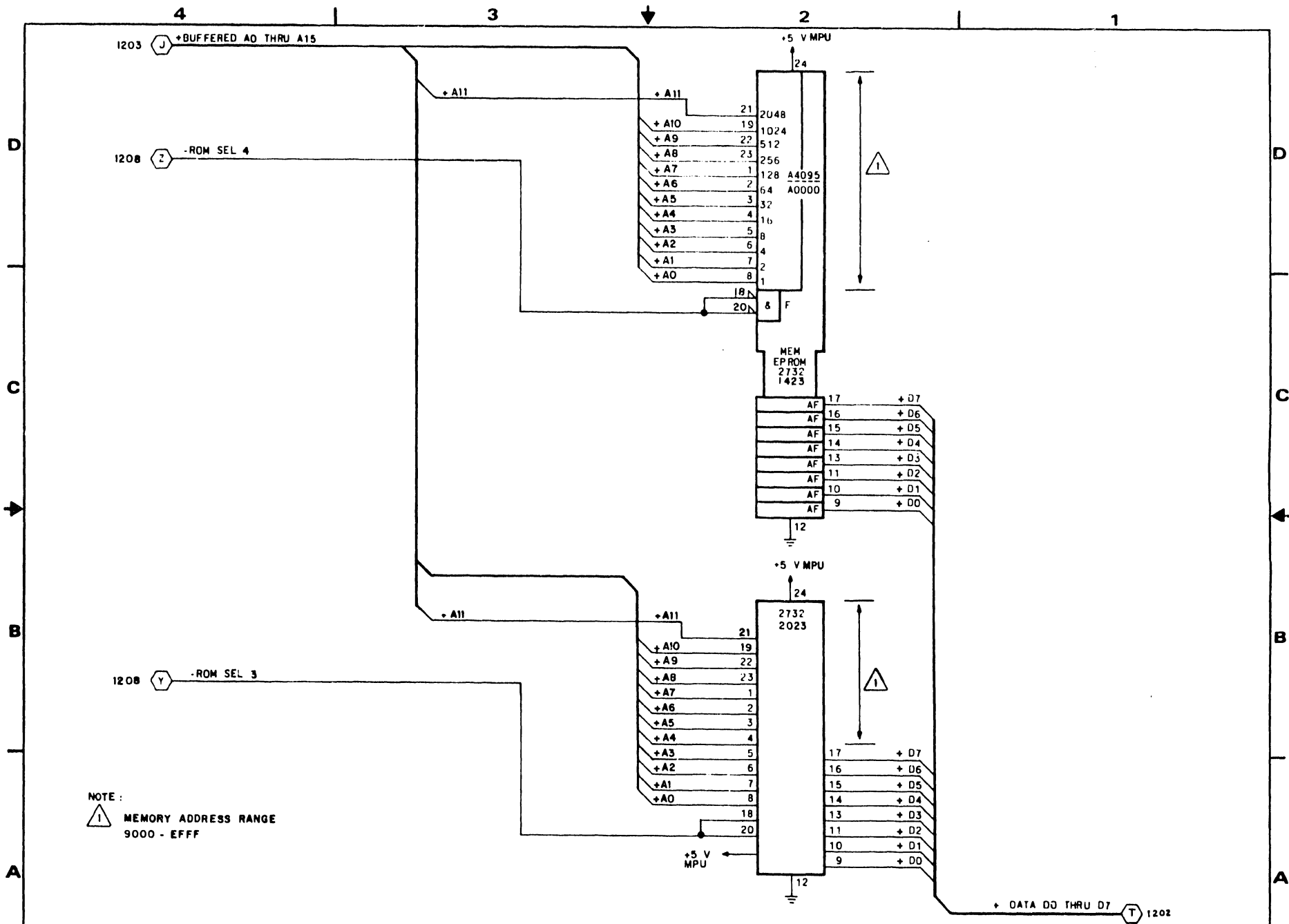


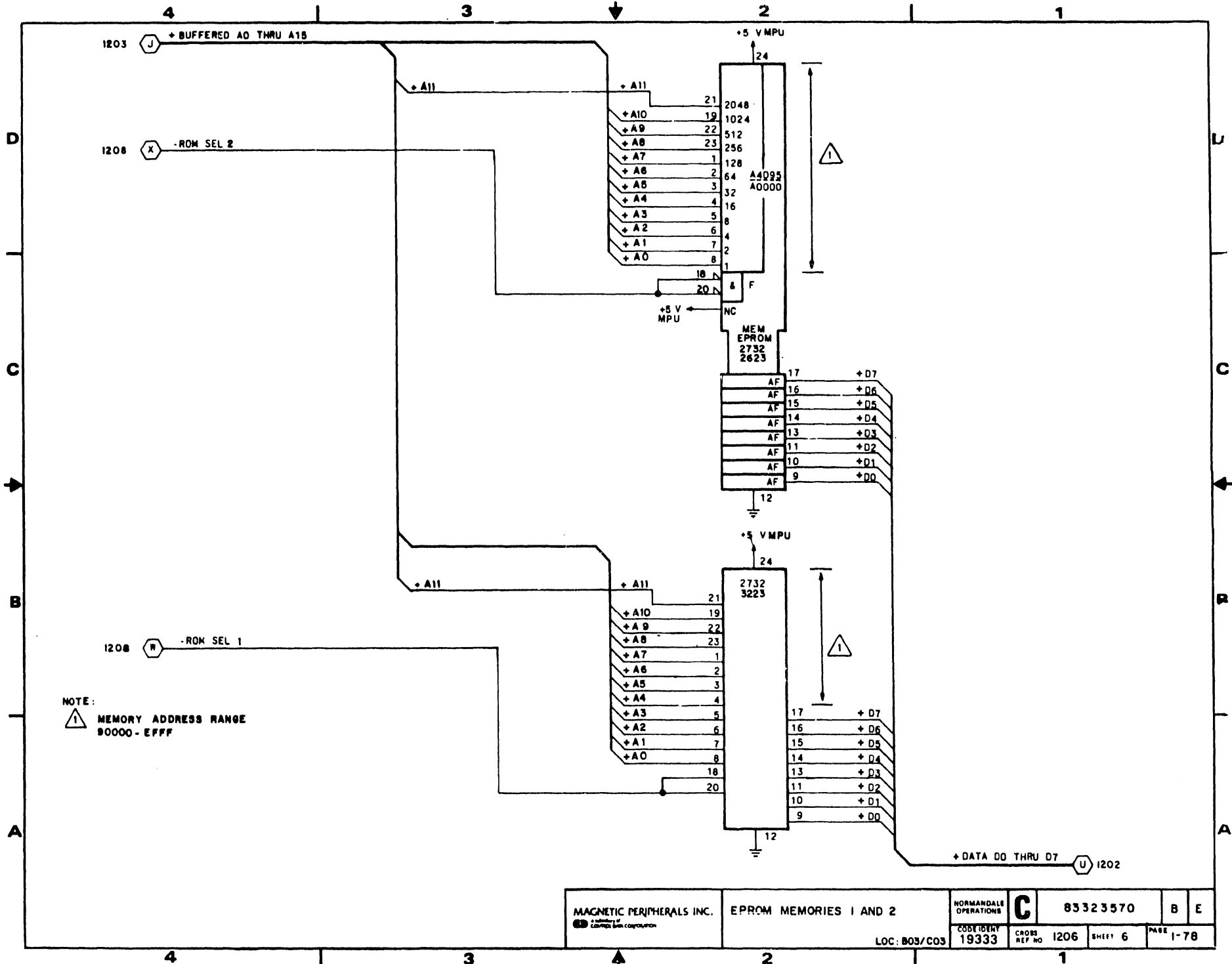


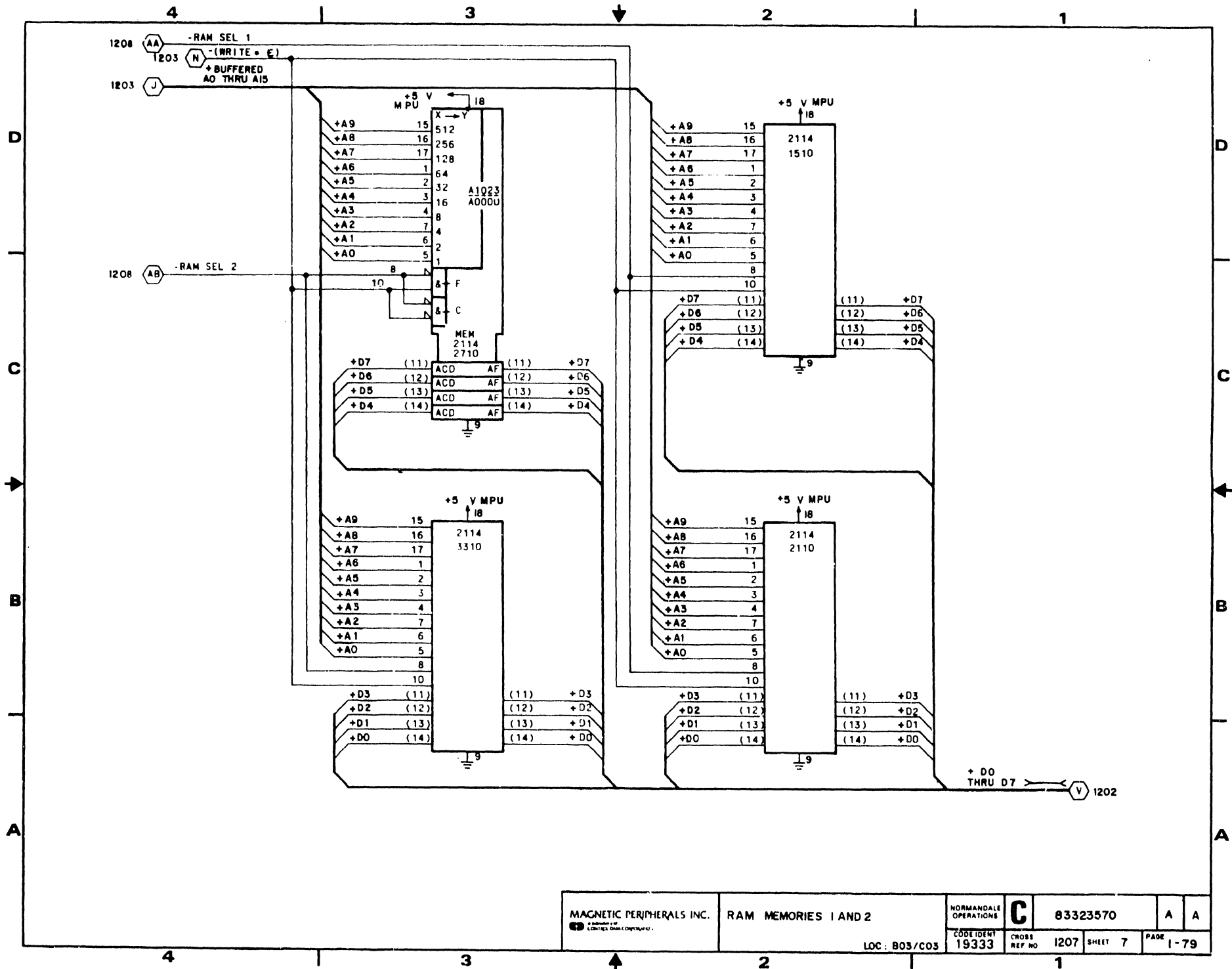


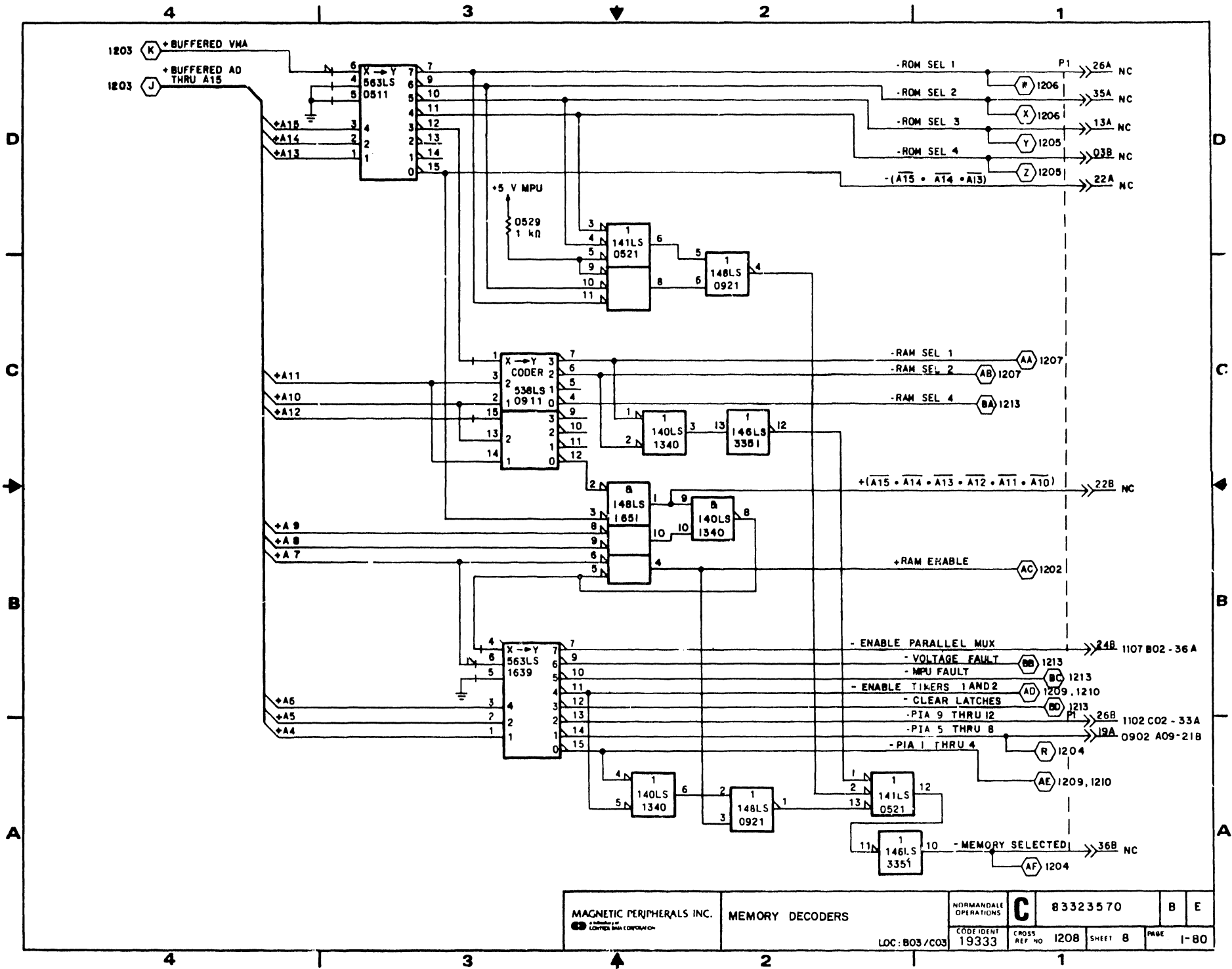


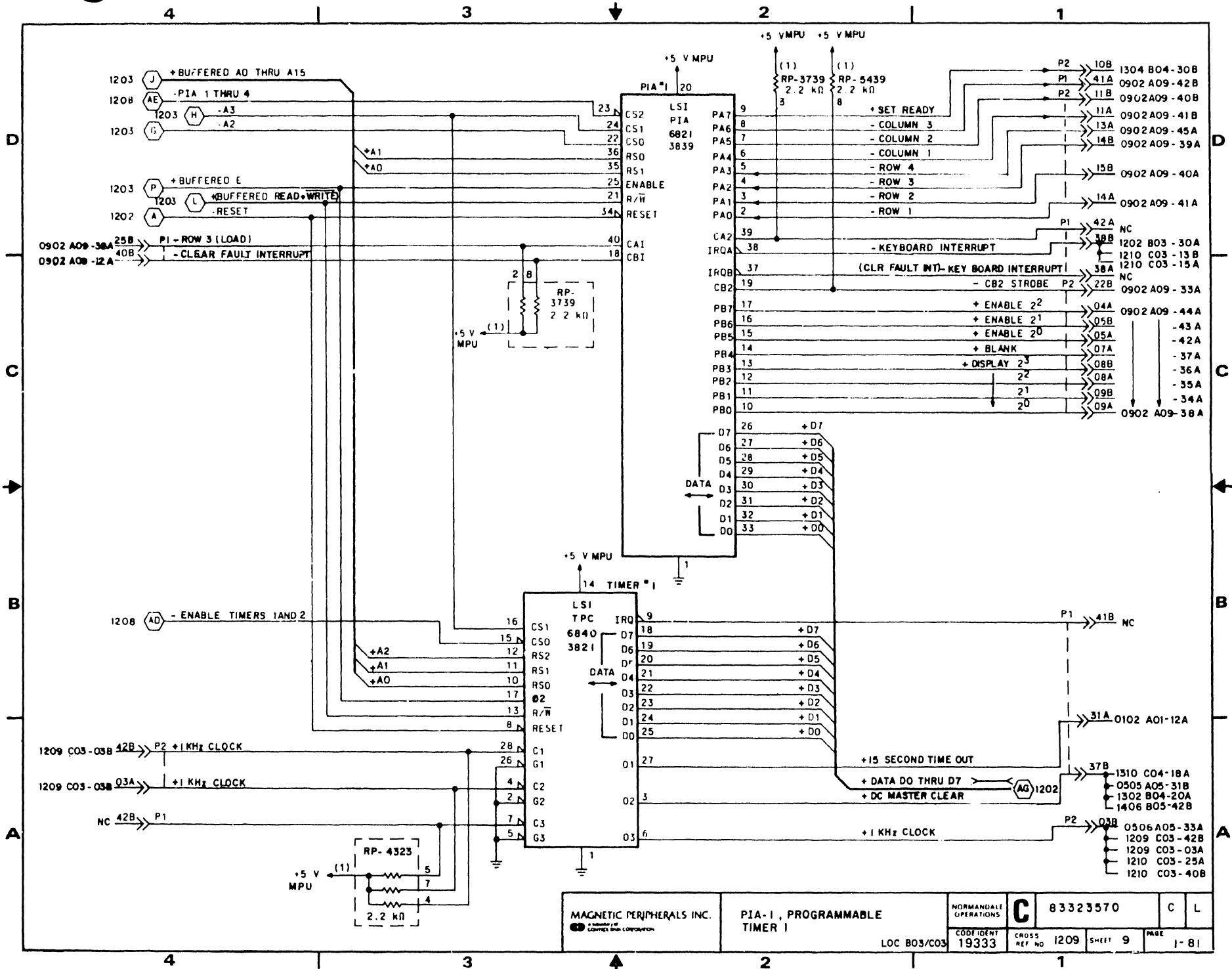
MAGNETIC PERIPHERALS INC. <small>A DIVISION OF          LORAIN DATA CORPORATION</small>	RECEIVERS / TRANSMITTERS		NORMANDEALE OPERATIONS	<b>C</b> 8332 3570	D	P
	LOC. B03/C03		CODE IDENT 19333	CROSS REF NO 1204	SHEET 4	PAGE 1-76











MAGNETIC PERIPHERALS INC.  
a subsidiary of  
 Control Data Corporation

PIA-1, PROGRAMMABLE  
 TIMER 1

NORMANDALE  
 OPERATIONS

**C**

83323570

C L

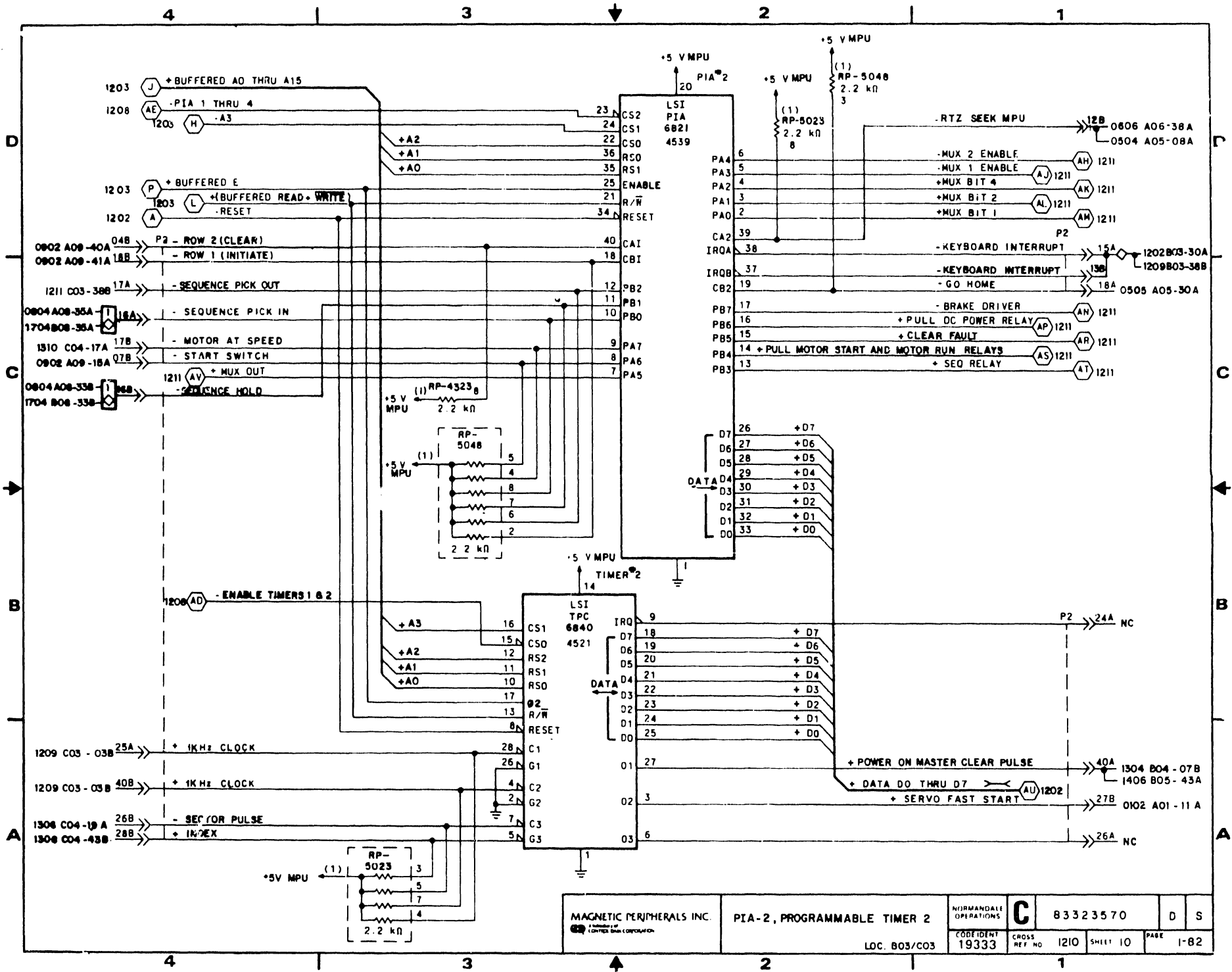
CODE IDENT  
 19333

CROSS REF NO  
 1209

SHEET  
 9

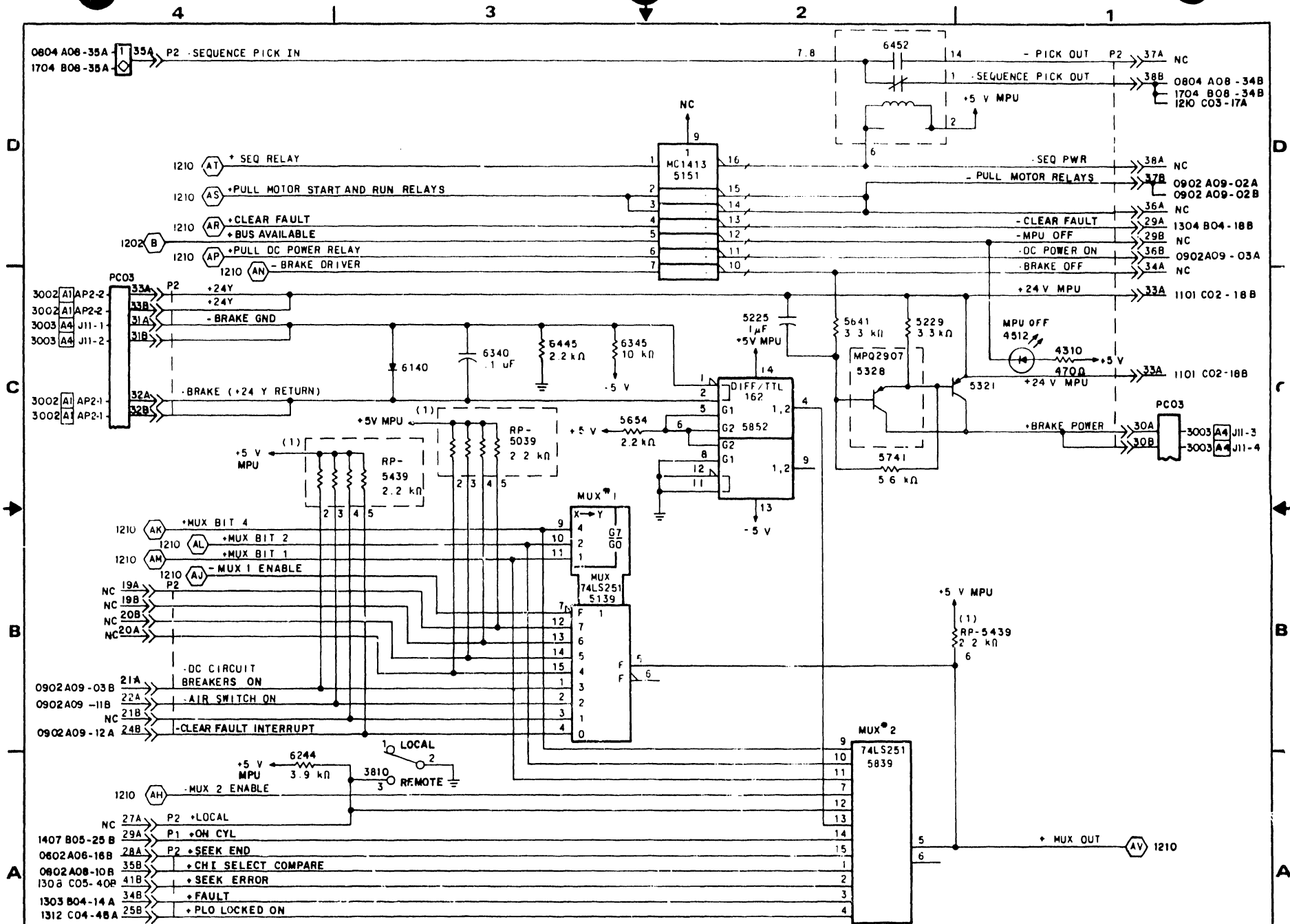
PAGE  
 1-81

LOC B03/C03



MAGNETIC PERIPHERALS INC. <small>A DIVISION OF</small> <small>GENERAL ELECTRIC CORPORATION</small>	PIA-2, PROGRAMMABLE TIMER 2		NORMANDALE OPERATIONS	<b>C</b> 83323570	D	S
	LOC. B03/C03		CODE IDENT 19333		CROSS REF NO 1210	SHEET 10



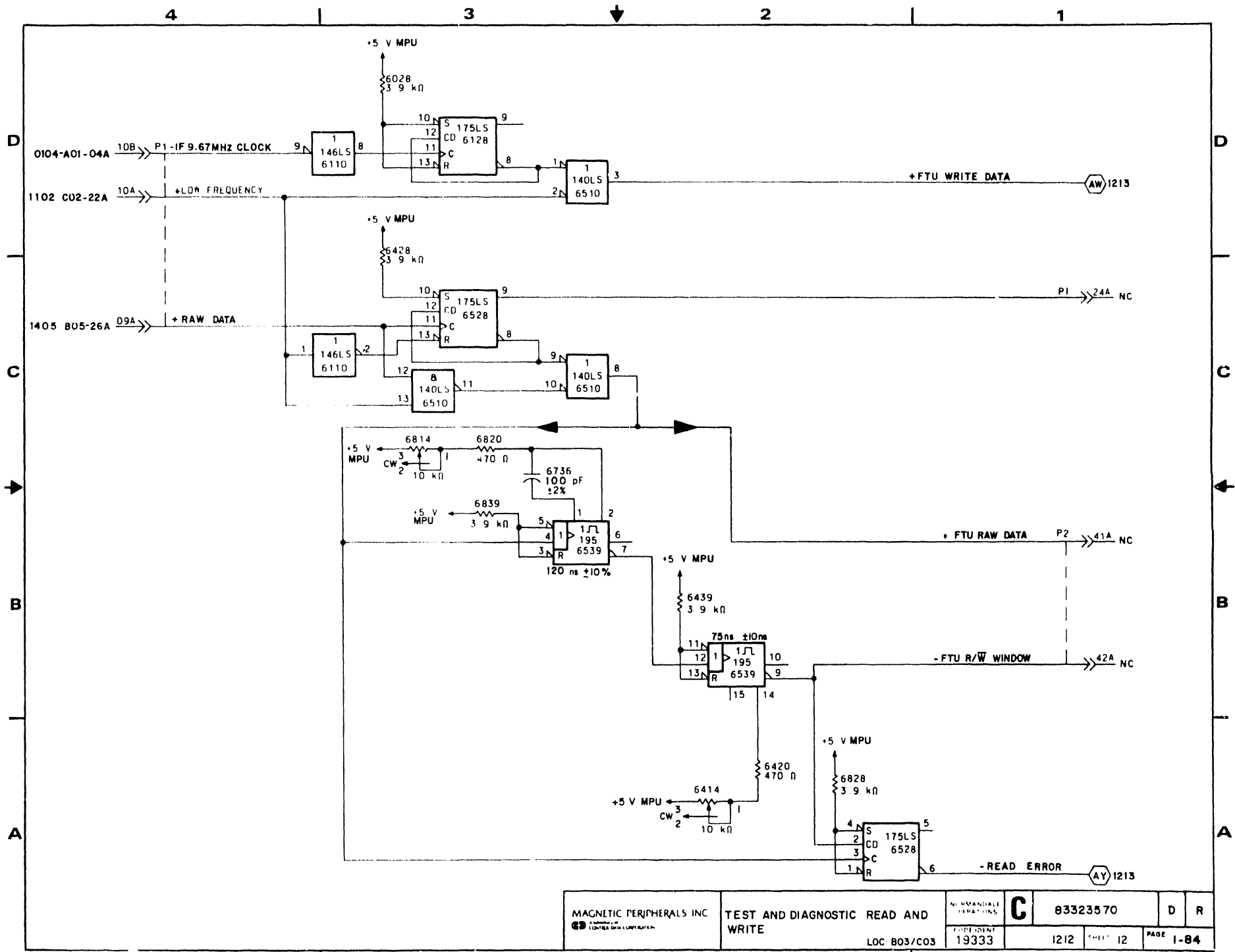


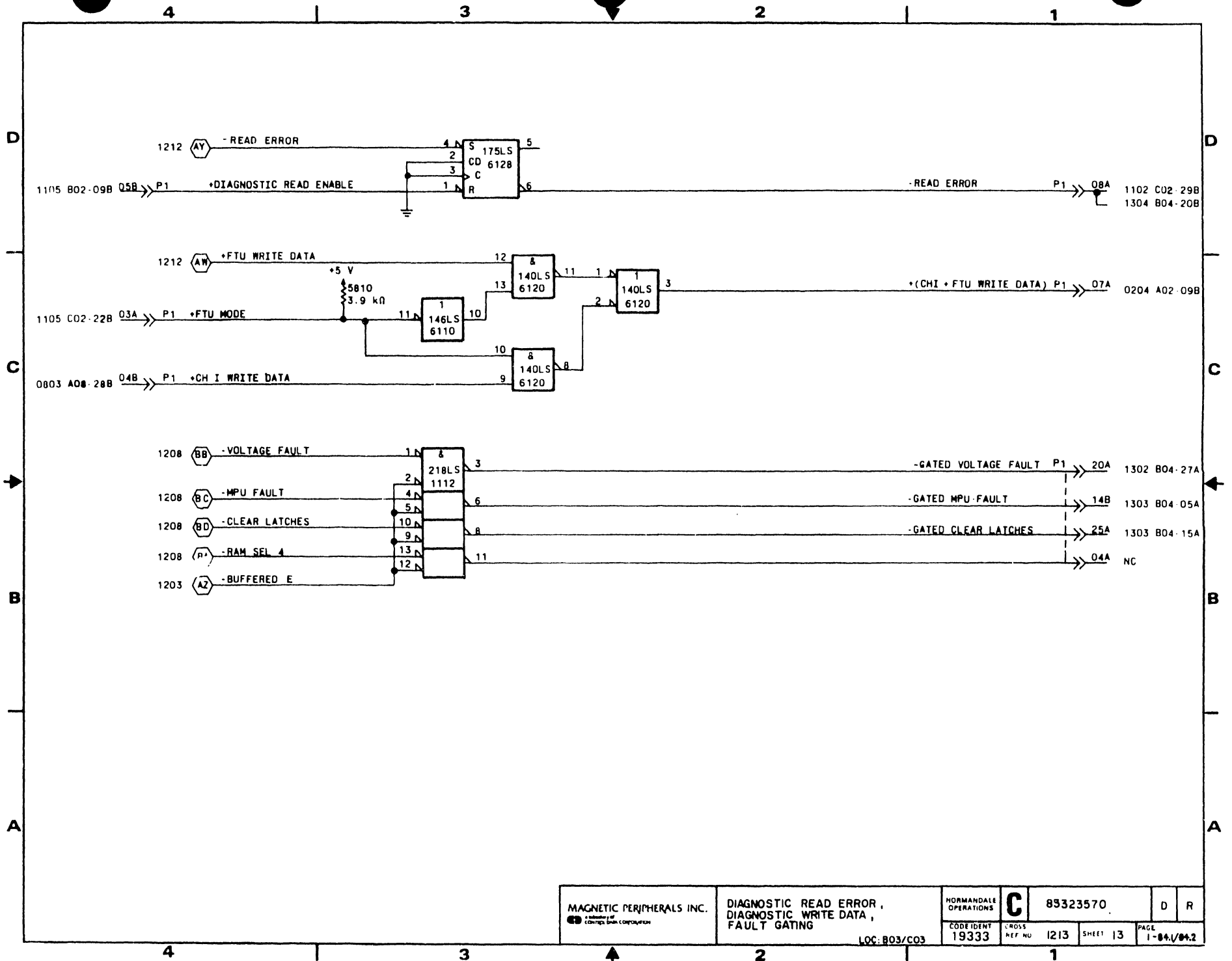
MAGNETIC PERIPHERALS INC.  
© 1978 by Magnetic Peripherals Inc.

MOTOR RELAY AND BRAKE DRIVERS,  
 SEQUENCE RELAY

NORMANDALE OPERATIONS	<b>C</b>	83323570	D	S
CODE IDENT 19333	CROSS REF NO 1211	SHEET 11	PAGE 1-83	

LOC. B03/CO3





REVISION STATUS OF SHEETS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	A	A	A	A	A	A	A	A	A	A	A								
B			B																	
C	C	C	G	C	C	C	C	C	C			C								
D																				
E		E					E													
F	F	F			F		F	F	F											
G			G					G			G									
H							H													
J	J																			
K			K																	
L				L	L	L														
M	M																			

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
148LS	2620	1
146LS	5209	8,10,12
140LS	3242	8
140LS	4442	6
140LS	6253	3,11
200	1520	10
203LS	3853	2,4,10
224LS	0451	12
224LS	4920	6,8
4049	6031	10
208LS	0420	8
208LS	2609	6
233LS	1042	13,4
148LS	3509	4,10

UNUSED TRANSISTOR SECTIONS

TYPE	LOCATION	PIN(S)
MPO 2369	6020	4,5,6

UNUSED RESISTOR PACK

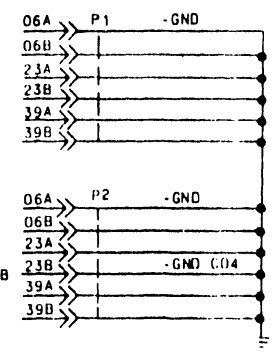
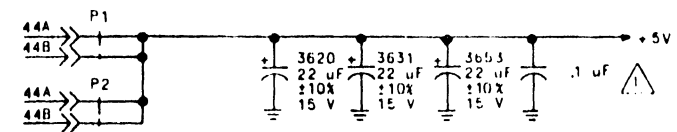
LOCATION	PIN(S)
4353	6,7,8

FILTER CAPS

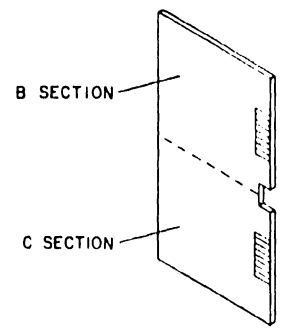
.1 uF		
0310	2532	4732
0321	2954	4743
0354	3010	4821
0808	3021	5243
0832	3032	
0743	3043	5810
1422	3521	5832
1832	3554	6343
1943	3732	6510
2421	4254	6921
2454	4710	
2510		

- NOTE:
- SEE TABLE FOR .1uF CAPACITOR LOCATION
  - THIS CARD USED IN UNITS UP TO SERIES CODE 15.

REV	DATE	DESCRIPTION	BY	CHKD
A	11-80	RELEASED		
B	1-78	OFFSET PIR		
C	1-80	ADD FLY CAPACITORS		
D	1-80	CHG CAP		
E	12-78	DATA TO E2R + B/P CHG		
F	1-80	UPDATE LOGIC DIAG'S		
G	4-78	UPDATE LOGIC DIAG'S		
H	10-28	FAULTY ENHCH		
J	10-28	CORRECT LOGIC DIA		
K	12-81	ADD TEST R UNL		
L	12-81	BLK TO D1A		
M	5-1-82	ENG RES		

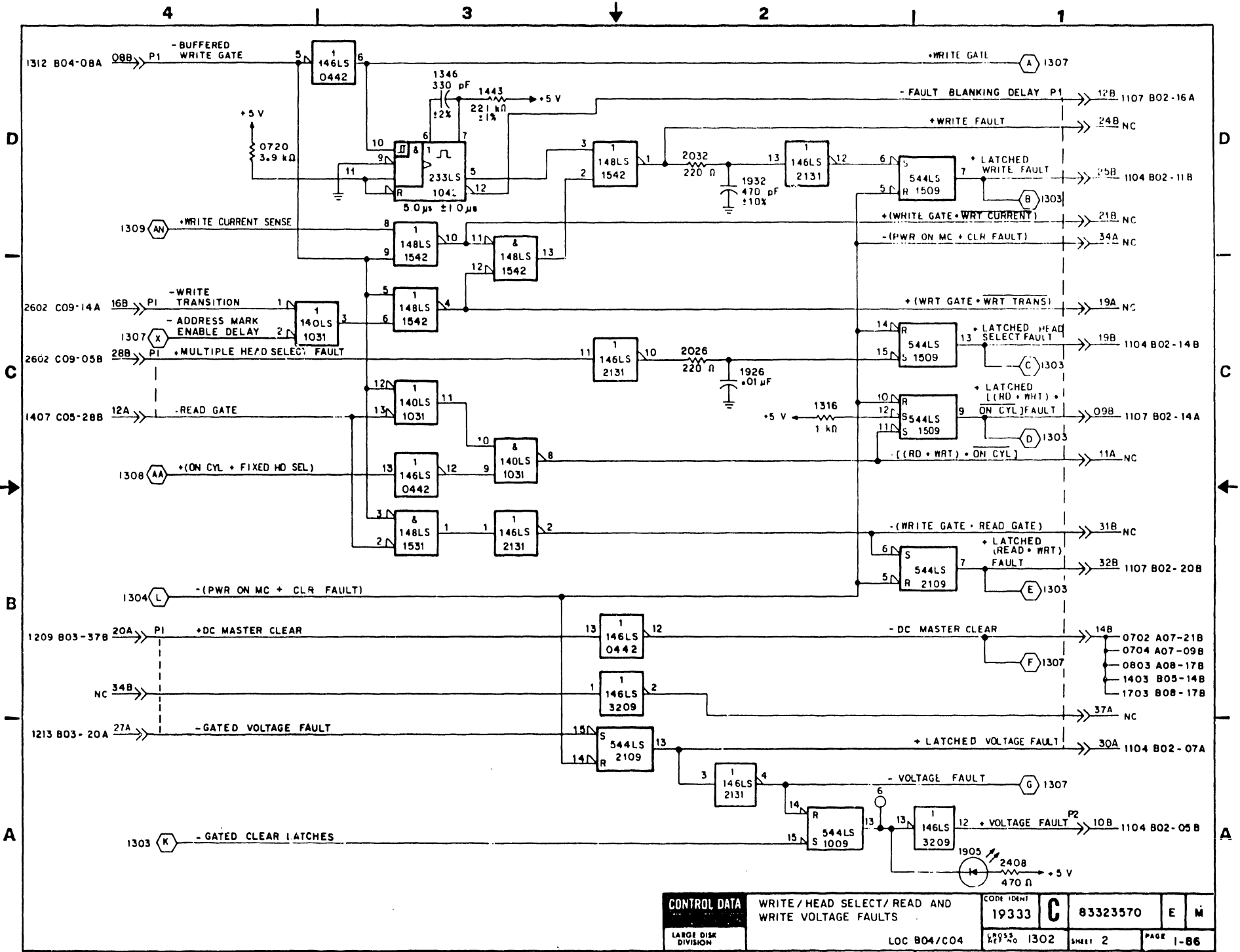


1310 C04 -20B

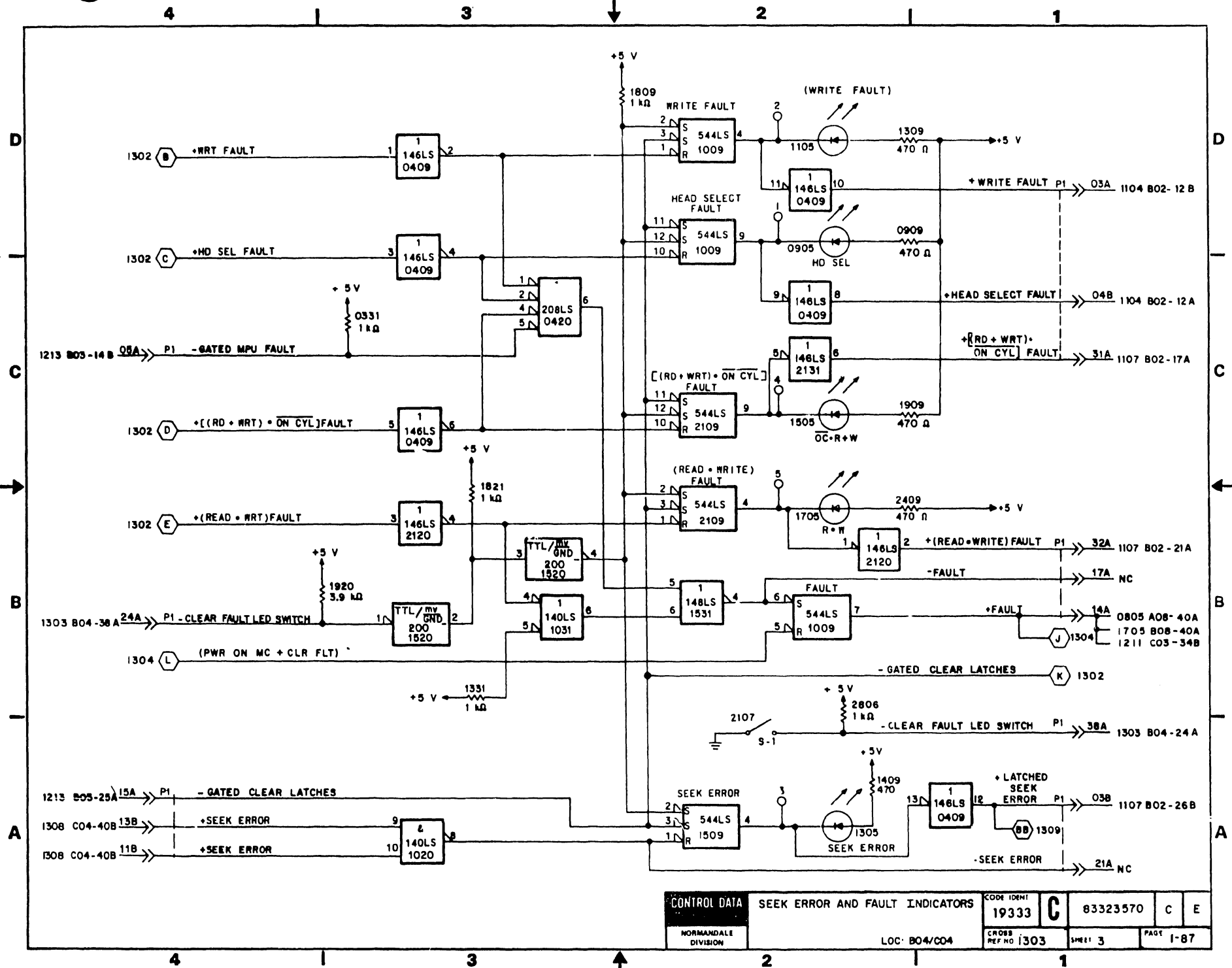


THE CARD IN THIS LOCATION SPANS ROWS B AND C OF THE LOGIC CHASSIS. THEREFORE, I/O INFORMATION MAY BE SPECIFIED BY BXY OR CXX. INFORMATION ON PINS IDENTIFIED WITH A "P1" RELATE TO THE B OR UPPER SECTION OF THE CARD WHEREAS "P2" RELATES TO PINS ON THE C OR LOWER SECTION OF THE CARD. CROSS REFERENCE NUMBERS ARE NOT AFFECTED.

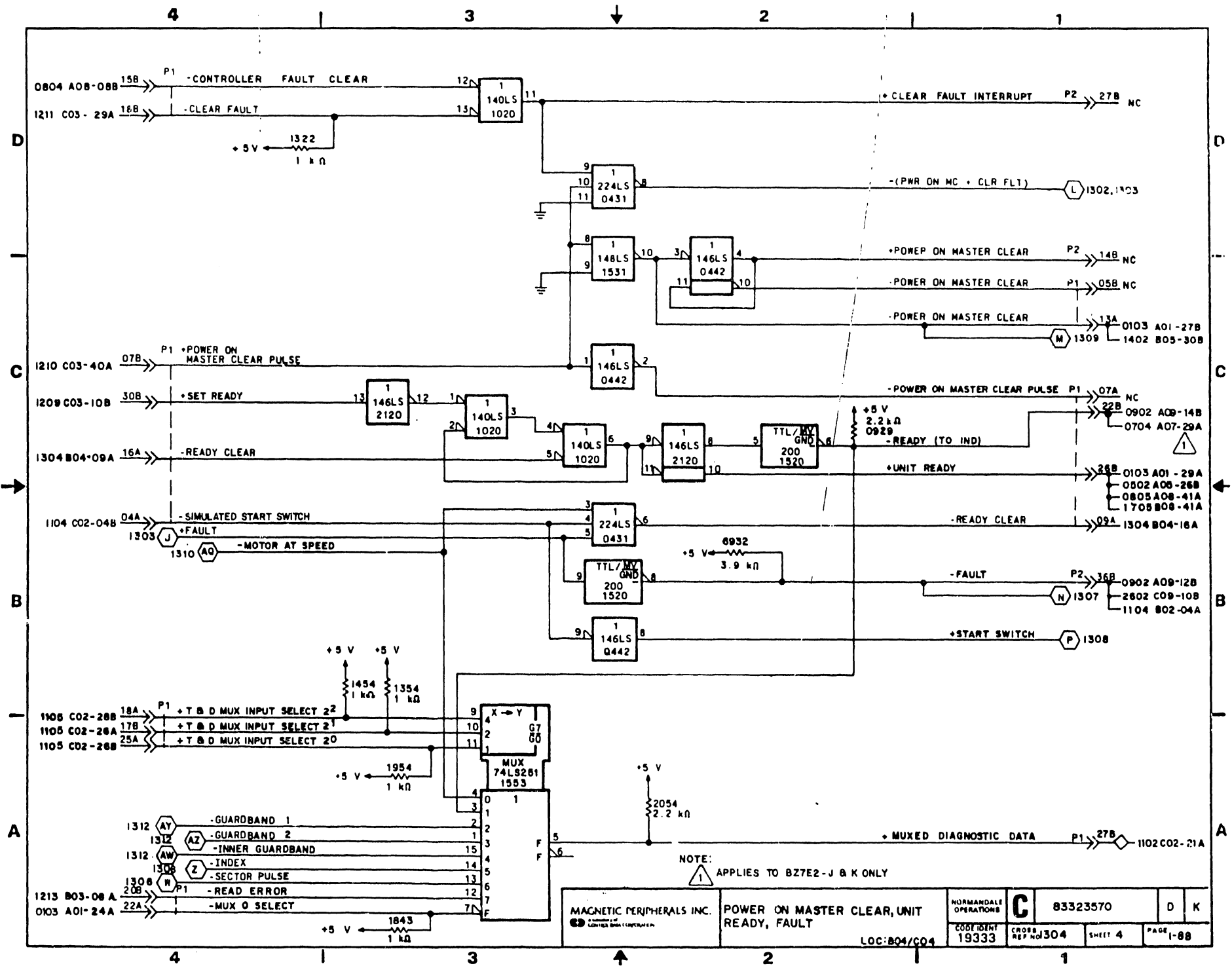
<table border="1"> <tr> <td>DRAWN</td> <td>C. Binn</td> <td>11/1/80</td> </tr> <tr> <td>CHECKED</td> <td></td> <td></td> </tr> <tr> <td>ENGINEER</td> <td>W. R. K. V. V. V.</td> <td></td> </tr> <tr> <td>APPROVED</td> <td></td> <td></td> </tr> </table>	DRAWN	C. Binn	11/1/80	CHECKED			ENGINEER	W. R. K. V. V. V.		APPROVED			MAGNETIC PERIPHERALS INC. 400 UNIVERSITY AVENUE BOSTON, MASS. 02118	FAULT / CONTROL FUNCTION DIAGRAMS TYPE: DLEX LOC: B04/C04	LARGE DISK DIVISION CROSS REF NO: 1301 SHEET 1 of 12 PAGE 1-85	C-83323570 E M
DRAWN	C. Binn	11/1/80														
CHECKED																
ENGINEER	W. R. K. V. V. V.															
APPROVED																



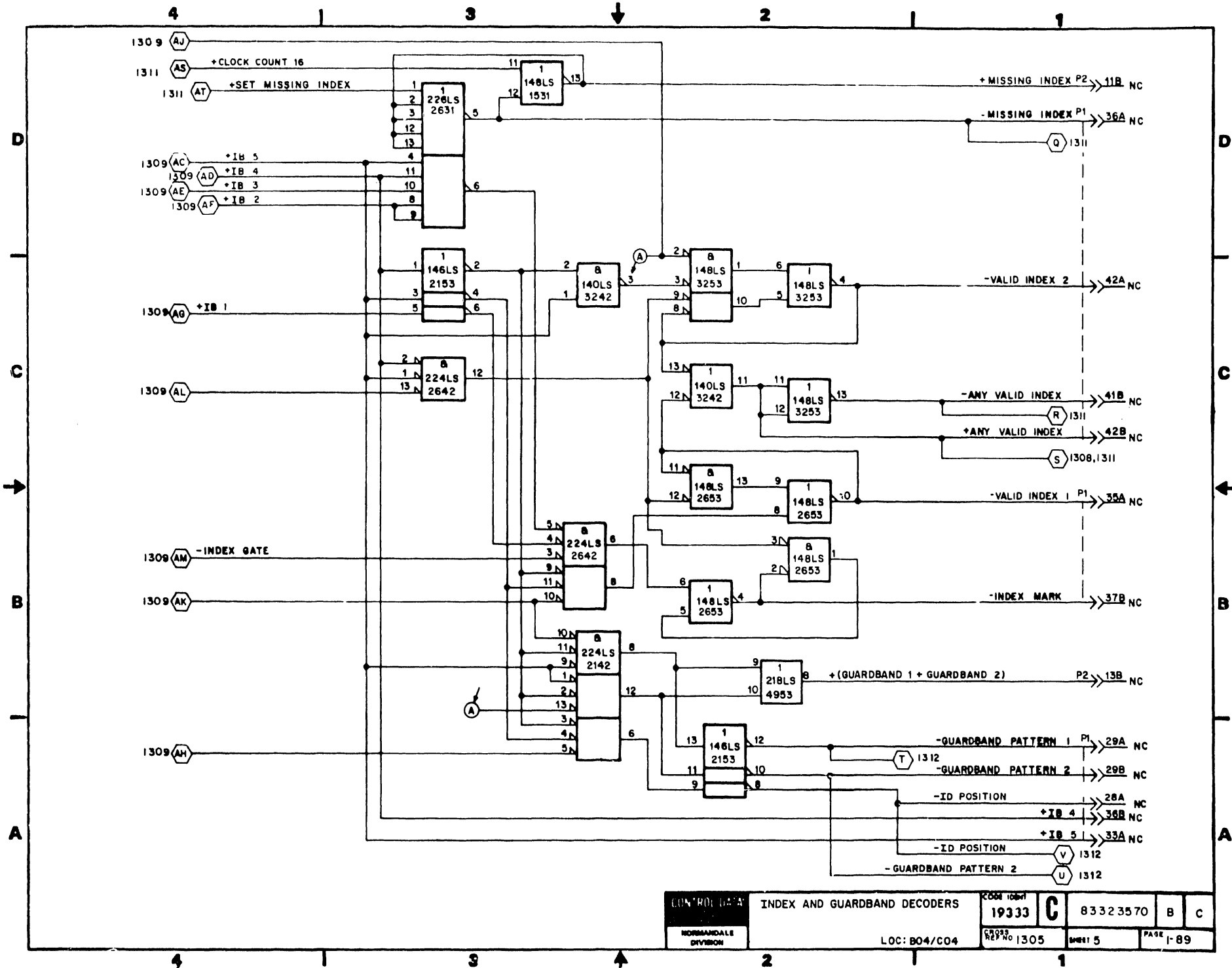
CONTROL DATA LARGE DISK DIVISION	WRITE / HEAD SELECT / READ AND WRITE VOLTAGE FAULTS	CODE IDENT 19333	C	83323570	E	M
	LOC B04/C04	1302	SHEET 2	PAGE 1-86		



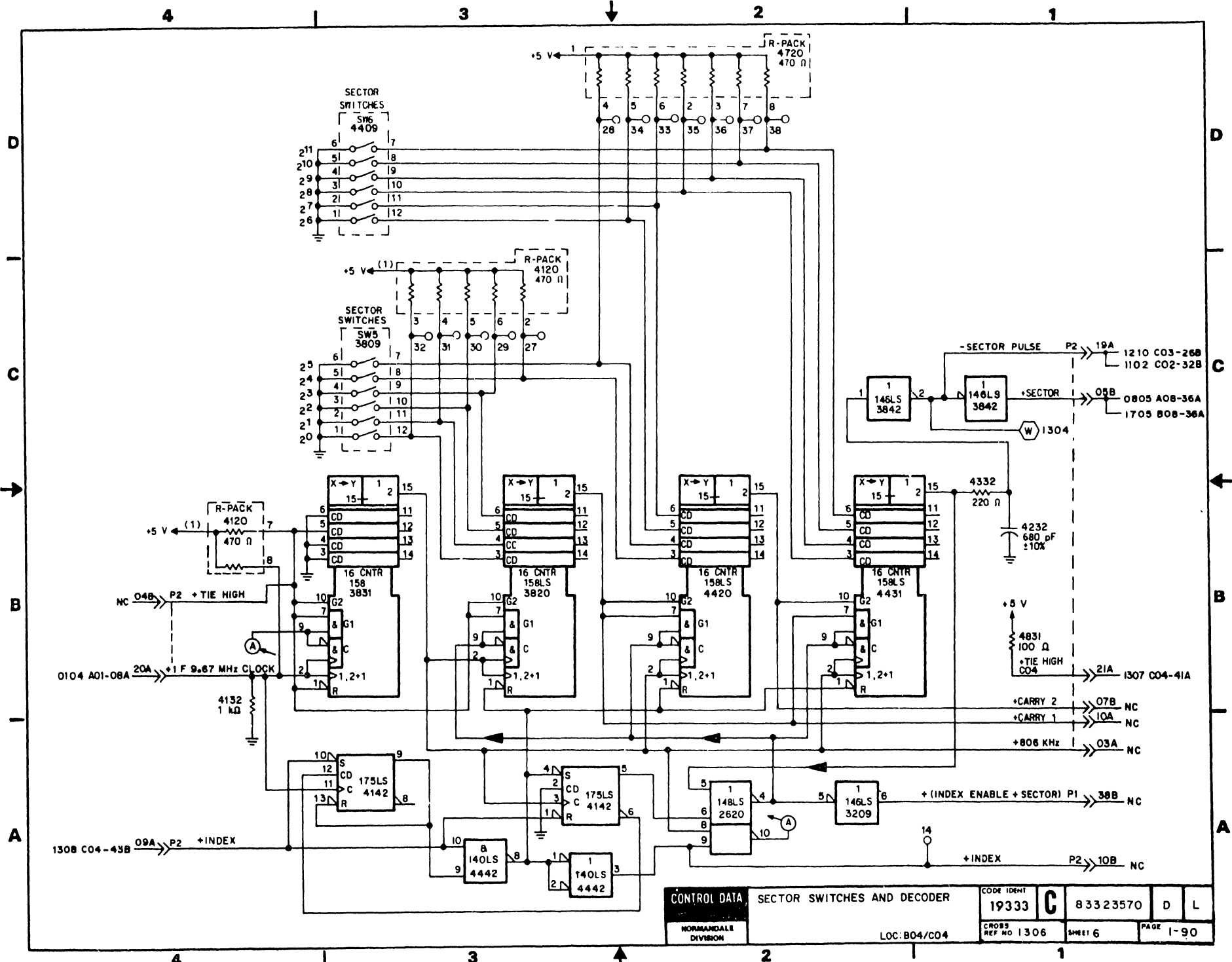
CONTROL DATA	SEEK ERROR AND FAULT INDICATORS	CODE IDENT	19333	C	83323570	C	E
	NORMANDEALE DIVISION	LOC: B04/CO4	CROSS REF NO   1303	SHEET   3	PAGE   1-87		



MAGNETIC PERIPHERALS INC.		POWER ON MASTER CLEAR, UNIT READY, FAULT		NORMANDALE OPERATIONS		C 83323570		D K	
CONTRACT NO. 19333		LOC: B04/C04		CROSS REF NO. J304		SHEET 4		PAGE 1-88	

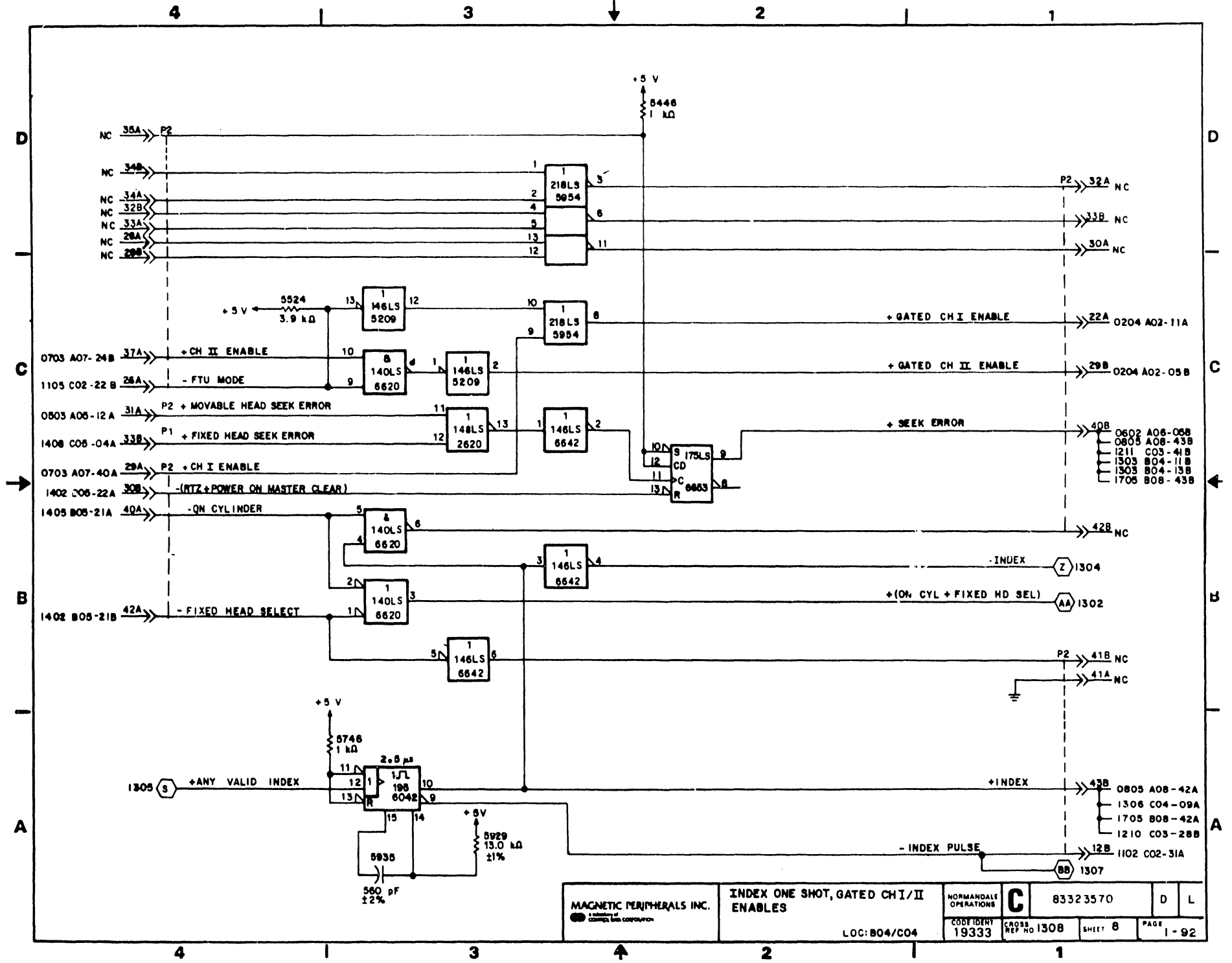


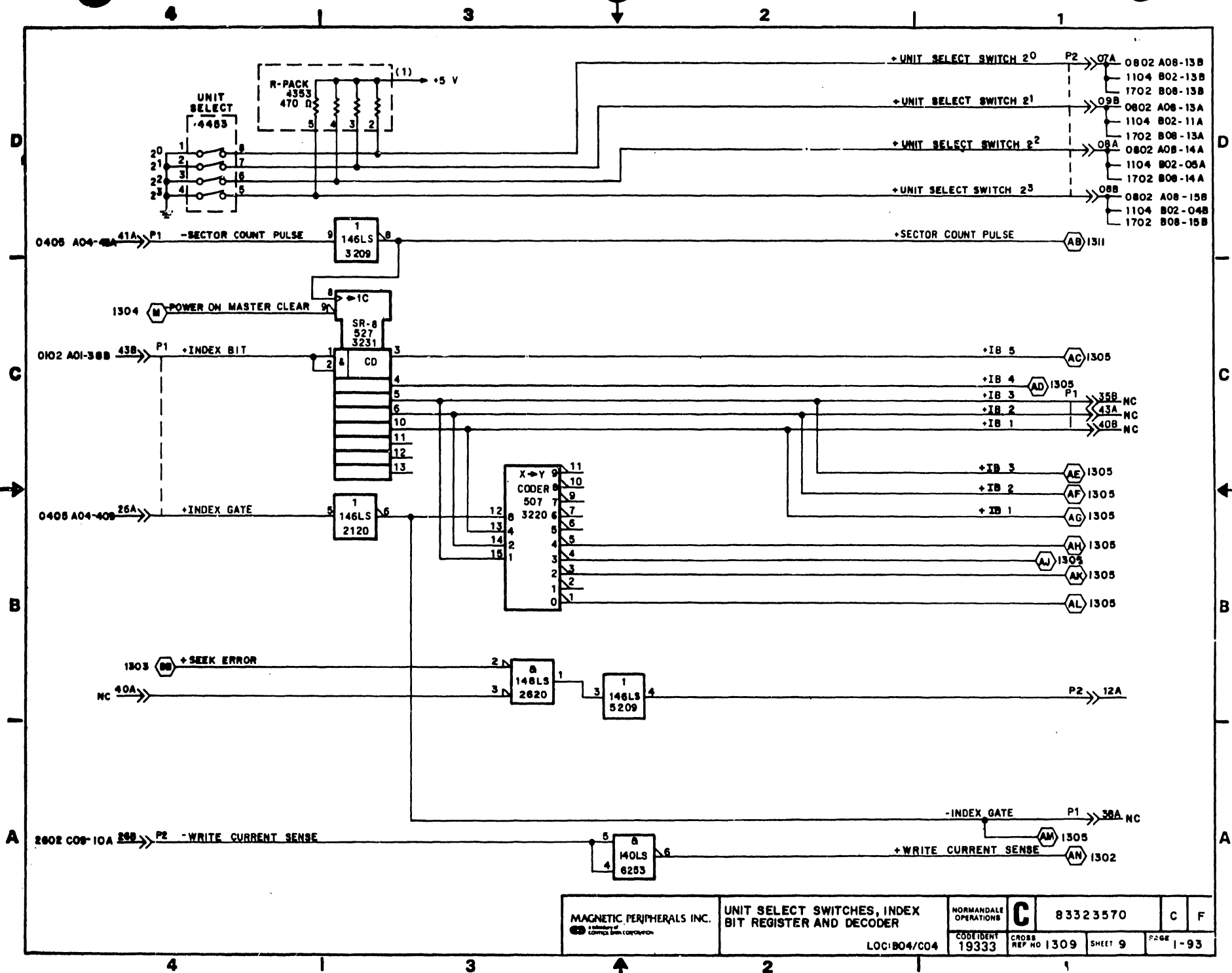




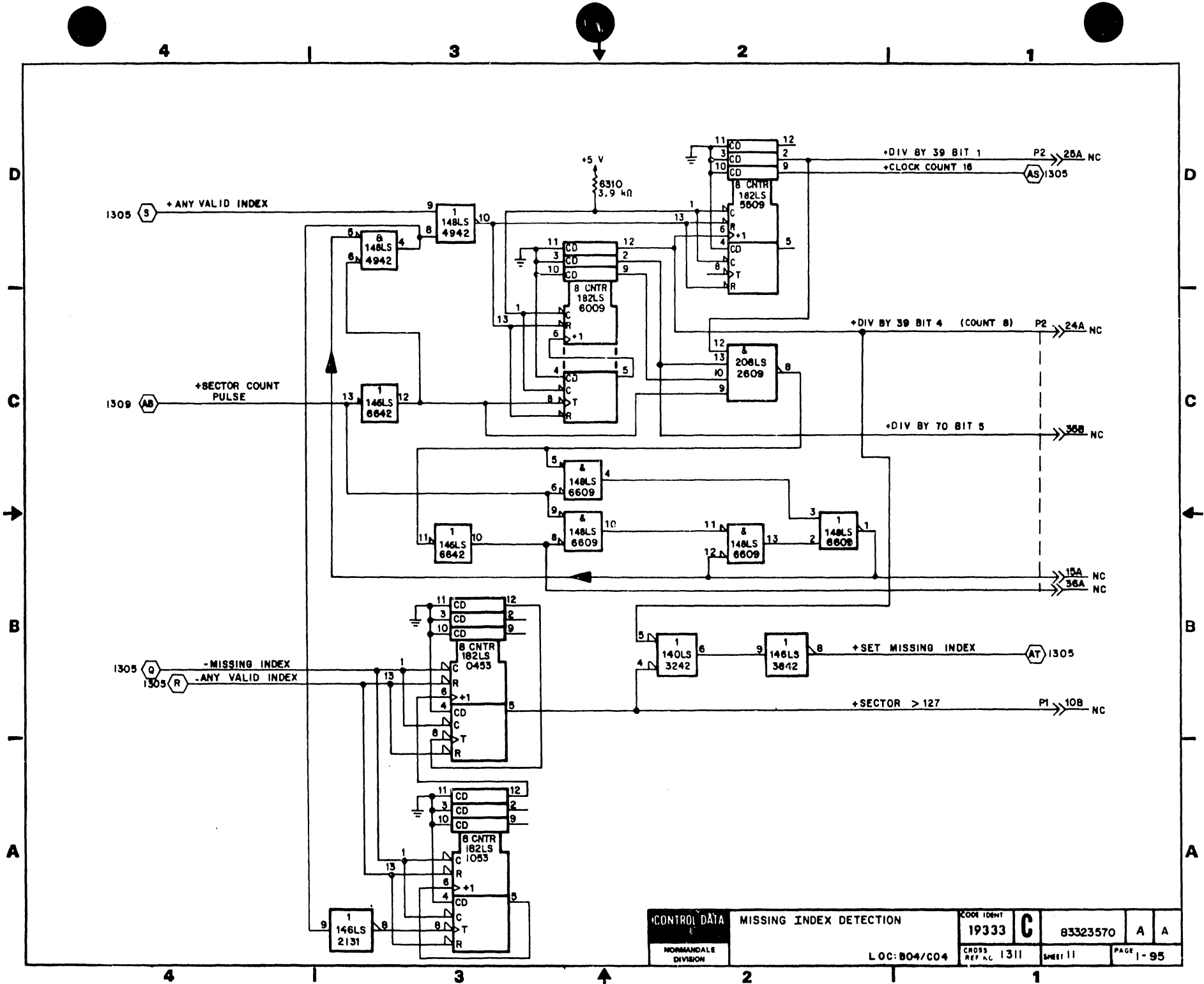
CONTROL DATA	SECTOR SWITCHES AND DECODER		CODE IDENT	C	8 33 23570	D	L
			19333				
NORMANDEALE DIVISION		LOC: B04/CO4		CROSS REF NO 1306	SHEET 6	PAGE 1-90	



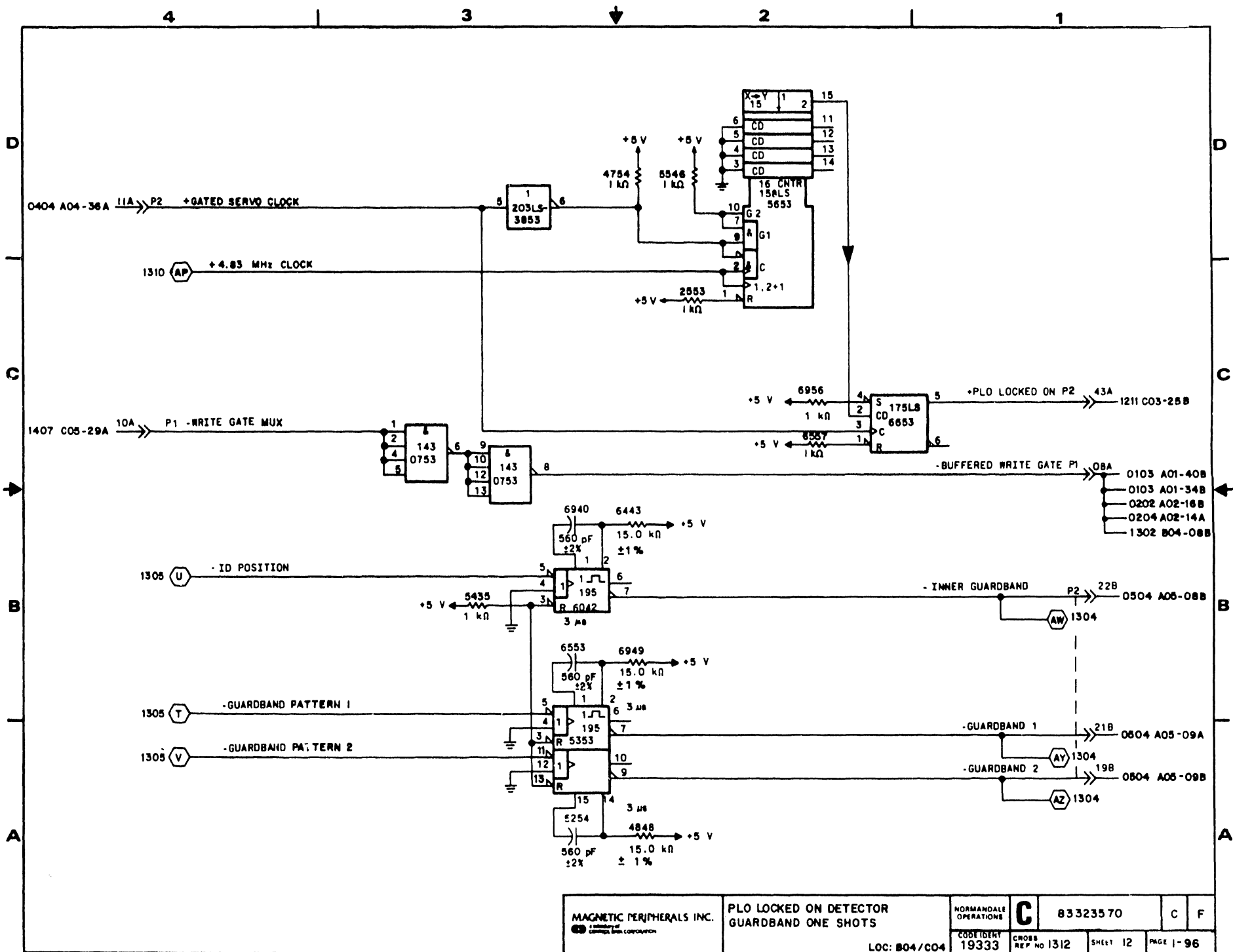








CONTROL DATA NORMANDEALE DIVISION	MISSING INDEX DETECTION	CODE IDENT 19333	C	83323570	A	A
	LOC: B04/C04	CROSS REF AC 1311				



<b>MAGNETIC PERIPHERALS INC.</b> <small>A Division of          General Electric Corporation</small>	<b>PLO LOCKED ON DETECTOR          GUARDBAND ONE SHOTS</b>	<b>NORMANDALE OPERATIONS</b>	<b>C</b>	<b>833235 70</b>	<b>C</b>	<b>F</b>
		CODE IDENT <b>19333</b>	CROSS REF No <b>1312</b>	SHEET <b>12</b>	PAGE <b>1-96</b>	
LOC: B04/CO4						

REVISION STATUS OF SHEETS

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

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
146LS	5209	12, 10, 8
140LS	3242	8
140LS	6253	3, 11
200	1520	10
203LS	3853	2, 4, 10
224LS	0431	12
224LS	4920	6, 8
4049	6031	10
208LS	0420	8
208LS	2609	6
233LS	1042	13, 4
140LS	4442	6
148LS	3509	10

REV	ECO	DESCRIPTION	DATE	BY
A	DH23000	RELEASED	4-10-62	CB
	DH02447	CREATED ELEX FOR BZ7E1 W/Y UNITS	7-30-62	CB

UNUSED TRANSISTOR SECTIONS

TYPE	LOCATION	PIN(S)
MPQ 2369	6020	4, 5, 6

UNUSED RESISTOR PACK

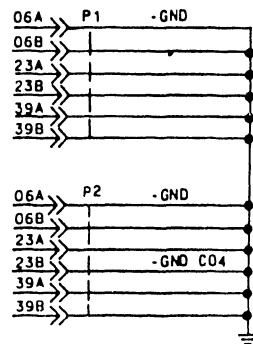
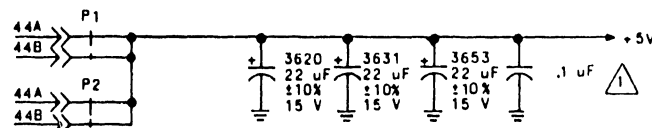
LOCATION	PIN(S)
4353	6, 7, 8

FILTER CAPS

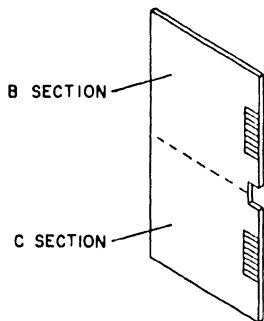
.1 uF		
0310	2532	4732
0321	2954	4743
0354	3010	4821
0808	3021	5243
0832	3032	
0743	3043	5810
1422	3521	5832
1832	3554	6343
1943	3732	6510
2421	4254	6921
2454	4710	
2510		

NOTE:

- SEE TABLE FOR .1uF CAPACITOR LOCATION
- THIS CARD USED ON BZ7E1 W & Y UNITS ONLY.



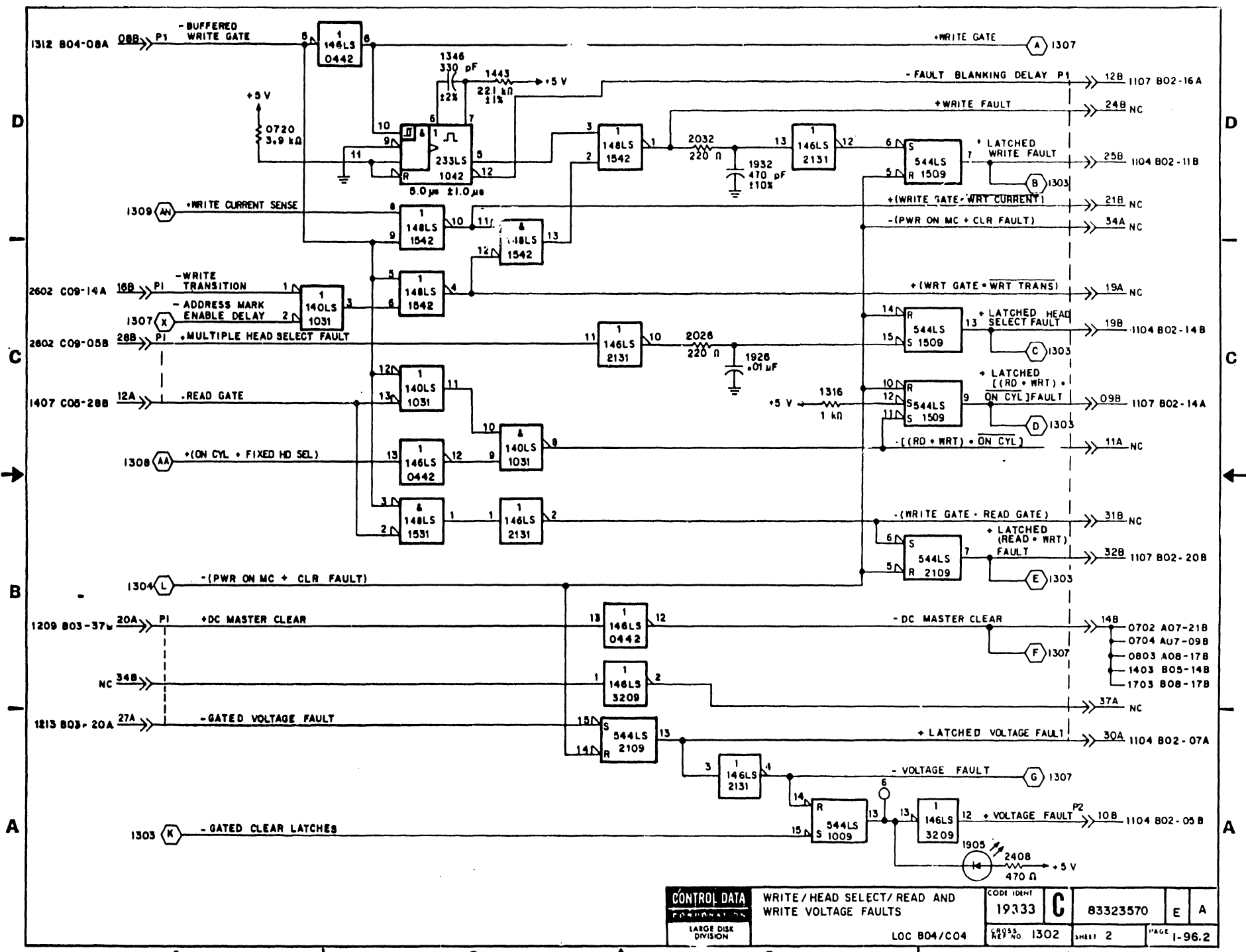
1310 C04 -20B



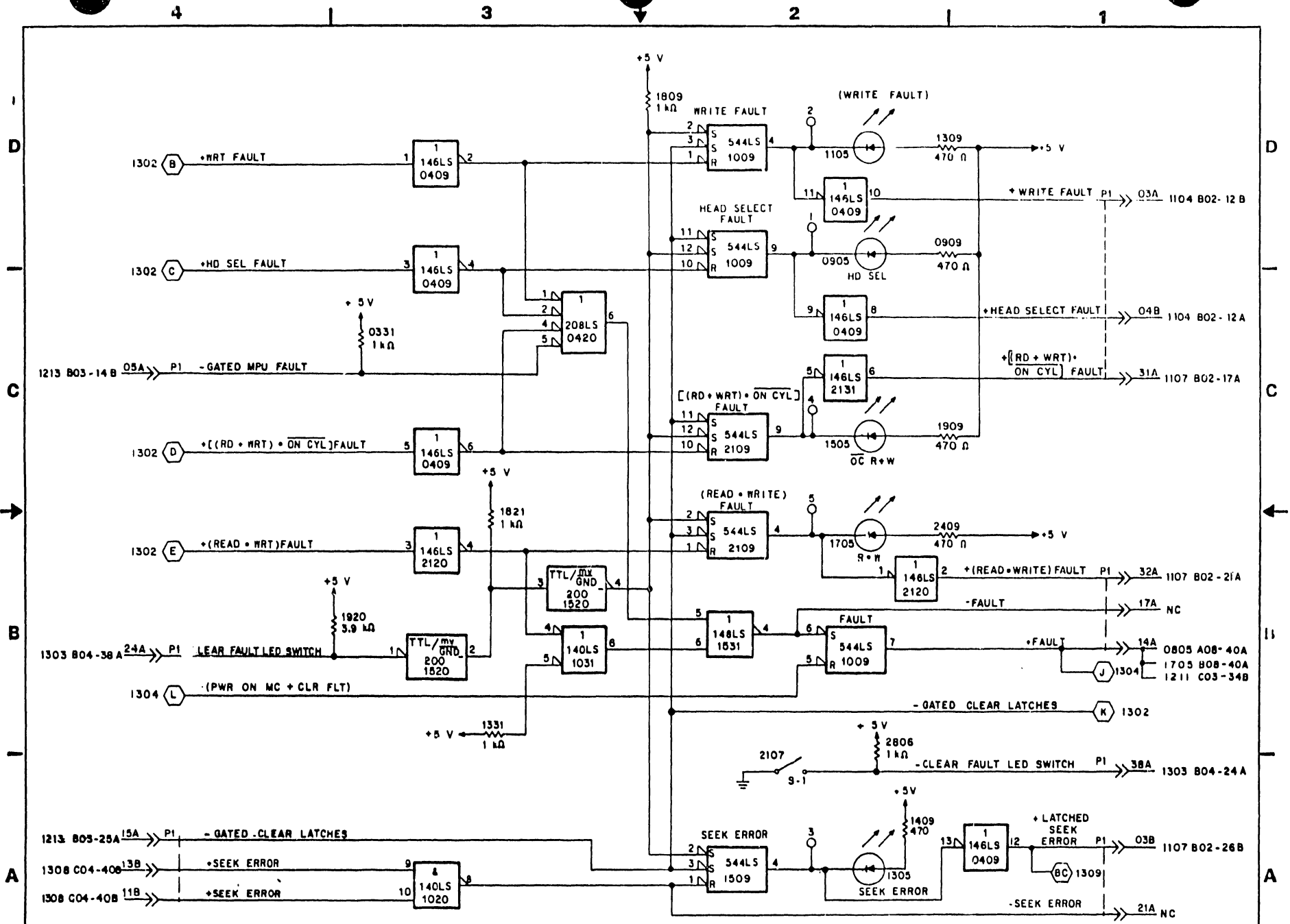
THE CARD IN THIS LOCATION SPANS ROWS B AND C OF THE LOGIC CHASSIS. THEREFORE, I/O INFORMATION MAY BE SPECIFIED BY BXX OR CXX. INFORMATION ON PINS IDENTIFIED WITH "P1" RELATE TO THE B OR UPPER SECTION OF THE CARD WHEREAS "P2" RELATES TO PINS ON THE C OR LOWER SECTION OF THE CARD. CROSS REFERENCE NUMBERS ARE NOT AFFECTED.

DRAWN	C. Buss	3/11/60	MAGNETIC PERIPHERALS INC. CONTROL DATA CORPORATION	FAULT/CONTROL FUNCTION DIAGRAMS	LARGE DISK DIVISION	C	83323570	E	A
CHECKED									
ENGINEER	P. S. R. J.	4/6/60							
APPROVED									
				TYPE: ELEX	LOC: B04/C04	CODE IDENT 19333	CROSS REF NO 1301	SHEET 1 of 12	PAGE 1-96.1

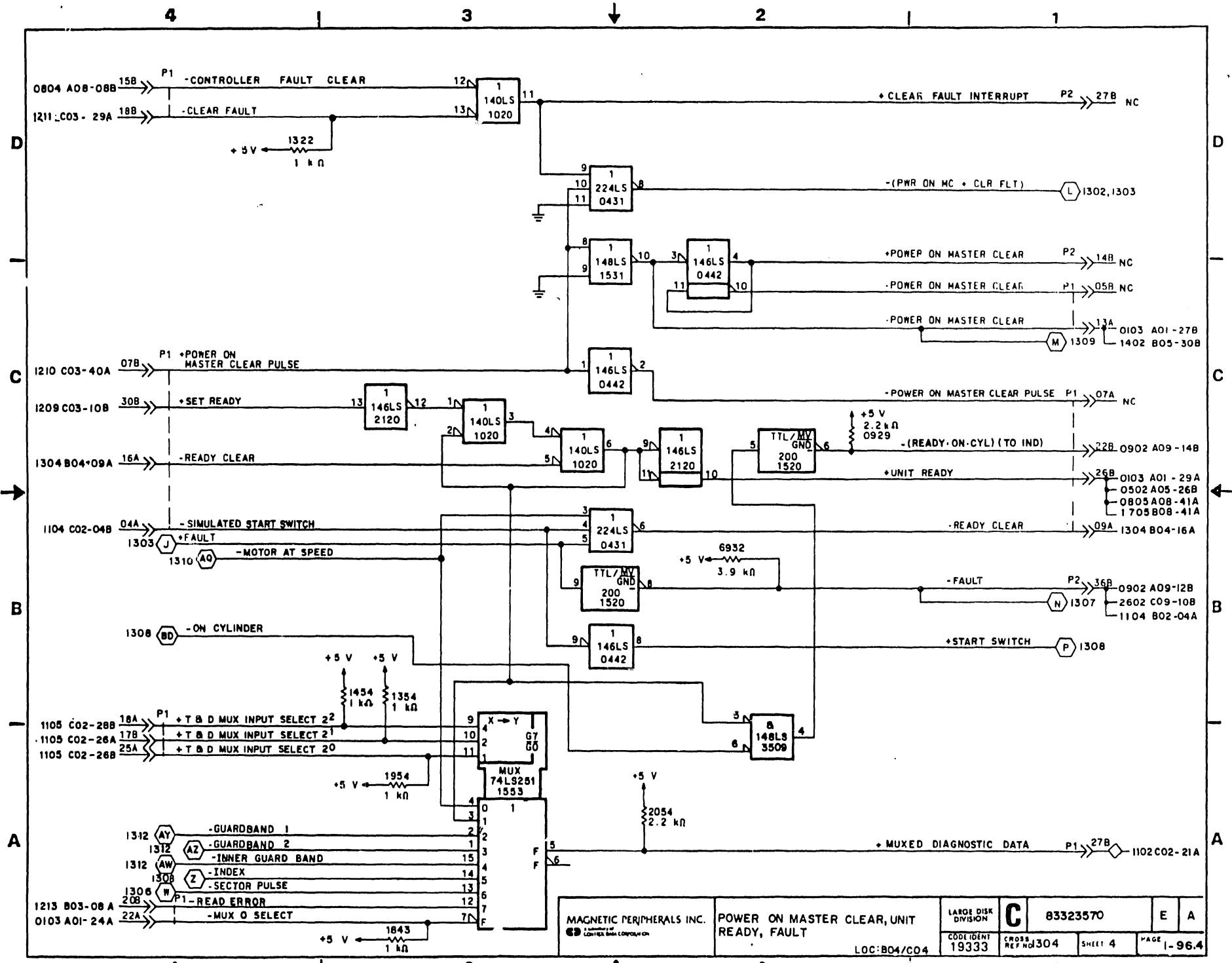




CONTROL DATA CORPORATION LARGE DISK DIVISION	WRITE / HEAD SELECT / READ AND WRITE VOLTAGE FAULTS	CODE IDENT 19333	G	83323570	E	A
	LOC B04/C04	REF NO 1302				

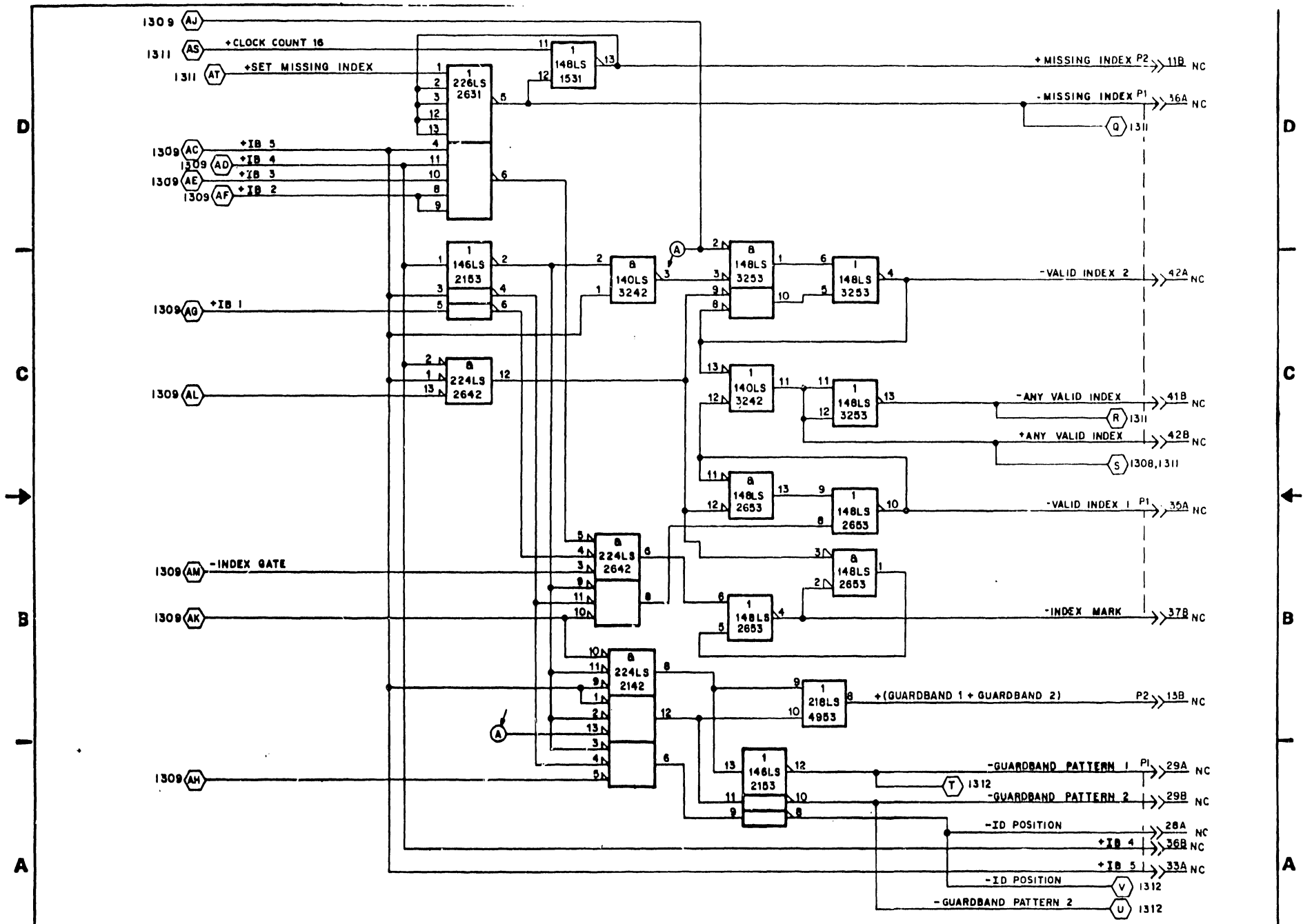


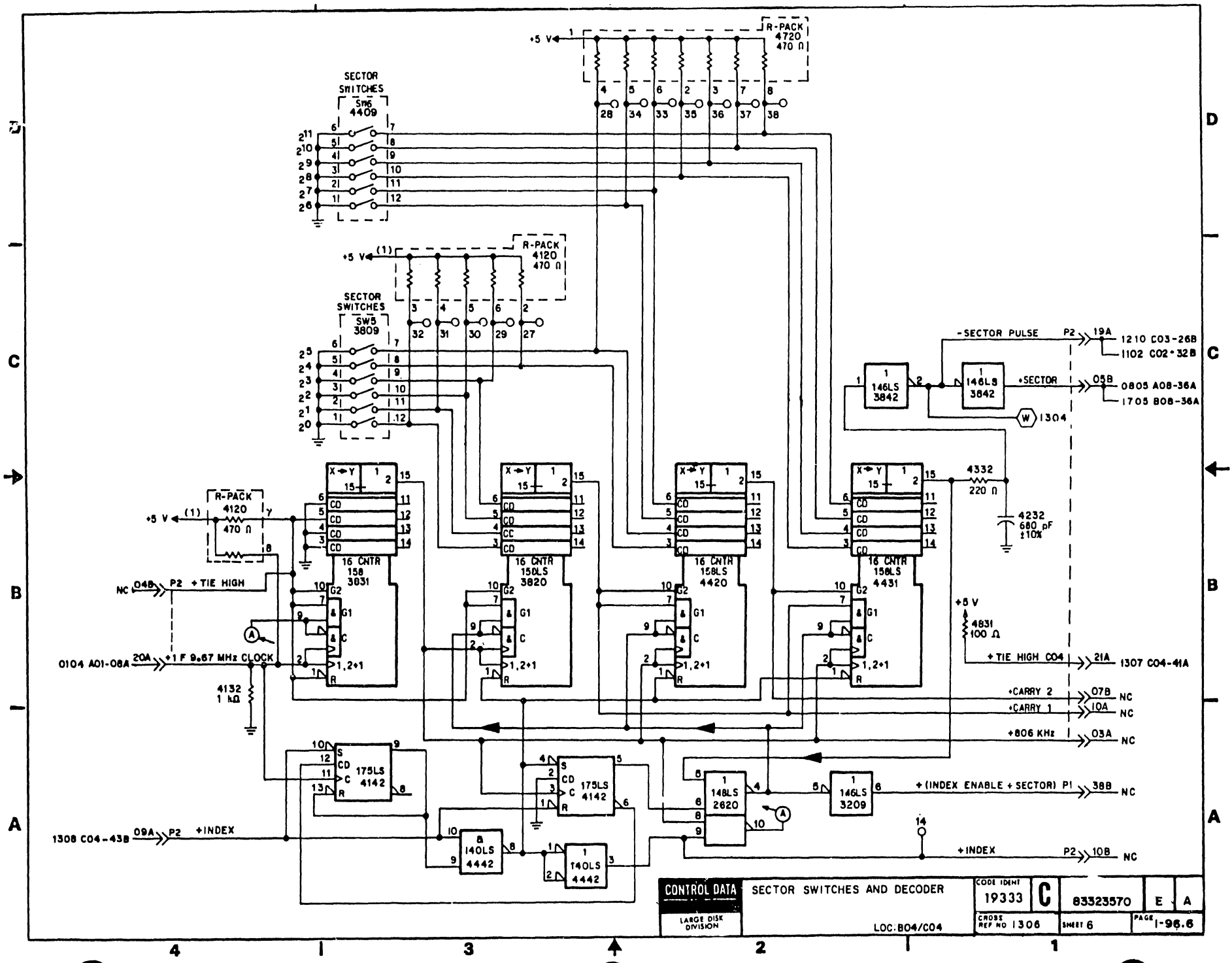
CONTROL DATA LARGE DISK DIVISION	SEEK ERROR AND FAULT INDICATORS	CODE 104M1 19333	C	83323570	E	A
	LOC: BU4/CO4	CROSS REF NO 1303				



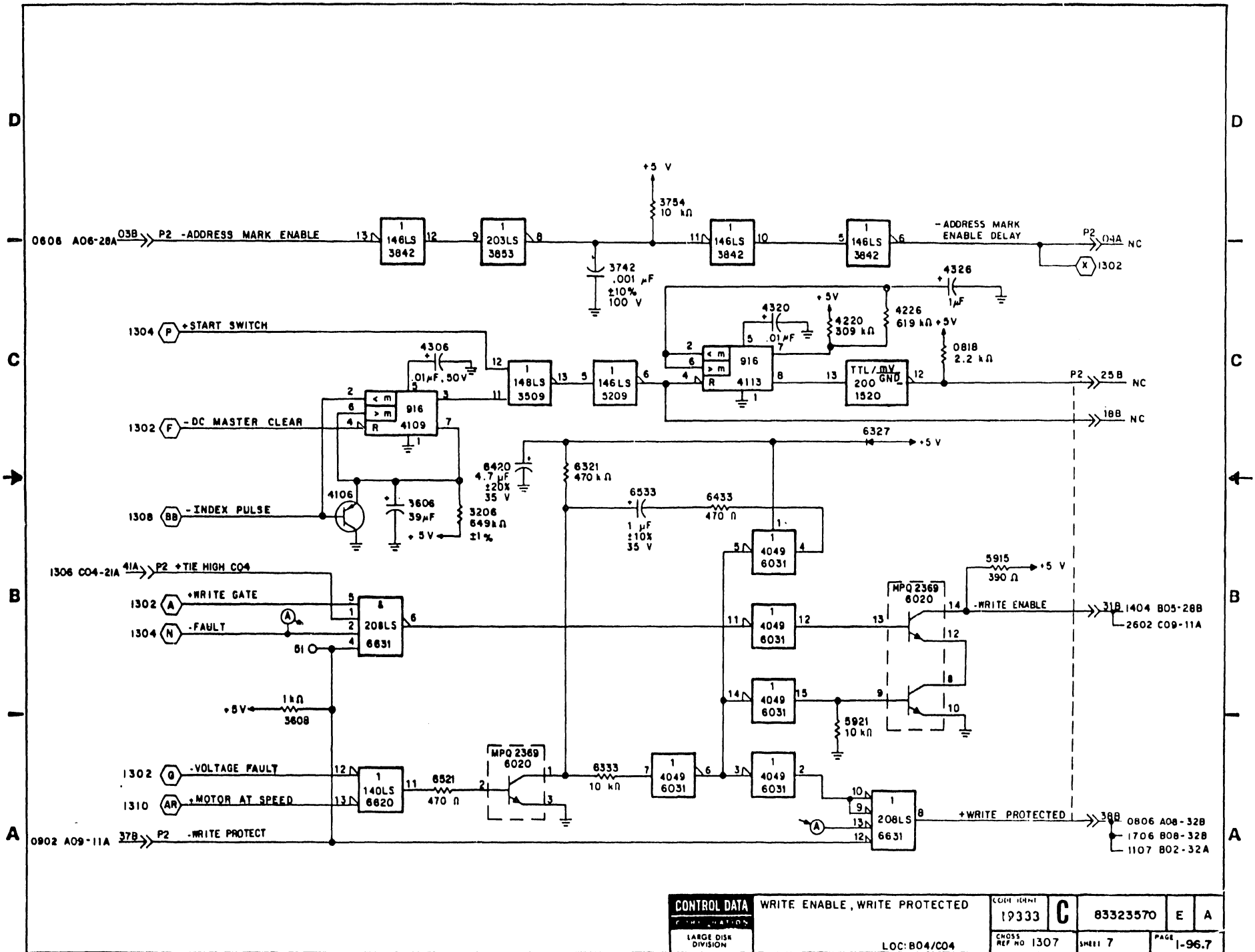
MAGNETIC PERIPHERALS INC. <small>© LIGHTS BARK COMPANY</small>	POWER ON MASTER CLEAR, UNIT READY, FAULT		LARGE DISK DIVISION	<b>C</b> 83323570	E A
	CODE IDENT 19333	CROSS REF NO 304	SHEET 4	PAGE 1-96.4	

LOC: B04/C04





CONTROL DATA LARGE DISK DIVISION	SECTOR SWITCHES AND DECODER		COIL IDENT 19333	C	83323570	E	A
	LOC. B04/CO4		CROSS REF NO 1306				

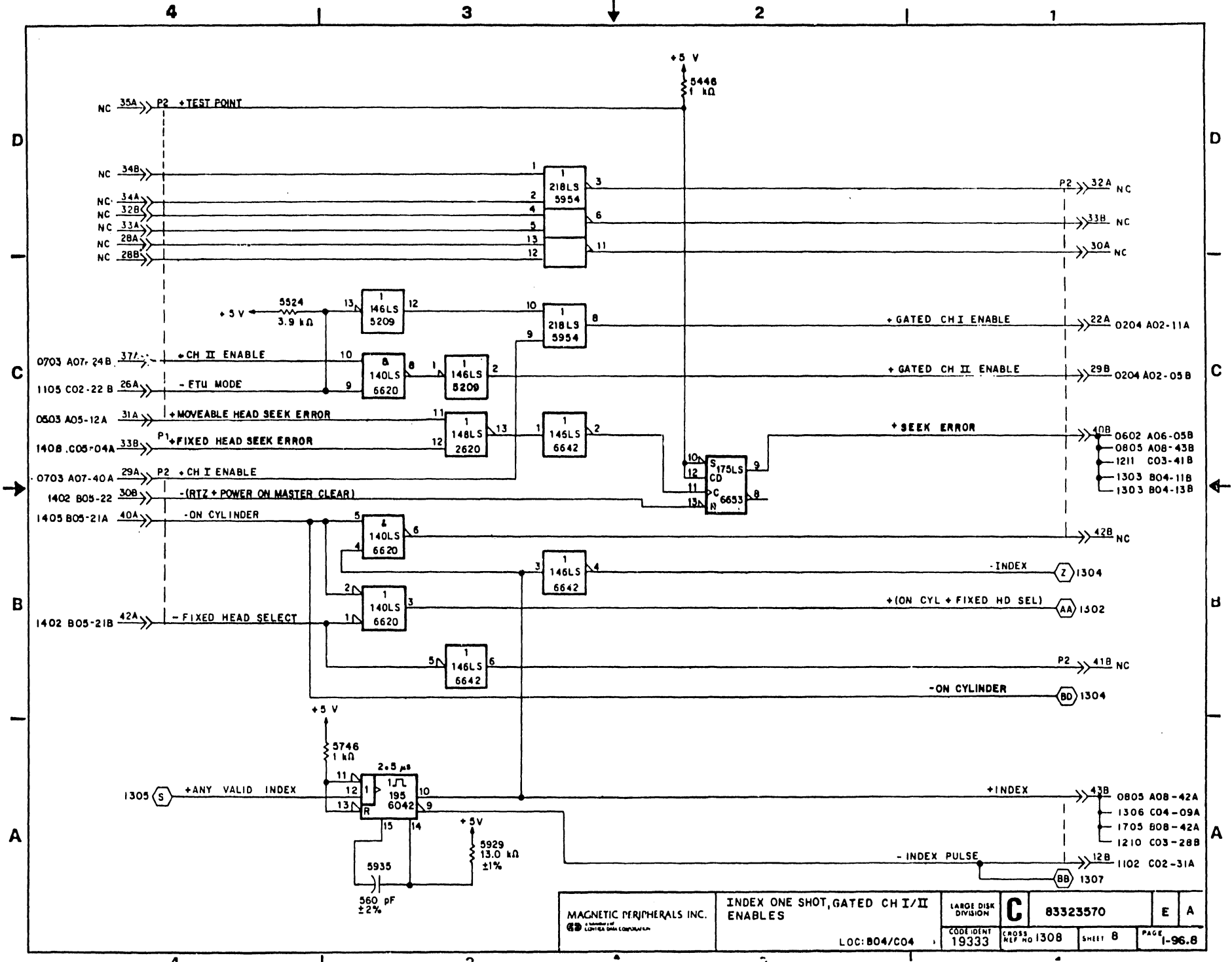


**CONTROL DATA** WRITE ENABLE, WRITE PROTECTED

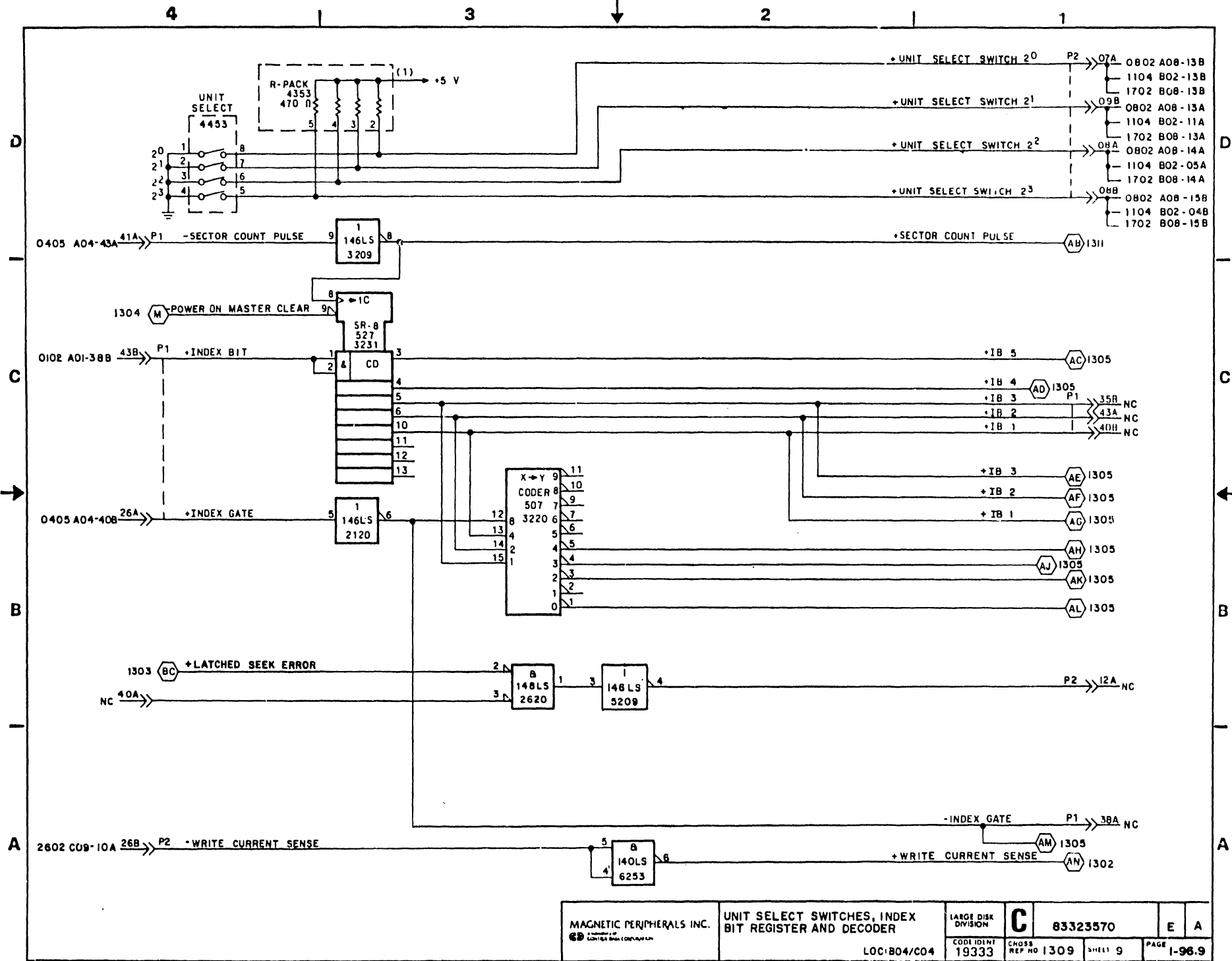
GENERATION  
LARGE DISK DIVISION

CODE IDENT 19333	<b>C</b>	83323570	E	A
CROSS REF NO 1307	SHEET 7	PAGE 1-96.7		

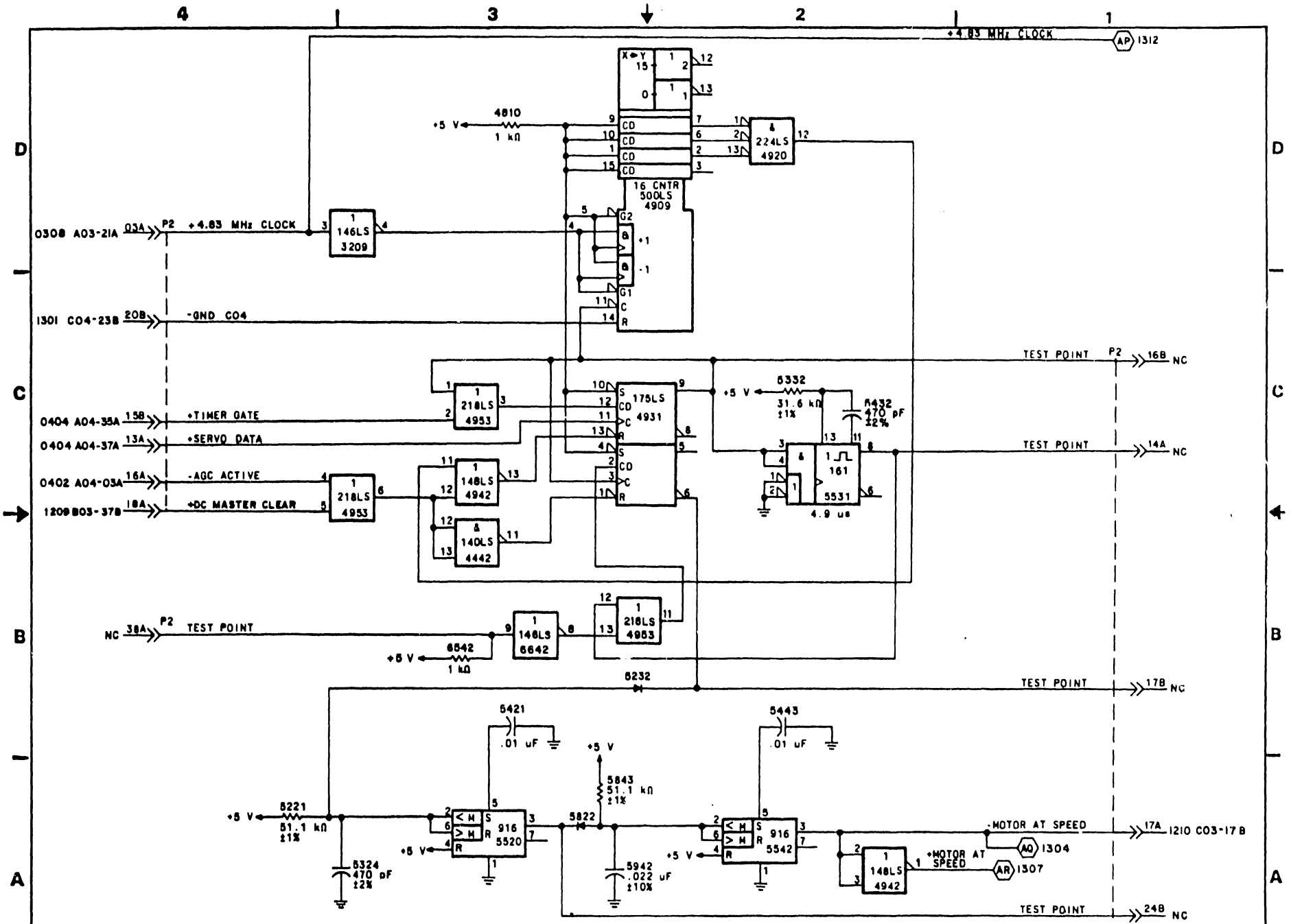
LOC: B04/C04



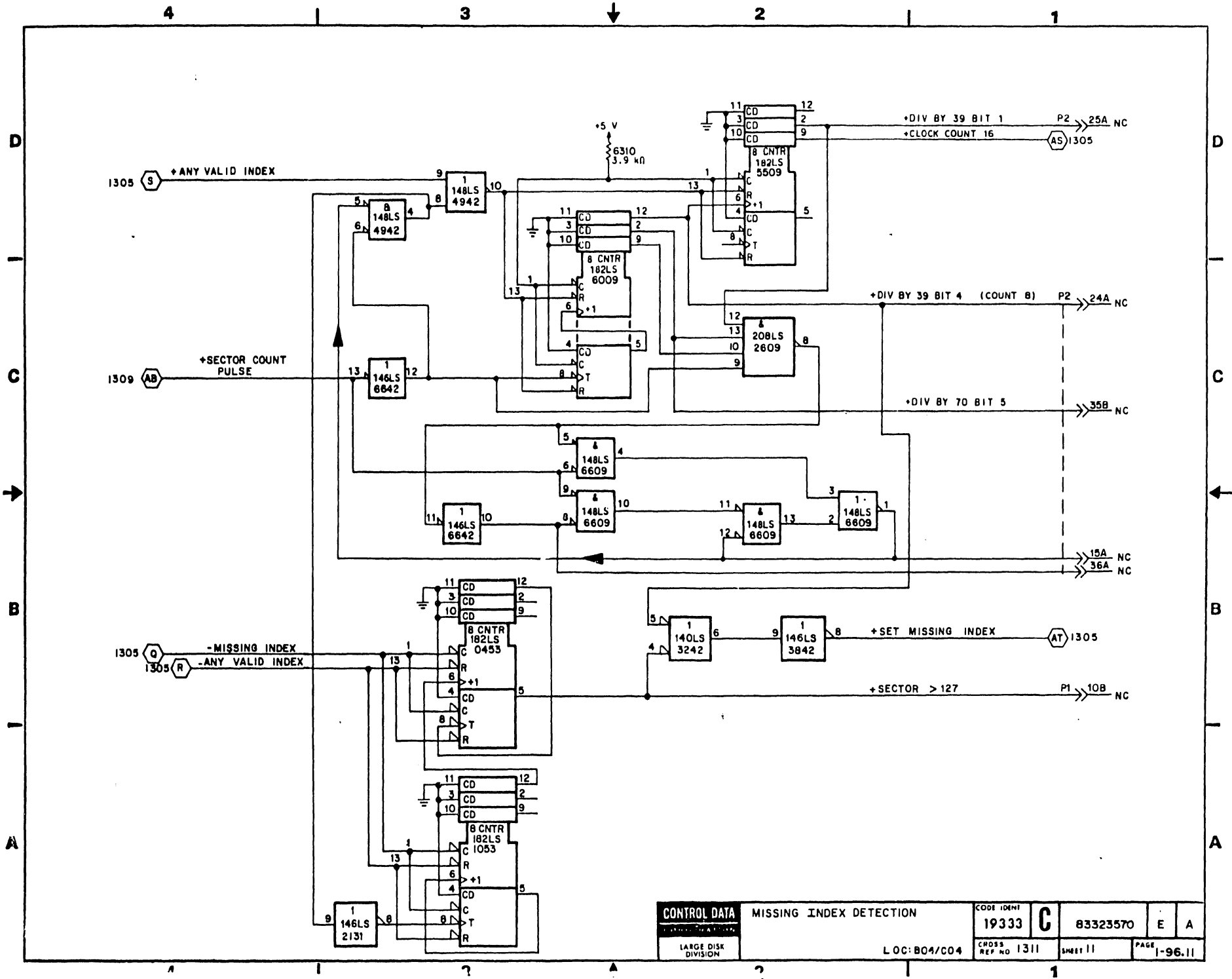
MAGNETIC PERIPHERALS INC. A Division of CENTRA DATA CORPORATION	INDEX ONE SHOT, GATED CH I/II ENABLES		LARGE DISK DIVISION	<b>C</b>	83323570	E	A
	LOC: B04/C04		CODE IDENT 19333	CROSS REF NO 1308	SHEET 8	PAGE 1-96.8	



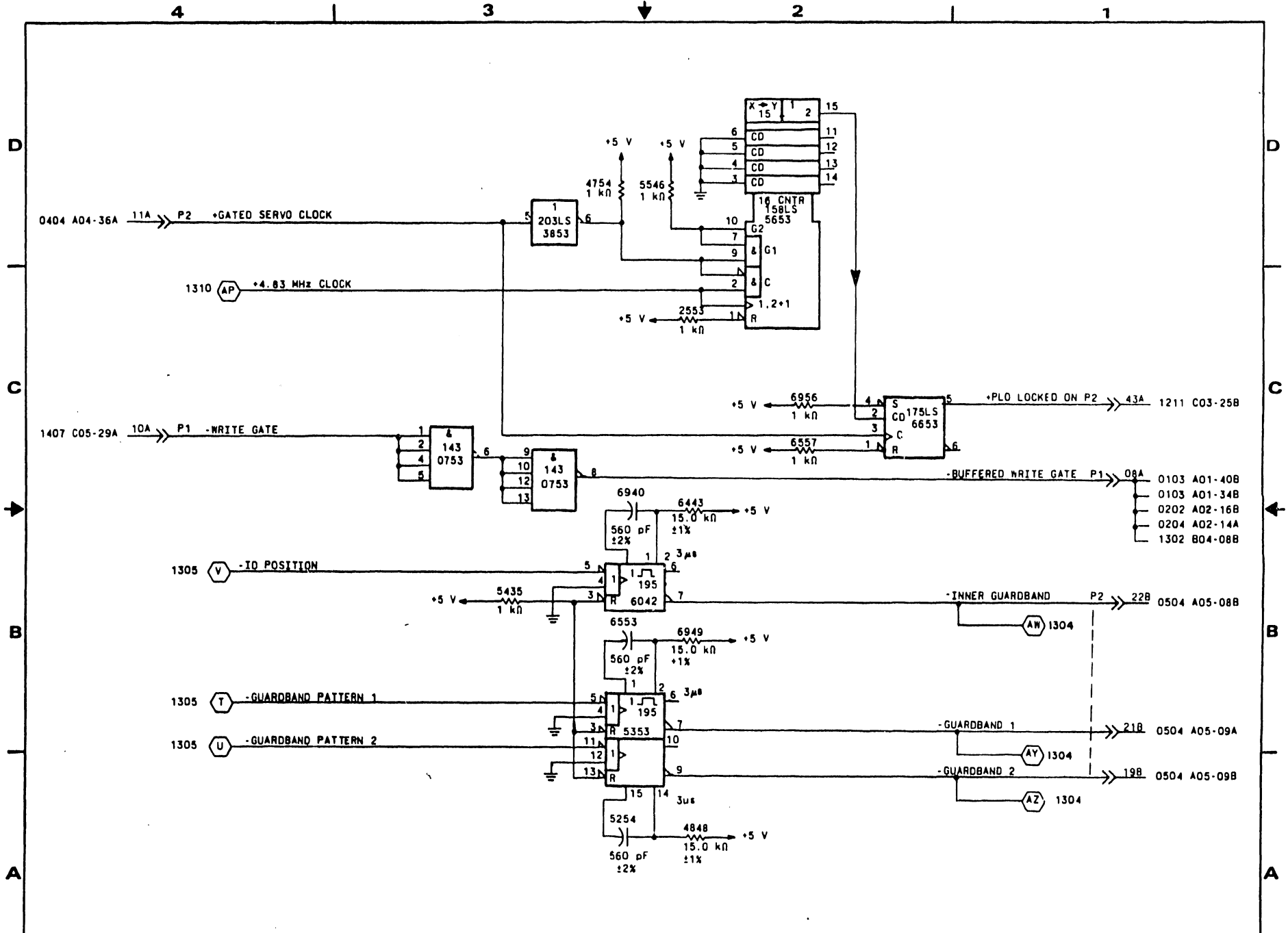




MAGNETIC PERIPHERALS INC. A Division of General Electric Company	MOTOR AT SPEED DETECTION	LARGE DISK DIVISION	<b>C</b>	83323570	E	A
	LOC: B04/CO4	CODE IDENT 19333	CROSS REF NO 310	SHEET 10	PAGE 1-96, 10	



CONTROL DATA LARGE DISK DIVISION	MISSING INDEX DETECTION		CODE IDENT 19333	C	83323570	E	A
	LOC: B04/C04		CROSS REF NO 1311	SHEET 11	PAGE 1-96.11		



MAGNETIC PERIPHERALS INC. A member of CONTECH BULL CORPORATION	PLO LOCKED DETECTOR, GUARDBAND ONE SHOTS		LARGE DISK DIVISION	<b>C</b>	83323570	E	A
	LOC: 804/C04		CODE IDENTY 19333	CROSS REF NO	1312	SHEET 12	PAGE 1-96.12

REVISION STATUS OF SHEETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	A	A	A	A	A	A	A	A	A	A								
B		B																	
C	C	C	C	C	C	C	C	C			C								
D		D		D															
E	E					E													
F		F						F		F									
G						G													
H							H												
J	J																		
K		K																	
L				L	L	L													
M	M																		
N		N	N			N		N		N									

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
148LS	2620	1
146LS	5209	8
140LS	3242	8
200	1520	10
203LS	3853	2,4,10
224LS	0431	12
224LS	4920	6,8
4049	6031	10
208LS	0420	8
208LS	2609	6
233LS	1042	13,4
140LS	8253	3,11
148LS	3509	4,10

REVISIONS

REV	ECO	DESCRIPTION	DRFT	DATE	CHK'D
A	PE23000	RELEASED	CB	1-15-80	
B	PE81281	OFFSET FIX	CB	8-20-80	
C	PE81483	ADD FYU CAPABILITY			
D	PE81728	LOGIC DIAGRAM UPDATE			
E	PE81340	GENERATES SEEK ERROR FOR CYLS 899+UP	GT	2-25-81	AIA
F	PE81804	IMPROVE CLOCK CKT			PKP
G	PE81877	WRITE SPILCE FIX	JW	6-17-81	PKP
H	DH02092	FAULTY ERROR FIX	DWT	1-22-82	
J	DH02226	CORRECT DIAG			
K	DH02187	ADD B DIAG INFO			
L	DH02203	CHG RTZ TO SEEK ERROR TMMG. BLEK TO DLEX			
M	DH02378	CARD IMPROVEMENT	CB	7-29-82	
N	DH02482	PREVENTS READY FROM FLASHING ON POWER UP; DLEX TO FLEX	CB	7-29-82	

NOTE:

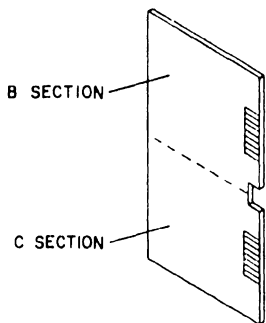
- SEE TABLE FOR .1uF CAPACITOR LOCATION
- THIS CARD USED IN UNITS HAVING SERIES CODES 15 & UP.

UNUSED RESISTOR PACK

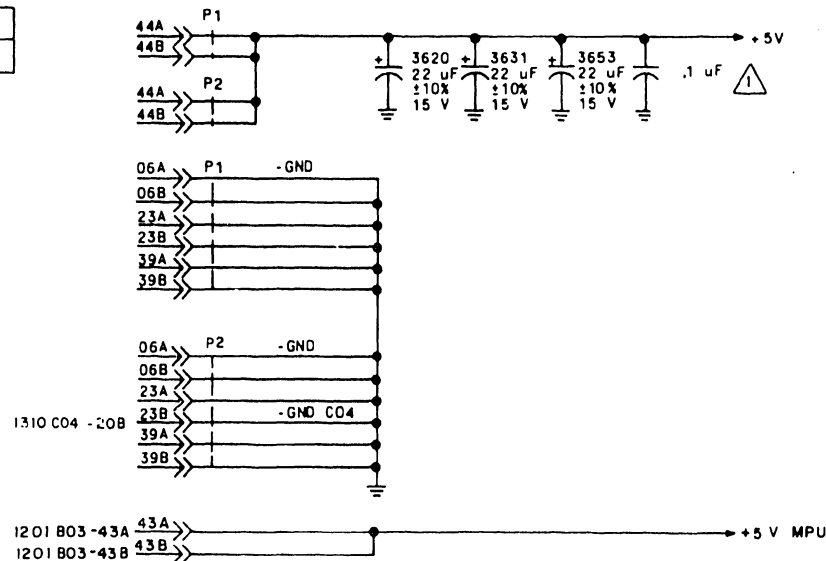
LOCATION	PIN(S)
4353	6,7,8

FILTER CAPS

.1 uF		
0310	2532	4732
0321	2954	4743
0354	3010	4821
0808	3021	5243
0832	3032	
0743	3043	5810
1422	3521	5832
1832	3554	6343
1943	3732	6510
2421	4254	6921
2454	4710	
2510		



THE CARD IN THIS LOCATION SPANS ROWS B AND C OF THE LOGIC CHASSIS. THEREFORE, I/O INFORMATION MAY BE SPECIFIED BY BXX OR CXX. INFORMATION ON PINS IDENTIFIED WITH A "P1" RELATE TO THE B OR UPPER SECTION OF THE CARD WHEREAS "P2" RELATES TO PINS ON THE C OR LOWER SECTION OF THE CARD. CROSS REFERENCE NUMBERS ARE NOT AFFECTED.



DRAWN	C. Binn	J. S. Co.
CHECKED		
ENGINEER	D. S. Katz	Varia
APPROVED		

MAGNETIC PERIPHERALS INC.  
A DIVISION OF CONTROL DATA CORPORATION

FAULT / CONTROL FUNCTION  
DIAGRAMS

LARGE DISK  
DIVISION

C

83323570

E N

TYPE: FLEX LOC: B04/C04

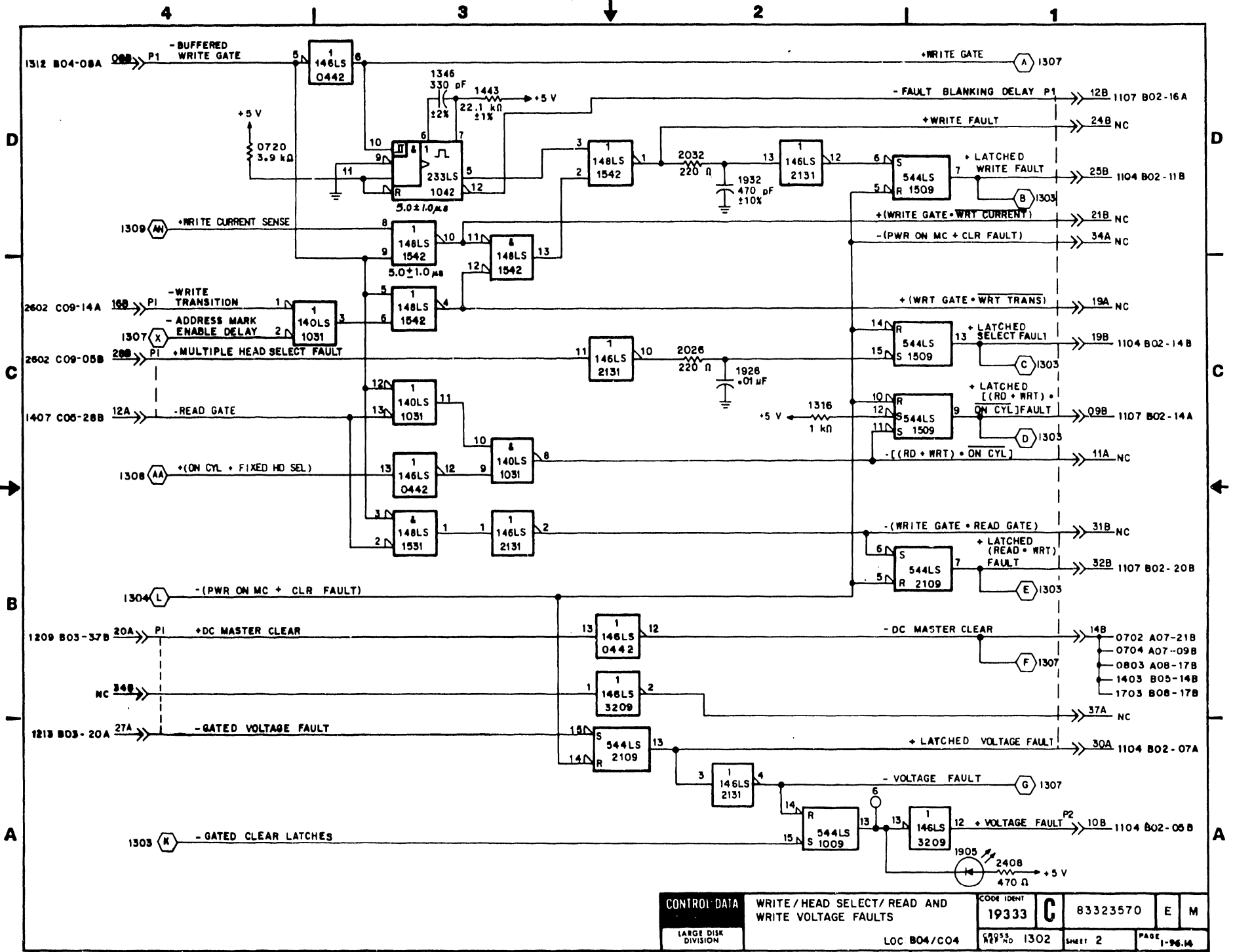
CODE IDENT  
19333

CROSS REF NO  
1301

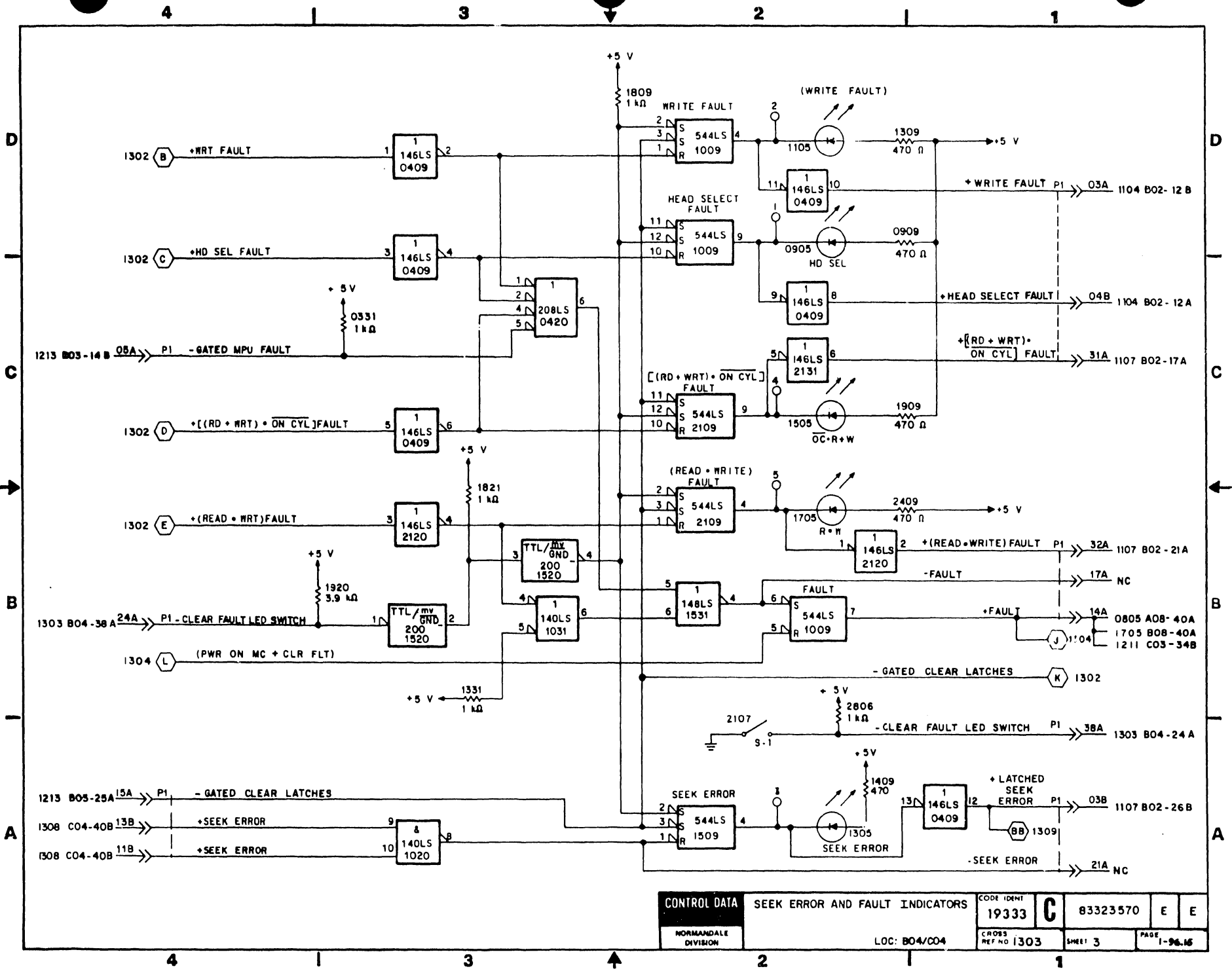
SHEET  
1 of 12

PAGE  
1-96.13

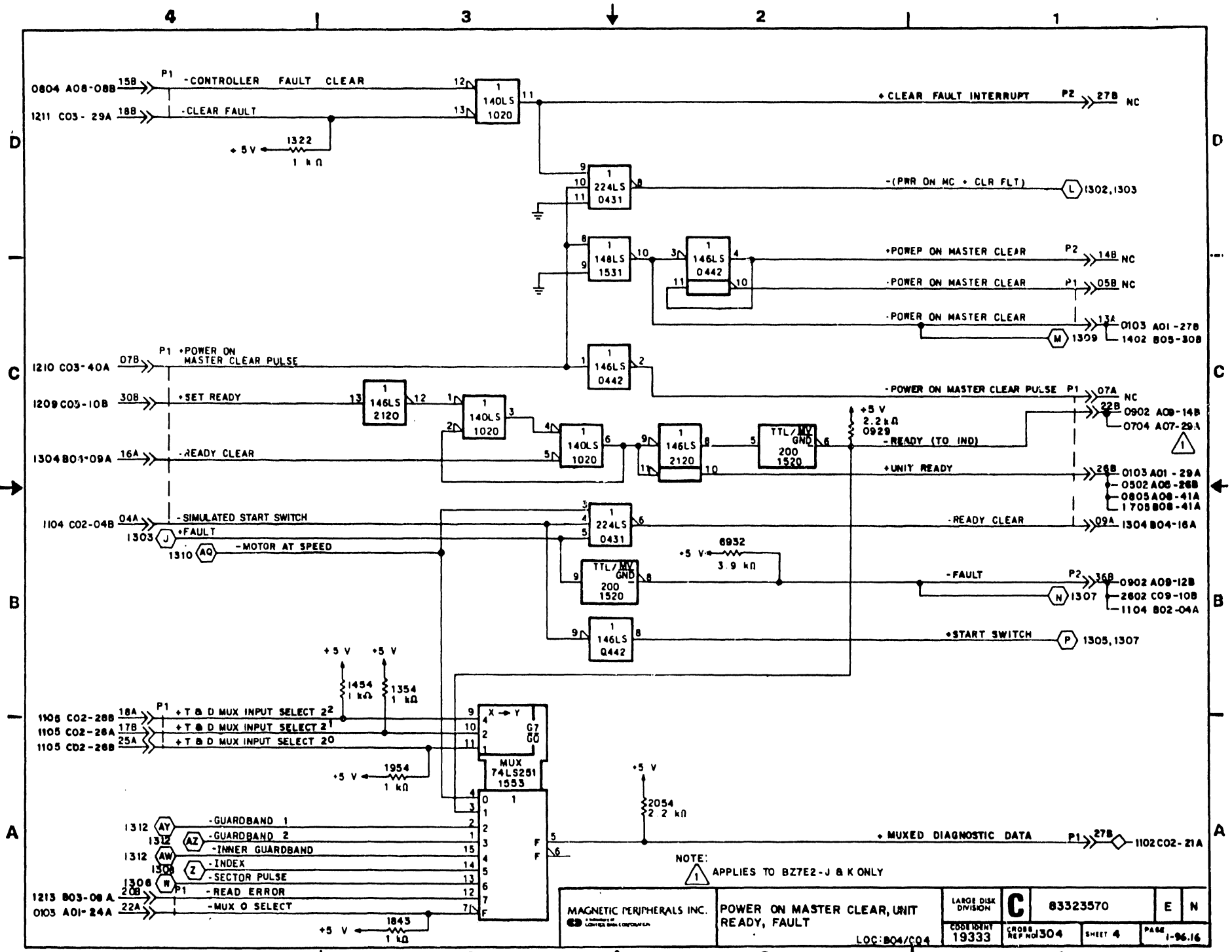
1 REF: 8180018

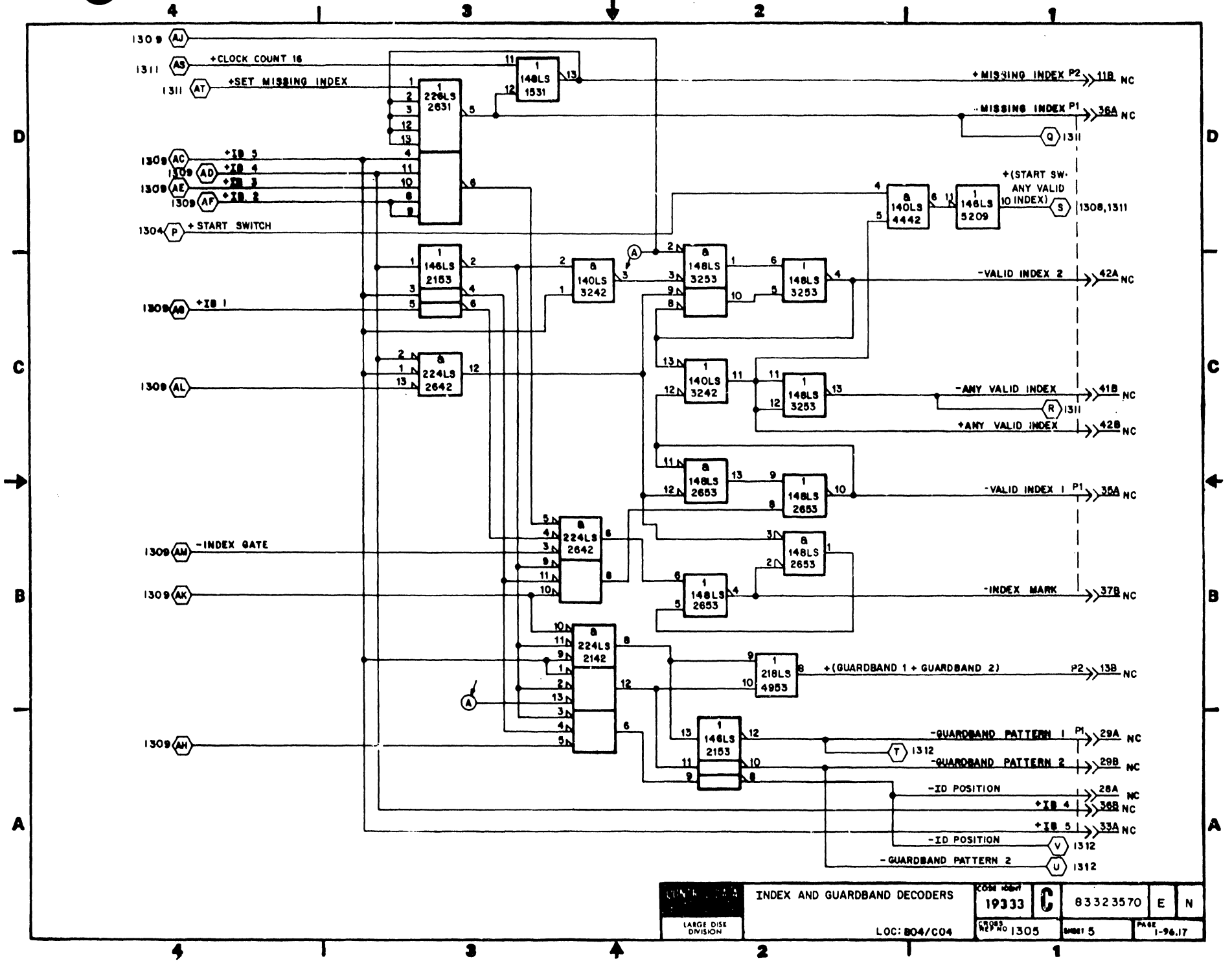


CONTROL DATA LARGE DISK DIVISION	WRITE / HEAD SELECT / READ AND WRITE VOLTAGE FAULTS	CODE IDENT 19333	C	83323570	E	M
	LOC B04/CO4	19333 No 1302				

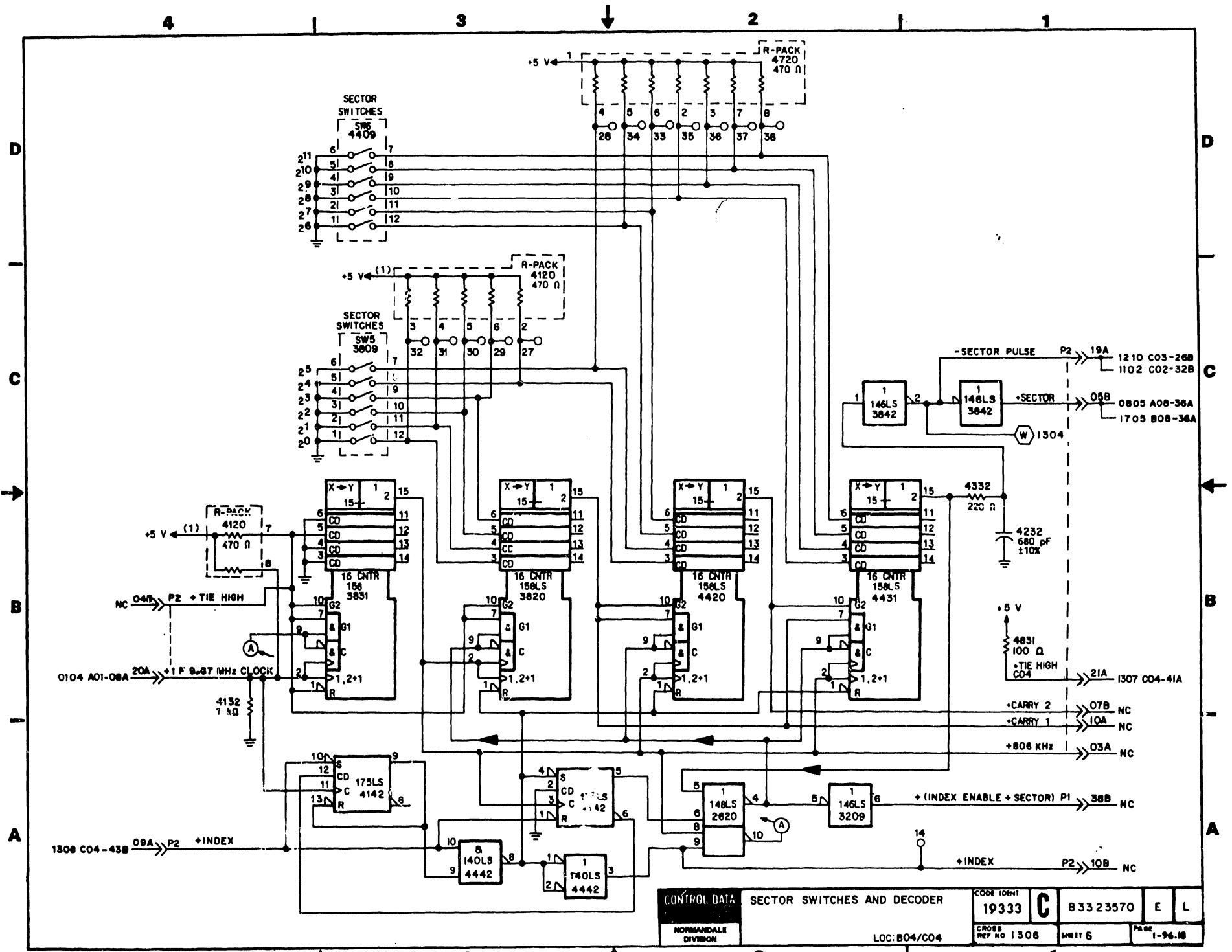


CONTROL DATA	SEEK ERROR AND FAULT INDICATORS	CODE IDENT	19333	C	83323570	E	E
	NORMANDEALE DIVISION	LOC: B04/CO4	CROSS REF NO 1303		SHEET 3	PAGE 1-96.16	

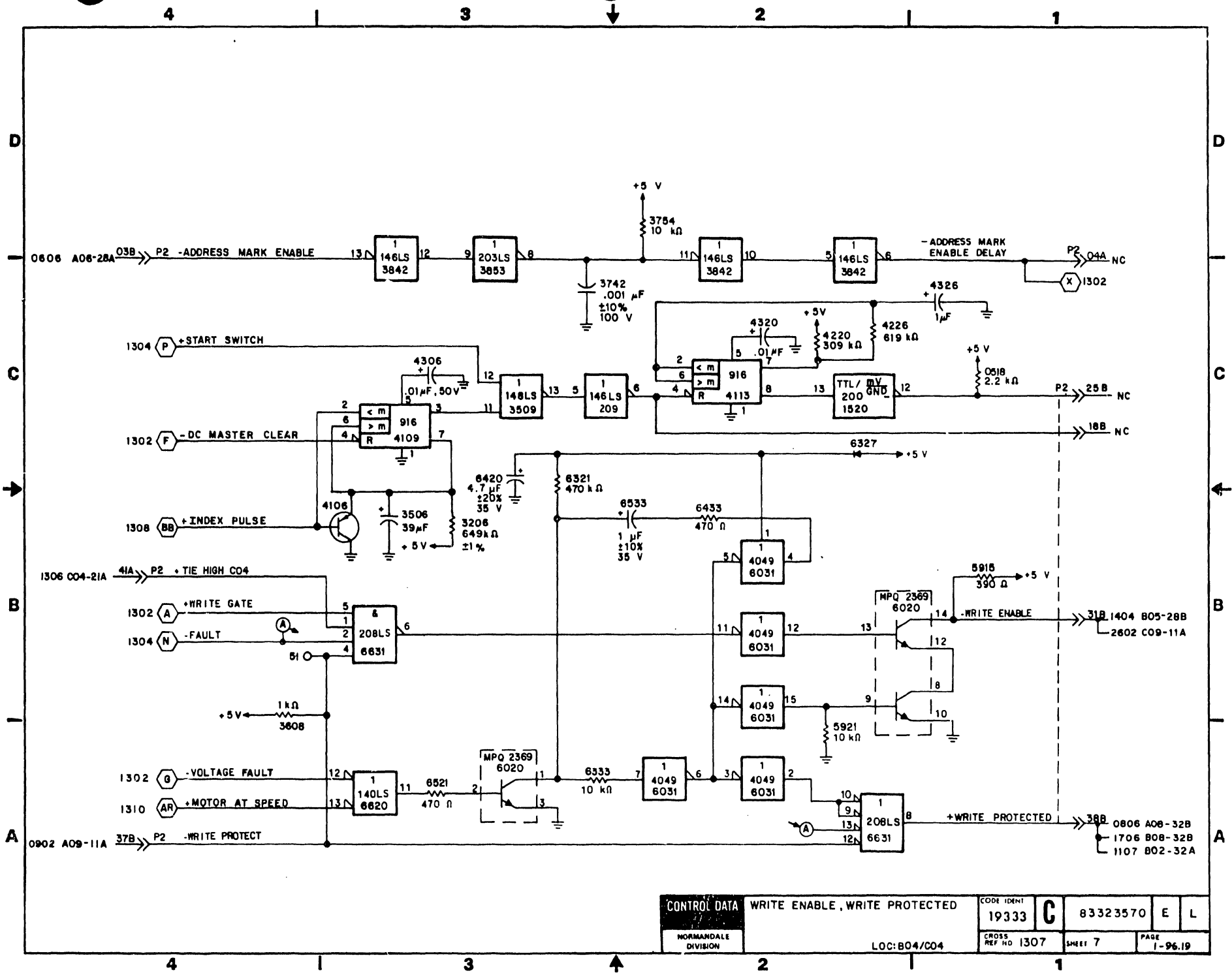




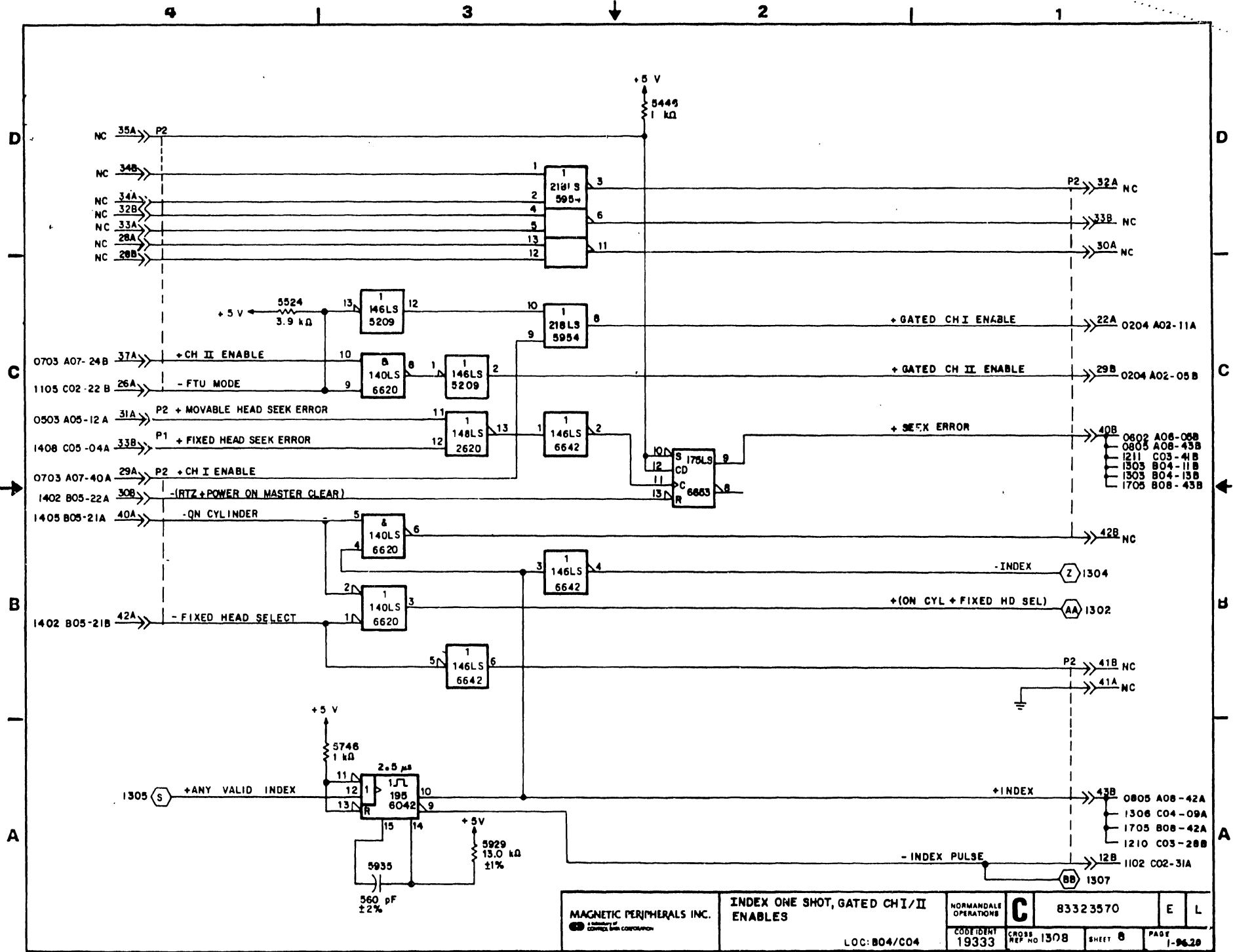




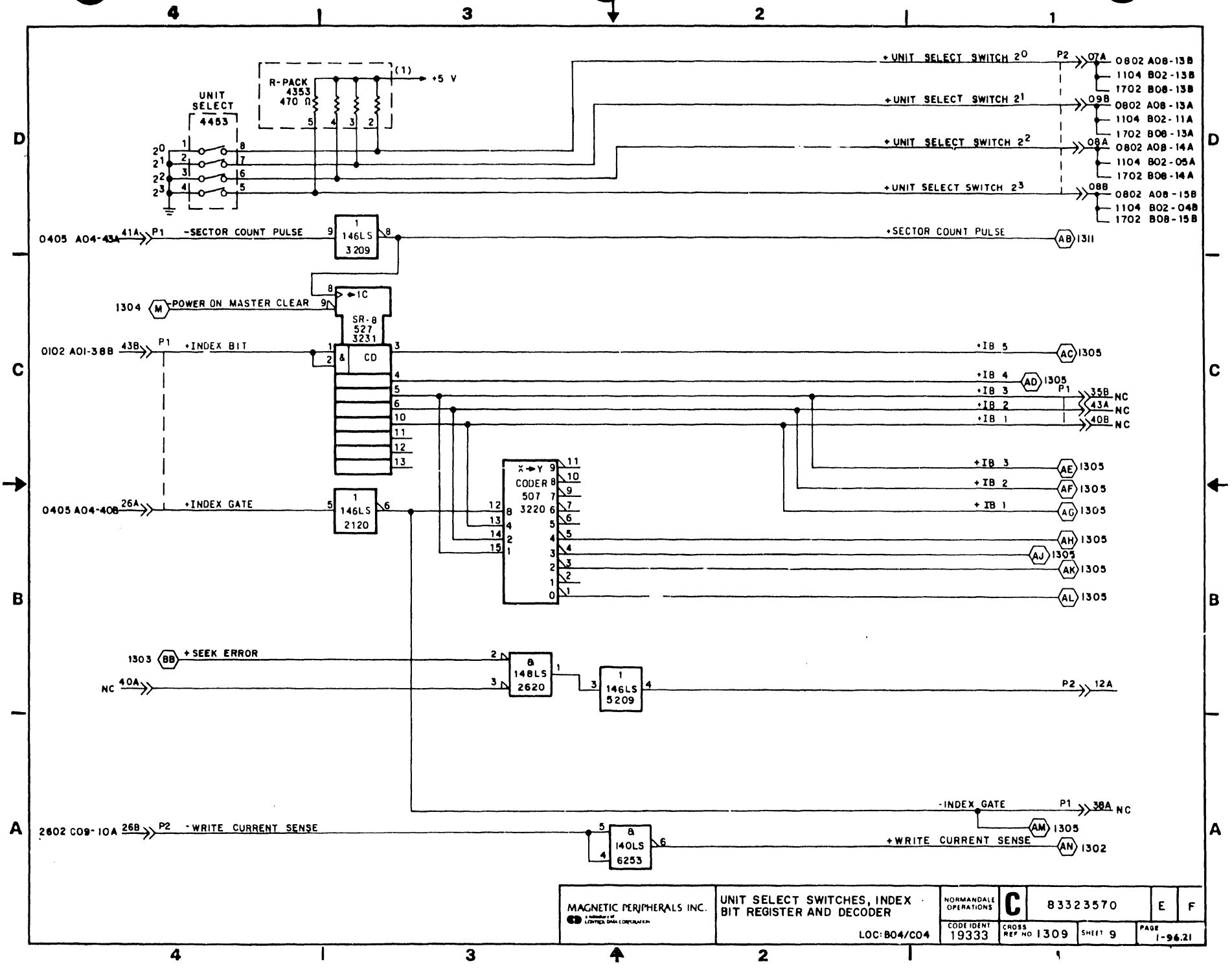
CONTROL DATA	SECTOR SWITCHES AND DECODER			CODE IDENT	C	833 23570	E	L
	NORMANDEALE DIVISION	LOC: B04/CO4		19333				
				CROSS REF NO 1306	SHEET 6	PAGE 1-96.18		

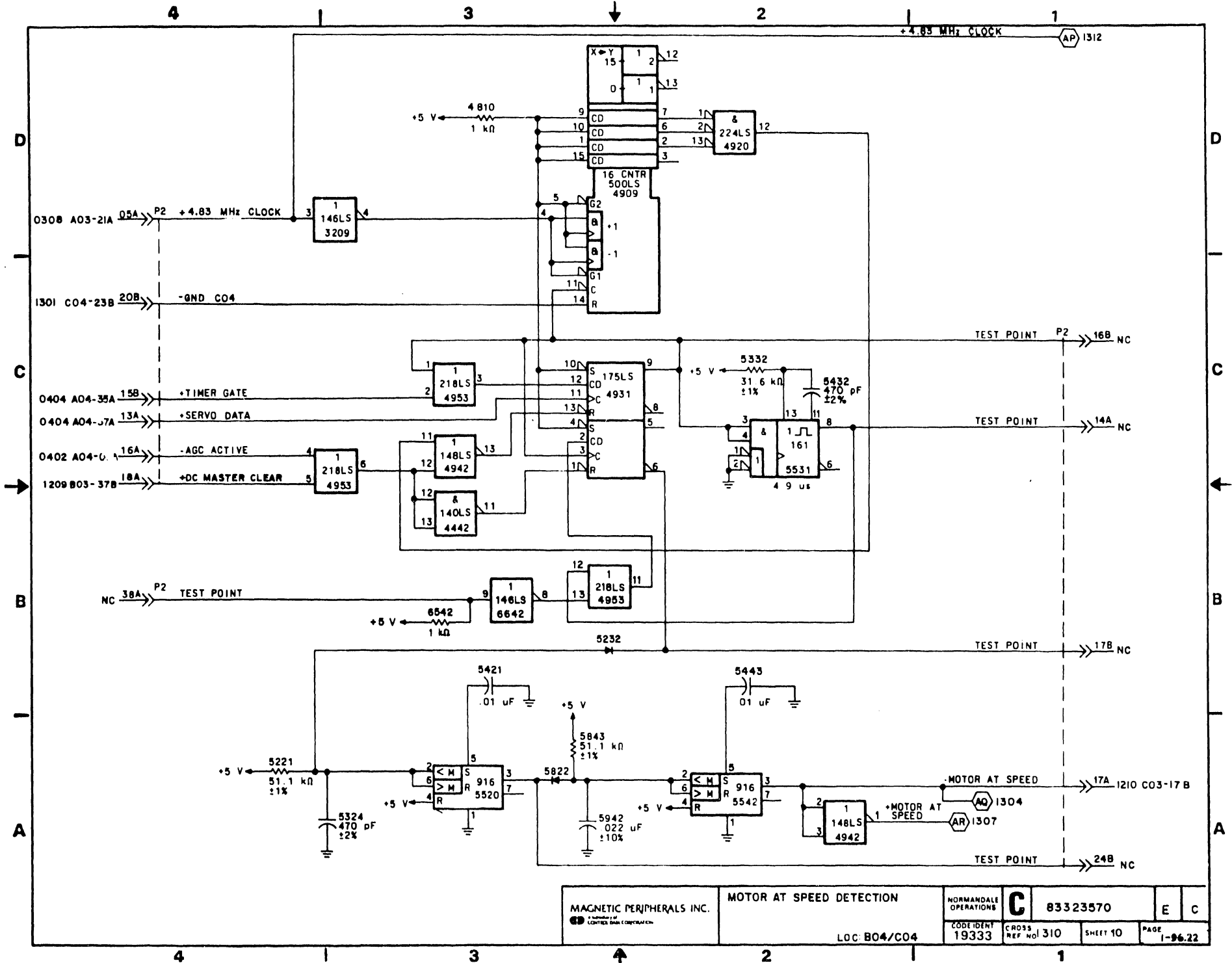


CONTROL DATA NORMANDEALE DIVISION	WRITE ENABLE, WRITE PROTECTED	CODE IDENT 19333	C	83323570	E	L
	LOC: B04/CO4	CROSS REF NO 1307		SHEET 7	PAGE 1-96.19	

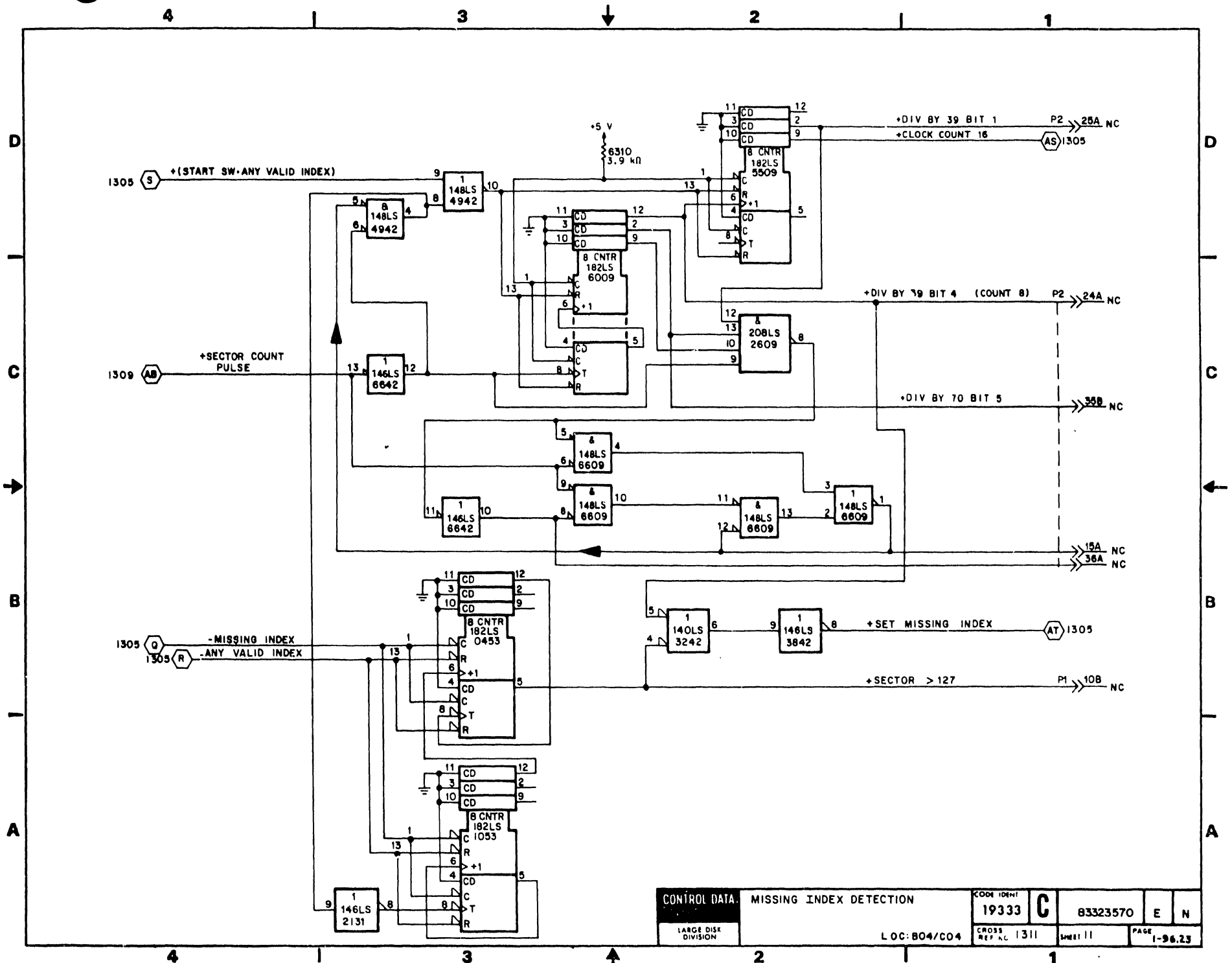


MAGNETIC PERIPHERALS INC. A Division of General Electric Company	INDEX ONE SHOT, GATED CHI/II ENABLES	NORMANDALE OPERATIONS	<b>C</b>	83323570	E	L
	LOC: B04/C04	CODE IDENT 19333	CROSS REF No 1308	SHEET 6	PAGE 1-9628	

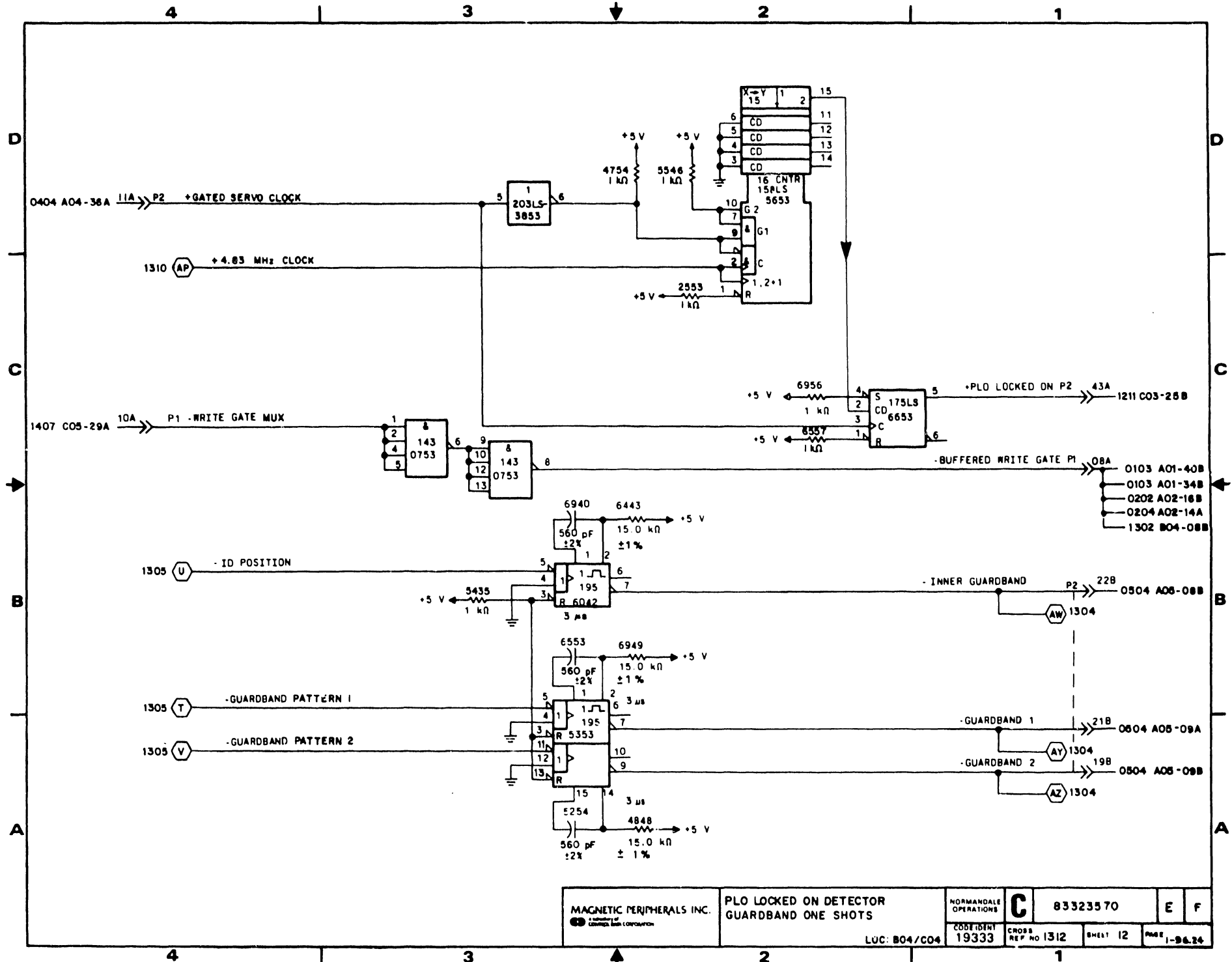




MAGNETIC PERIPHERALS INC. A subsidiary of CONTROL DATA CORPORATION	MOTOR AT SPEED DETECTION	NORMANDALE OPERATIONS	<b>C</b>	83323570	E	C
	LOC B04/CO4	CODE IDENT 19333	CROSS REF NO 1310	SHEET 10	PAGE 1-96.22	



CONTROL DATA		MISSING INDEX DETECTION		CODE IDENT	19333		G		83323570		E	N
LARGE DISK DIVISION		LOC: B04/C04		CROSS REF AC	1311		SHEET 11		PAGE		1-96.23	



MAGNETIC PERIPHERALS INC. <small>A subsidiary of          Control Data Corporation</small>	<b>PLO LOCKED ON DETECTOR          GUARDBAND ONE SHOTS</b>		NORMANDALE OPERATIONS	<b>C</b>	83323570	E	F
	LUC: B04/CO4		CODE IDENT 19333	CROSS REF NO 1312	SHEET 12	PAGE 1-96.24	

REVISION STATUS OF SHEETS

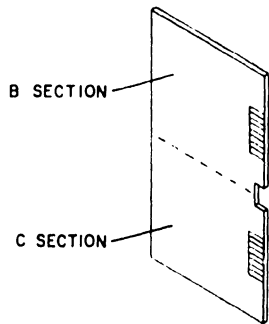
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A	A	A	A	A	A	A													
B						B													
C	C			C	C														
D	D	D	D	D	D	D													
E	E	E	E	E	E	E													
F	F					F	F												
G	G			G	G		G	G											
H	H			H	H	H	H												
J		J	J																
K		K	K	K	K														
L							L												
M				M		M													
N				N															
P	P																		
R	R																		
S				S															
T	T																		
U	U	U	U	U															

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN (S)
140LS	6620	3, 11
146LS	2153	10, 12, 4
148S	1009	10, 13
148LS	4909	1
227	4453	4, 10, 12
227	5553	8
208LS	6642	6

FILTER CAPS

.1 uF	
+5 V	
0310	4332
0910	5432
2510	0343
3010	0343
3710	3043
5410	3643
0321	4142
0921	4843
2421	5443
3621	5943
4321	0354
5421	1454
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2432	5354
3732	6454
1432	

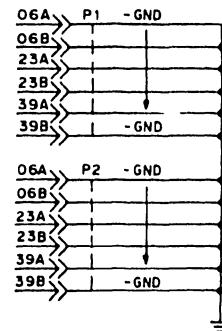
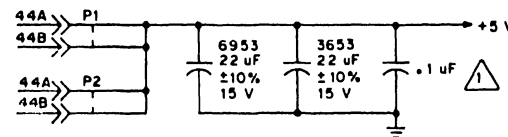


THE CARD IN THIS LOCATION SPANS ROWS B AND C OF THE LOGIC CHASSIS. THEREFORE, I/O INFORMATION MAY BE SPECIFIED BY BXX OR CXX. INFORMATION ON PINS IDENTIFIED WITH A "P1" RELATE TO THE B OR UPPER SECTION OF THE CARD WHEREAS "P2" RELATES TO PINS ON THE C OR LOWER SECTION OF THE CARD. CROSS REFERENCE NUMBERS ARE NOT AFFECTED.

NOTE:

SEE TABLE FOR .1uF CAPACITOR LOCATIONS

REVISIONS					
REV	ECU	DESCRIPTION	DRFT	DATE	CHKD
A	PE23000	RELEASED			
B	PE1134H	NEW BD BLANK	TH	6/7/80	CS
C	PE1281	OFFSET FIX	MF	7/23/80	JA
D	PE1463	ADD FIU CAPABILITIES	TH	9/8/80	JA
E	PE1552	NEW BD BLANK	TH		JA
F	PE1540	DJTX TO EJTX + B/P CHG	CB	12/15/80	
G	PE1728	UPDATE LOGIC DIAG'S	CB	1/6/81	JA
H	PE1734	B/P CHG	CB	1/14/81	JA
J	PE1804	UPDATE LOGIC DIAG'S	CB	4/7/81	JA
K	PE1831	ADD LOCK TO DATA SIGNAL	ULM	6/8/81	JA
L	PE1884	ADD DIOU	ULM	6/10/81	JA
M	DH02018	CORRECTION	ULM	6/10/81	JA
N	DH02032	CORR DWG	TF	8/26/81	JA
P	DH02092	FAULTY ERROR	ULM	9/29/81	JA
R	DH02160	BRKX TO CKAX	ULM	9/29/81	JA
S	DH02189	BRKX FJTX TO HJTX	S.A.W.	11/2/81	JA
T	DH02203	BLEX TO DLEX	ULM	12/14/81	JA
U	DH02388	REMOVE COMPONENTS	SCHLIER	3/18/82	JA



DRAWN	<i>W. J. ...</i>	8/9/80
CHECKED		
ENGINEER	<i>W. S. ...</i>	11/24/80
APPROVED		

MAGNETIC PERIPHERALS INC.  
A DIVISION OF  
CONTROL DATA CORPORATION

HEAD SELECTION/ADDRESS MARK  
DETECTION DIAGRAMS

LARGE DISK  
DIVISION

C 83323570 E U

CODE IDENT  
19333

CROSS  
REF NO 1401

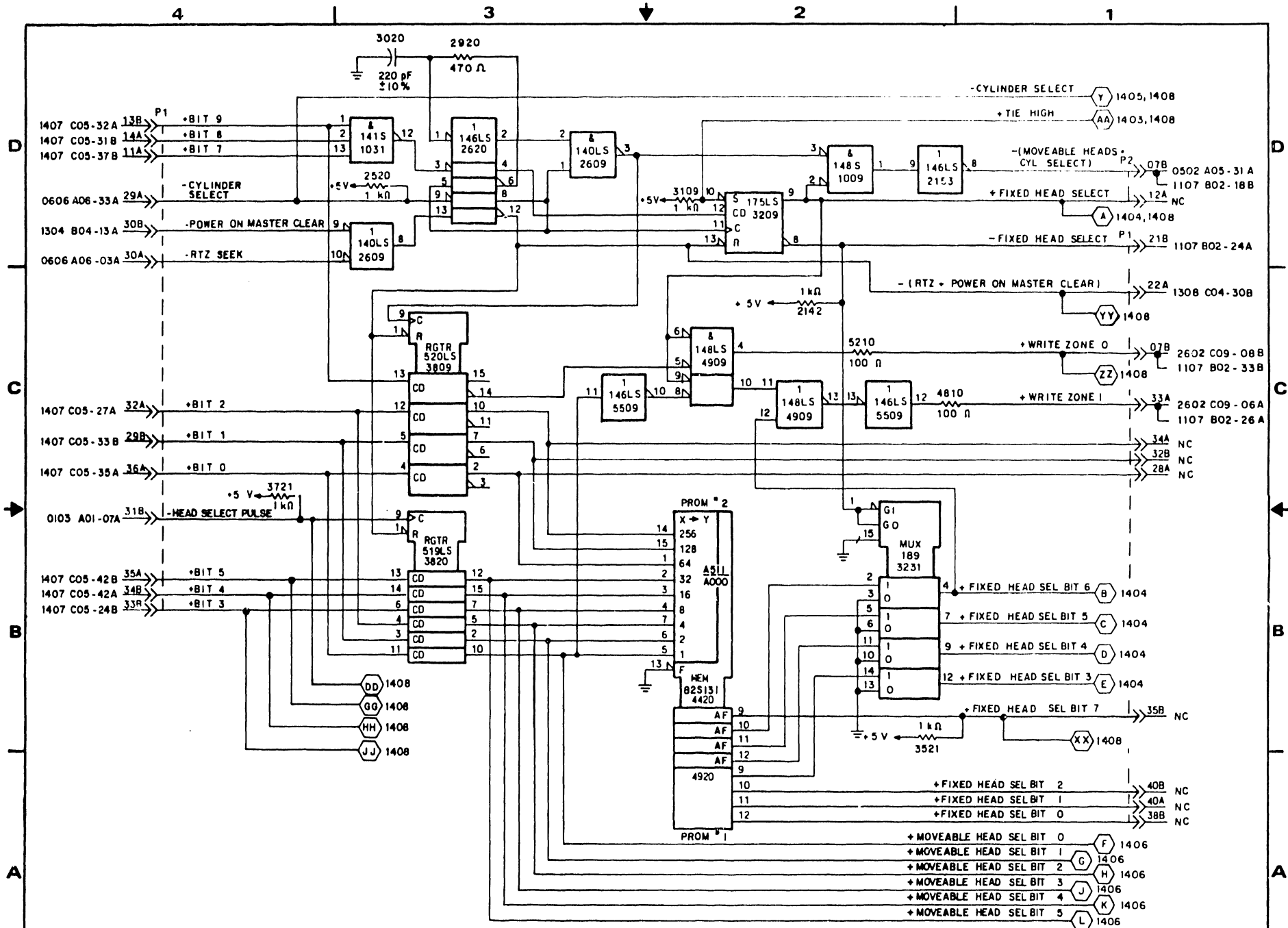
SHEET  
1 of 8

PAGE  
1-97

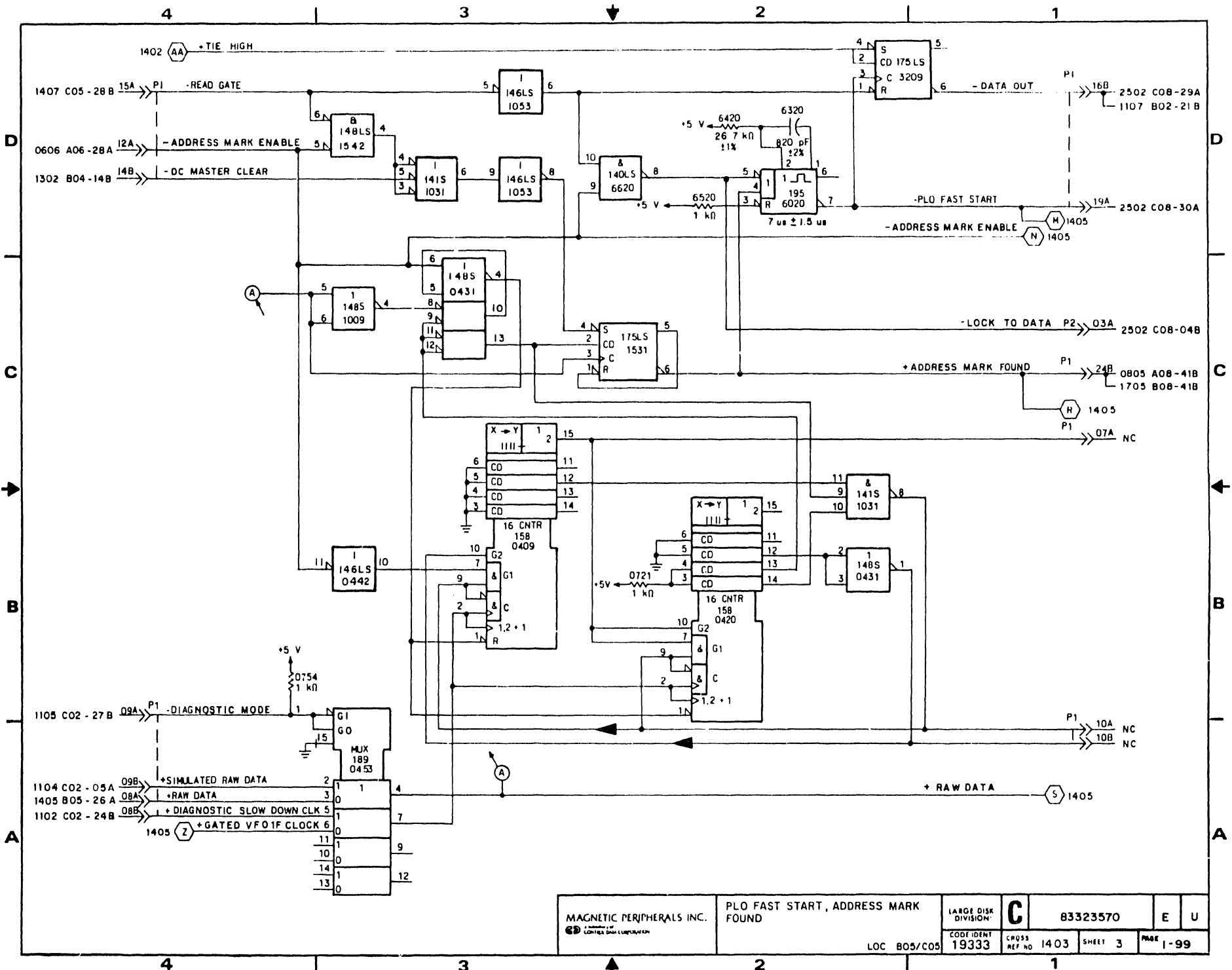
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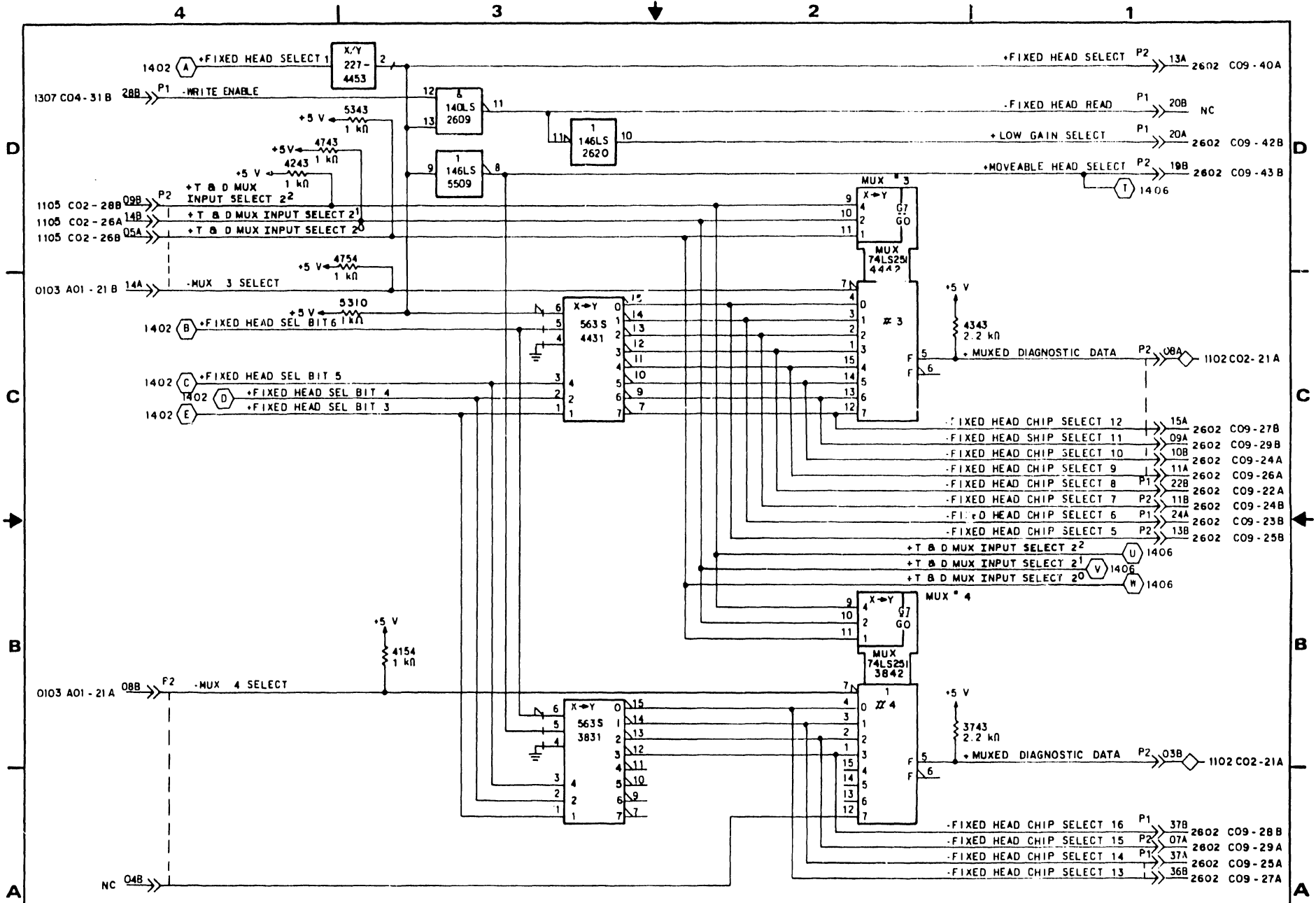
LOC: B05/C05

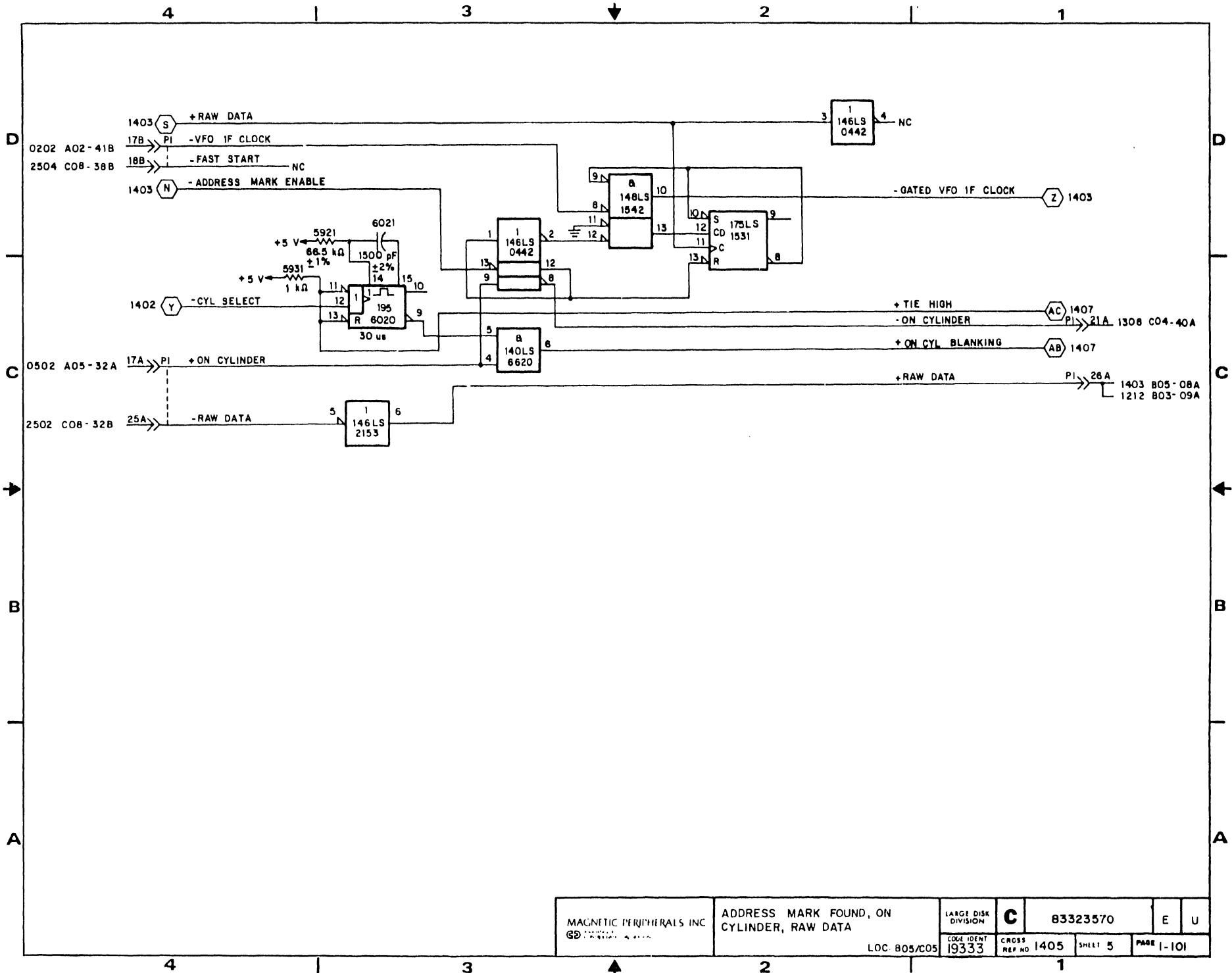


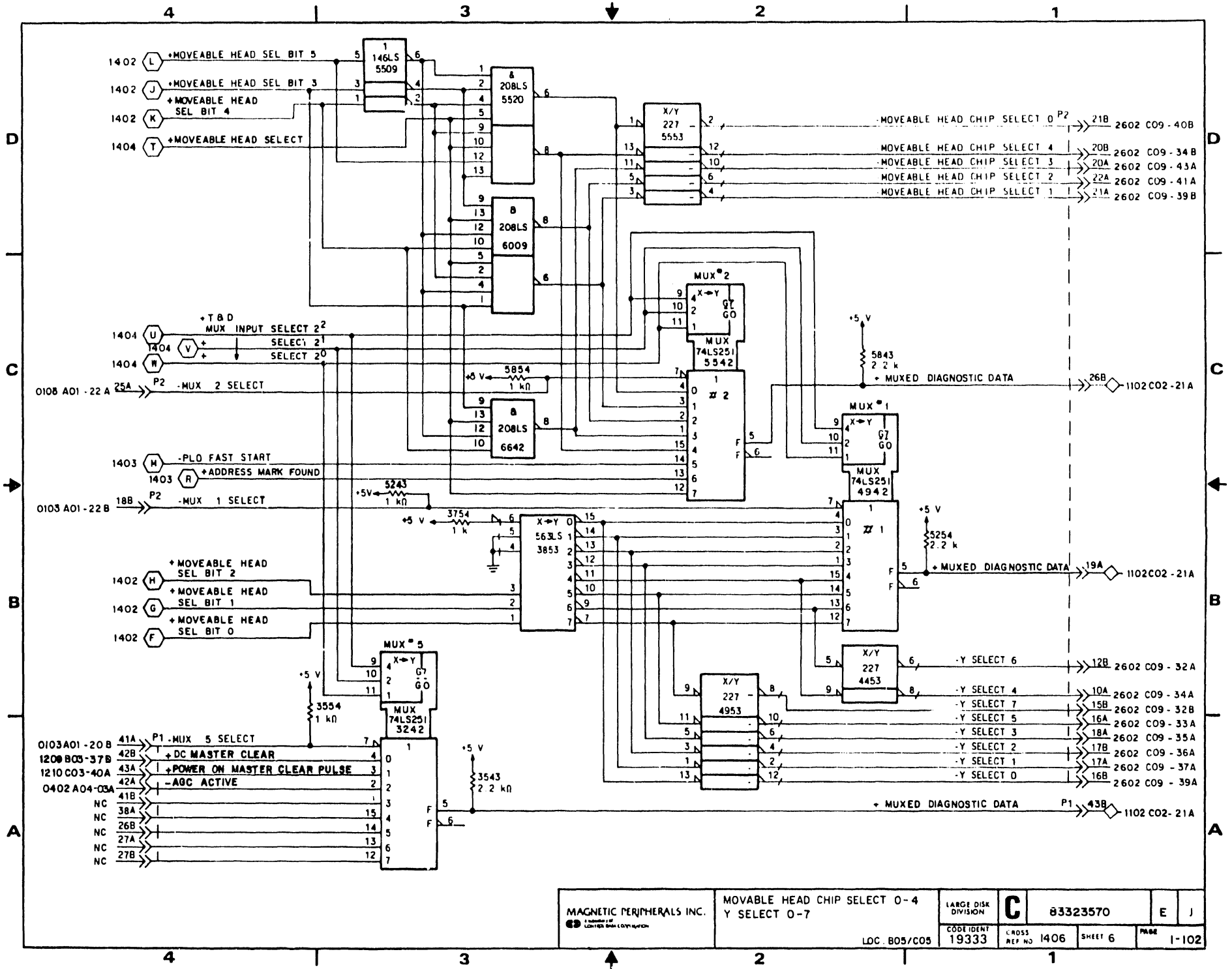


MAGNETIC PERIPHERALS INC. <small>Member of          CONTROL DATA CORPORATION</small>	MOVABLE HEAD SEL BITS 0-5, FIXED HEAD SEL BITS 0-7, WRITE ZONES 0/1, RTZ OR POWER ON MC	LARGE DISK DIVISION	<b>C</b>	83323570	E	T
	LOC B05/CO5	CODE IDENT 18333	CROSS REF NO 1402	SHEET 2	PAGE 1-98	

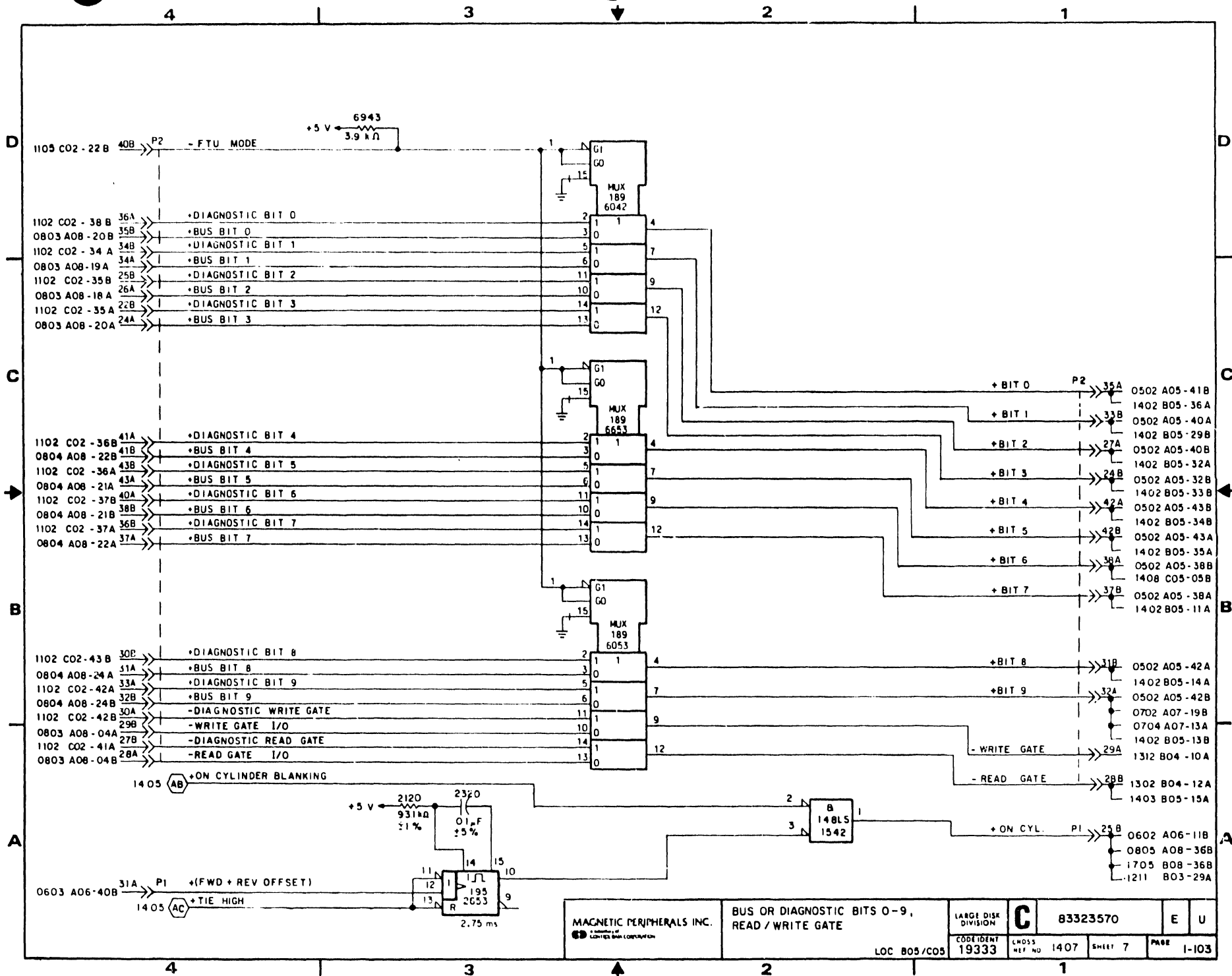


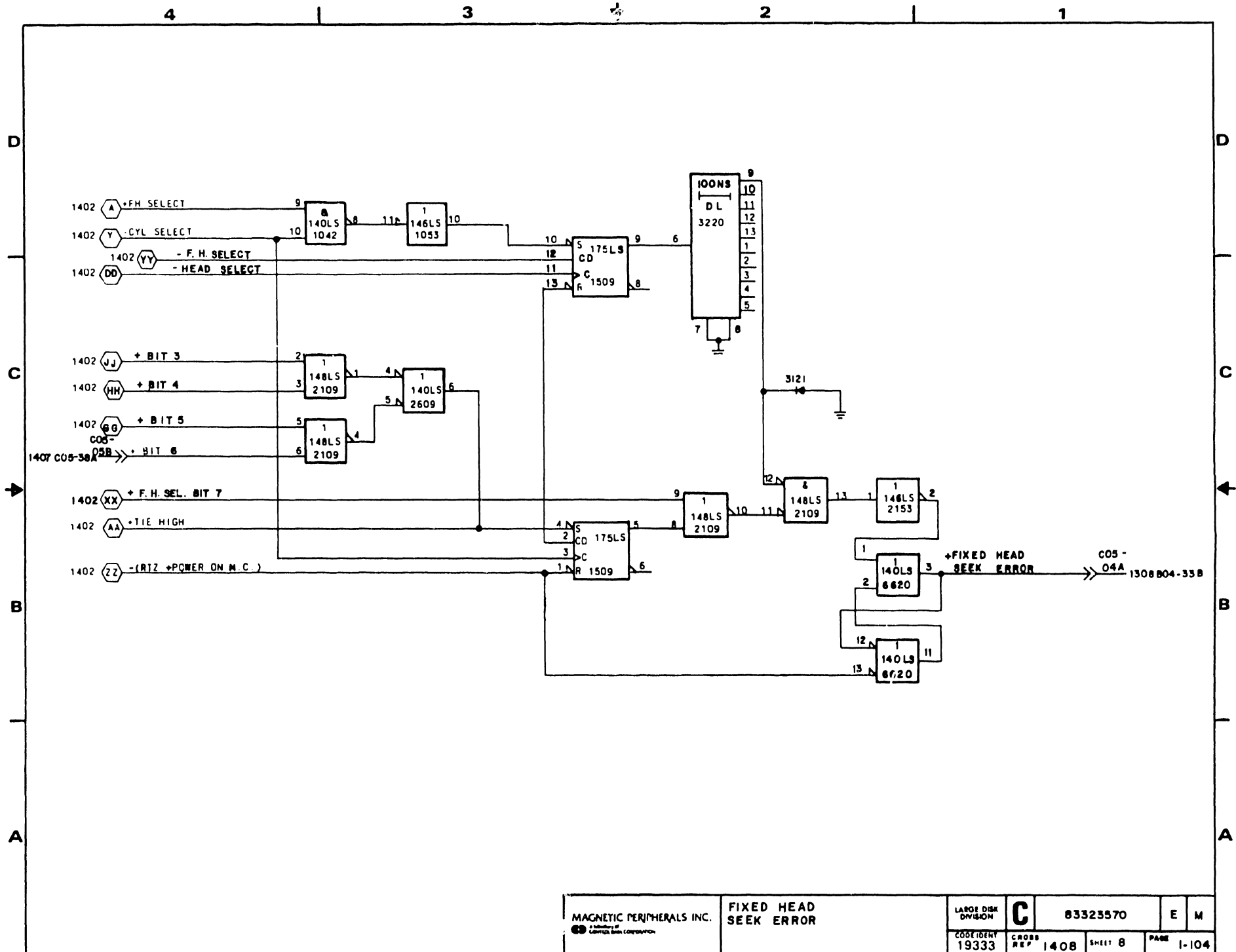






MAGNETIC PERIPHERALS INC. <small>Number of          LIMITED DATA CAPACITY</small>	MOVABLE HEAD CHIP SELECT 0-4 Y SELECT 0-7		LARGE DISK DIVISION	<b>C</b>	83323570	E	J
	LOC. 805/C05	CODE IDENT 19333	CROSS REF NO 1406	SHEET 6	PAGE	1-102	





REVISION STATUS OF SHEETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A																
B	B																			
C	C																			
D	D																			
E	E																			
F	F																			

FILTER CAPS 2

.1 uF					
+10 V	+5 V	-5 VA	-5 V	-12.3 V	-24 V
3309	4527	3143	0309	4309	3224
3841	6635	5156	0339	4334	3847
5508	6948	6349	034R	4856	5032
4254		6347	0928		5146
			0953		5527
			1319		
			1439		
			1453		
			1628		
			1708		
			2039		
			2053		
			2128		
			2209		

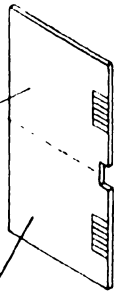
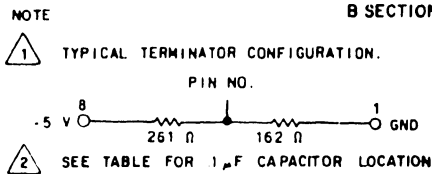
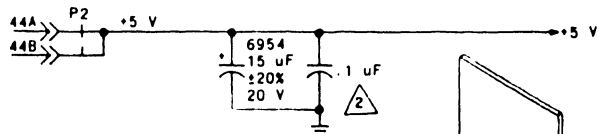
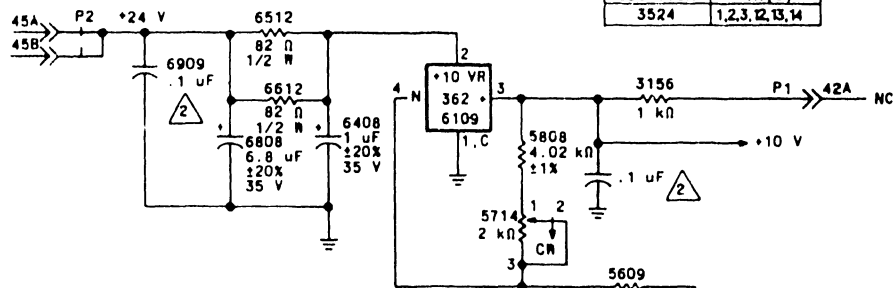
REVISIONS					
REV	ECO	DESCRIPTION	DRFT	DATE	CHK'D
A	PE23100	RELEASED			
U	PEB124	REPLACE IC WITH DISCRETE CRT	C	11-21-60	
C	PEB143	ADD FTU CAPABILITIES			
D	PEB168	DECREASE NOISE LEVELS			
E	PEB104	IMPROVE CLOCK CRT	BT	2-25-61	
F	DH02187	ADD TEST & DIAG INFO	DW	125 62	

UNUSED RESISTOR PACKS

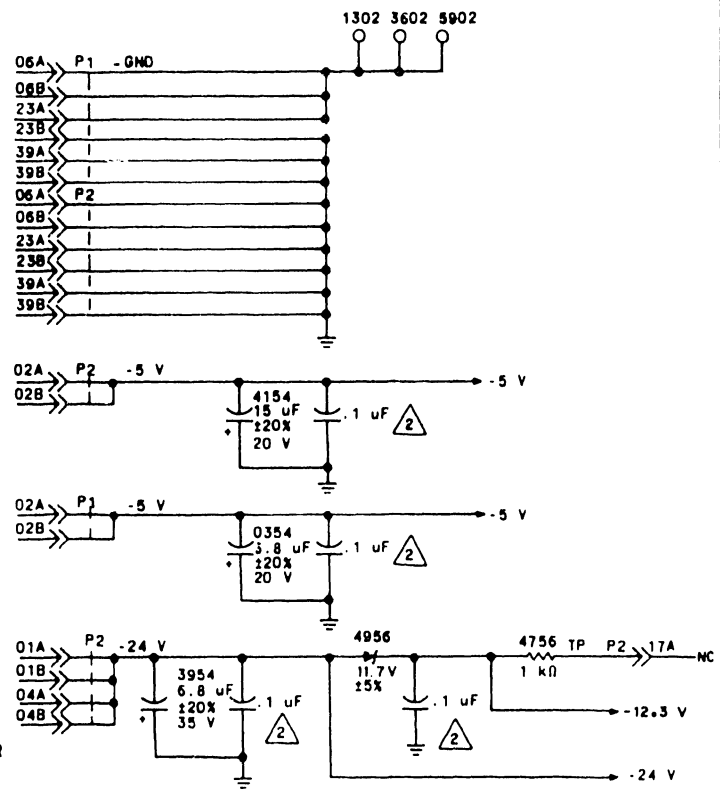
LOCATION	PIN(S)
0709	7, 8
0853	8
2409	8
2428	8
1719	4

UNUSED TRANSISTOR PACKS

LOCATION	PIN(S)
3524	1, 2, 3, 13, 14



THE CARD IN THIS LOCATION SPANS ROWS B AND C OF THE LOGIC CHASSIS. THEREFORE, I/O INFORMATION MAY BE SPECIFIED BY BXX OR CXX. INFORMATION ON PINS IDENTIFIED WITH "P1" RELATE TO THE B OR UPPER SECTION OF THE CARD WHEREAS "P2" RELATES TO PINS ON THE C OR LOWER SECTION OF THE CARD. CROSS REFERENCE NUMBERS ARE NOT AFFECTED.



DRAWN	T. Long	1	PO
CHECKED			
ENGINEER			
APPROVED			

MAGNETIC PERIPHERALS INC.

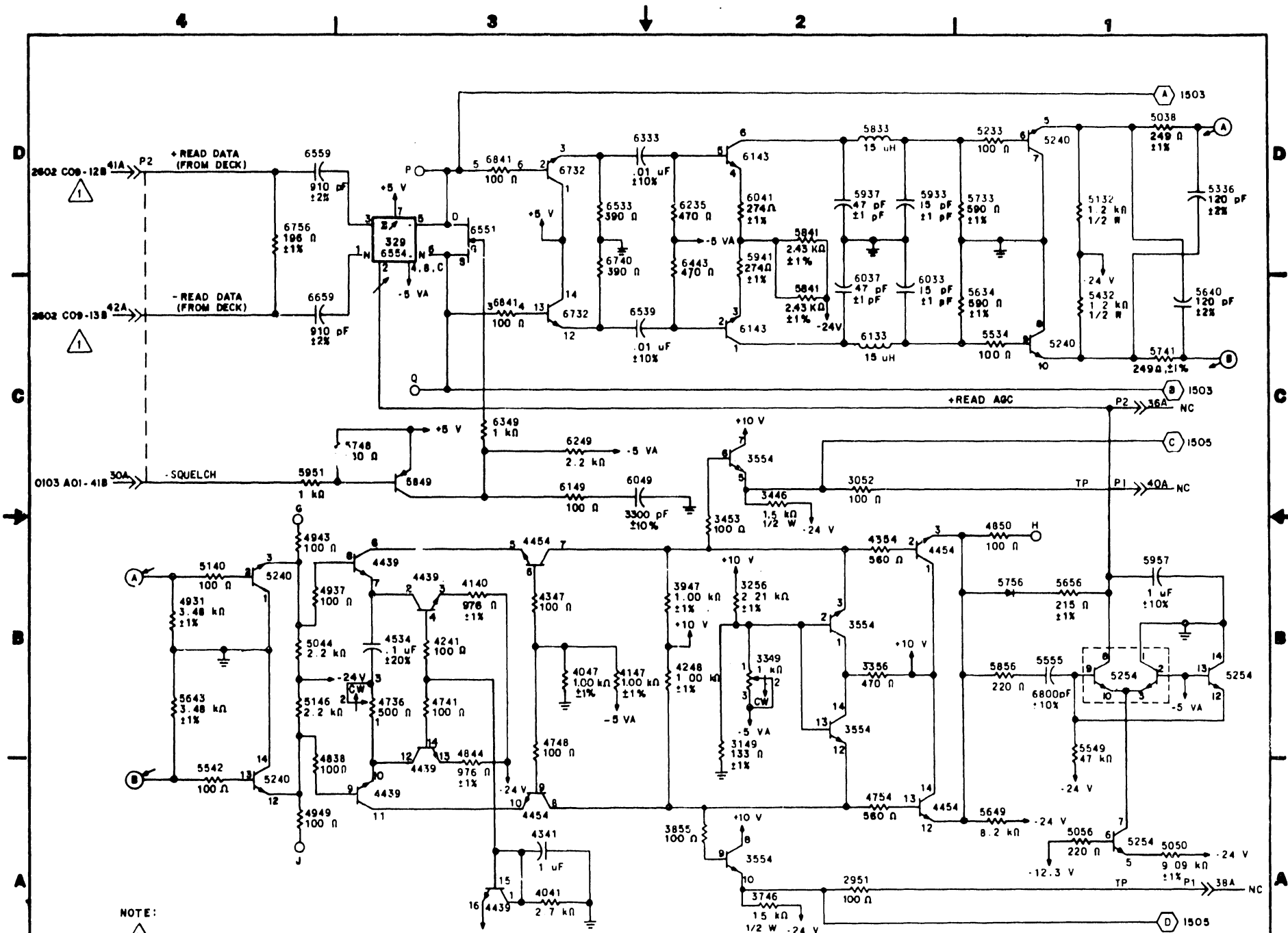
READ DECODER DIAGRAMS

TYPE: AKCX

LOC: B06/C06

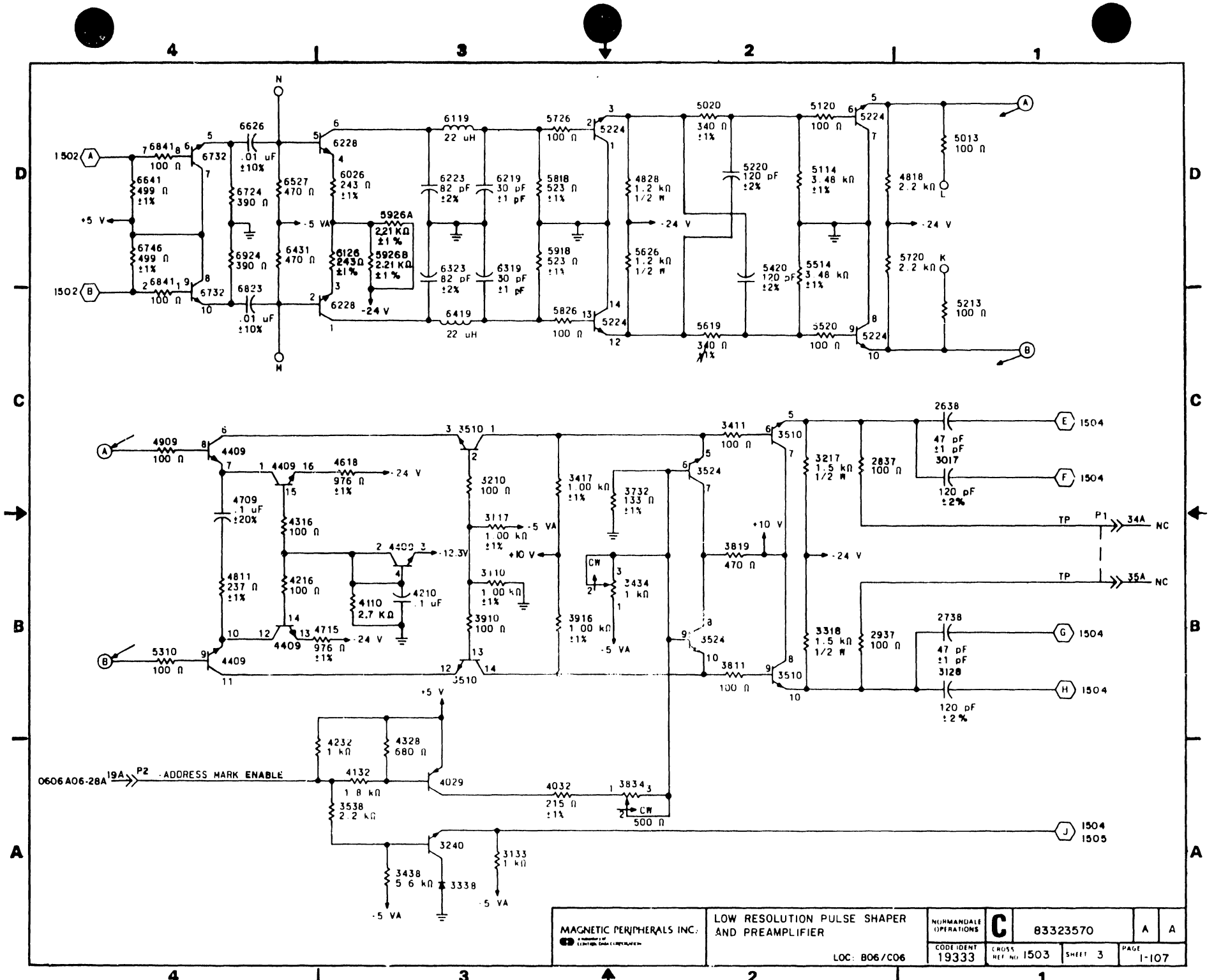
NORMANDALE OPERATIONS	<b>C</b>	8323570	D	F
CODE IDENT	CROSS REF NO	SHEET	PAGE	
19333	1501	1 of 5	1-105	



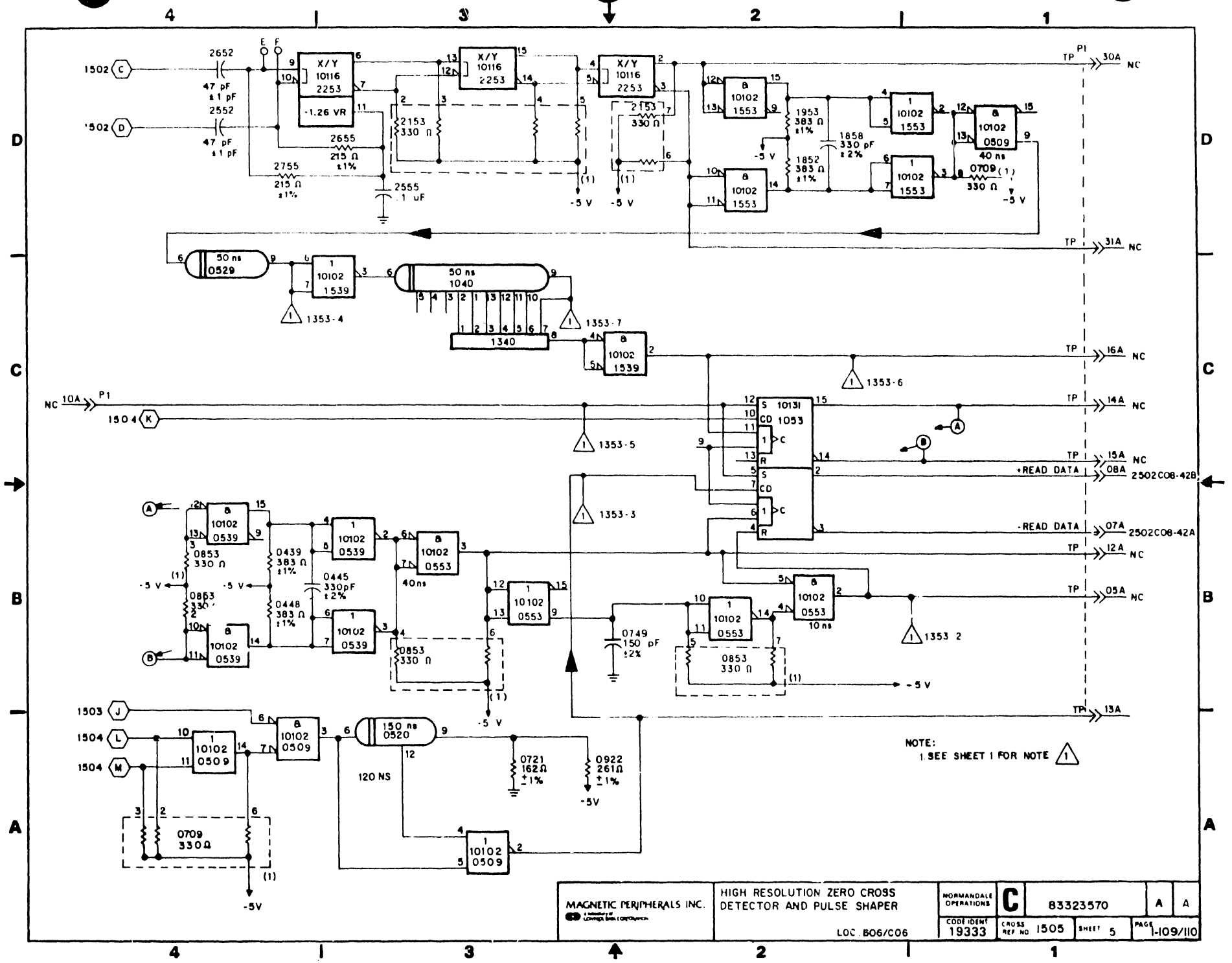


NOTE:  
 1 DENOTES TWISTED PAIR LINES

MAGNETIC PERIPHERALS INC. <small>Division of          General Electric Corporation</small>	HIGH RESOLUTION PULSE SHAPER AND PREAMPLIFIER		NORMANDELE OPERATIONS	C 83323570	D F
	LOC 806/CO6		CODE IDENT 19333	CROSS REF NO 1502	SHEET 2 PAGE 1-106







NOTE:  
1 SEE SHEET 1 FOR NOTE 1

MAGNETIC PERIPHERALS INC. <small>COMMERCIAL DIVISION</small>	HIGH RESOLUTION ZERO CROSS DETECTOR AND PULSE SHAPER		NORMANDALE OPERATIONS	<b>C</b>	83323570	A	A
	LOC. B06/C06	CODE IDENT 19333	CROSS REF. NO. 1505	SHEET 5	PAGE 1-109/110		

REVISION STATUS OF SHEETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A	A															
B	B	A		B	A															
C				C																
D	D																			
E			E																	
F				F																
G	G	G	G	G	G															
H				H																
J	J																			
K	K	K																		

UNUSED RESISTOR PACKS

LOCATION	PINS
0264	4,7
1014	4,7,8
1026	6
1044	5,7,8
1054	3,7,8

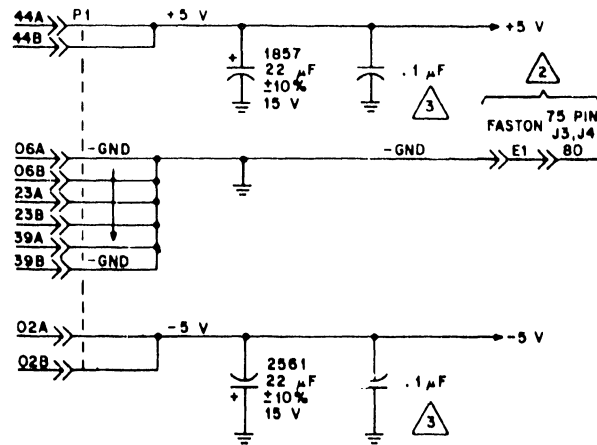
UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
175H	0228	5,6

REVISIONS					
REV	ECO	DESCRIPTION	DMPT	DATE	CHK'D
A	PE2300	RELEASED	CB	1-4-80	
B	PE6861	OFFBET FIX	CB	11-25-80	
C	PE6862	ADD FTU CAPABILITIES	"	"	
D	PE6866	ALLOW FTU WRITE OPERATIONS	"	"	
E	PE6868	LOGIC DIAGRAM UPDATE	"	"	
F	PE6840	GENERATES SEEK ERROR FOR CYLS 899 + UP	GT	2-23-81	PLP
G	PE6872	ADDS INDEX SECTOR TO B CABLE (MTEI-JK)	"	"	PLP
H	PE6804	IMPROVE CLOCK CKT	"	"	PLP
J	DHO2187	ADD TEST & DIAG INFO	DWE	125 82	
K	DHO2408	FIX SELECT TAB PROB, REDUCE NOISE, CFAX TO TFAX, DFAX TO UFAX	CB	3-8-82	

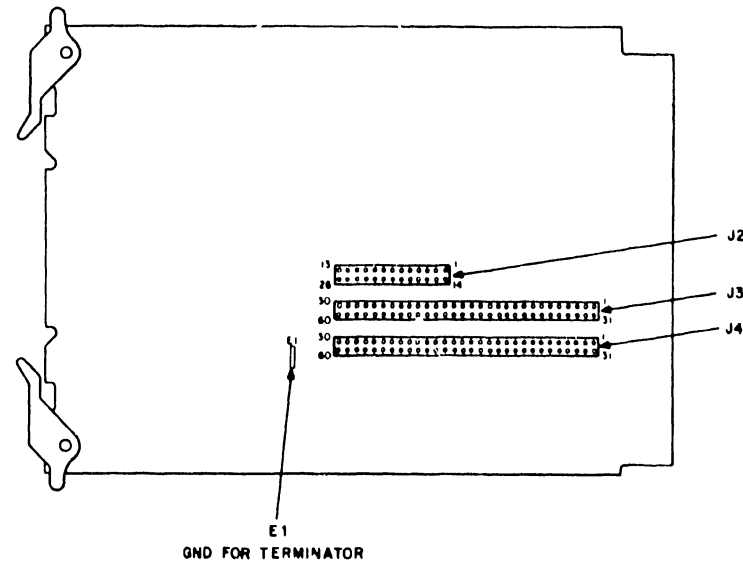
NOTES:

- 1 UNUSED LOGIC ELEMENT INPUT PINS ARE GROUNDED.
- 2 FLAT TO ROUND CABLE ADAPTER ACCESSORY.
- 3 SEE TABLE FOR .1 μF CAPACITOR LOCATIONS.



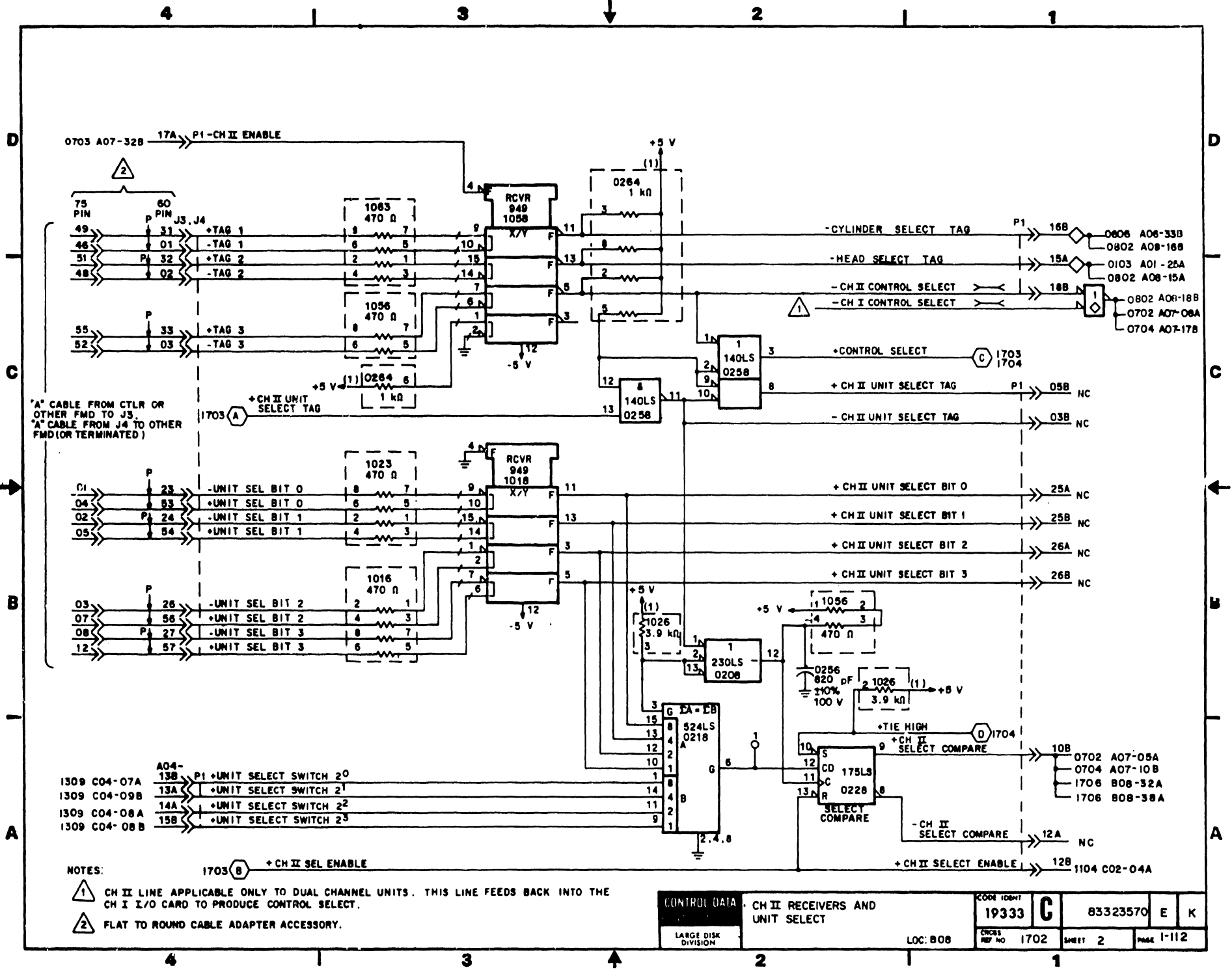
.1 μF FILTER CAPS

+5 V	-5 V
0214	1012
0226	1122
0235	1032
0245	1042
0255	1147
1015	1262
1025	2812
1035	2822
1145	2830
1155	2837
2814	2845
2823	2855
2831	
2838	
2846	
2854	



CFAX CARD APPLICABLE ONLY TO UNITS WITH INDEX AND SECTOR IN THE "A" CABLE  
 DFAX CARD APPLICABLE ONLY TO UNITS WITH INDEX AND SECTOR IN THE "B" CABLE

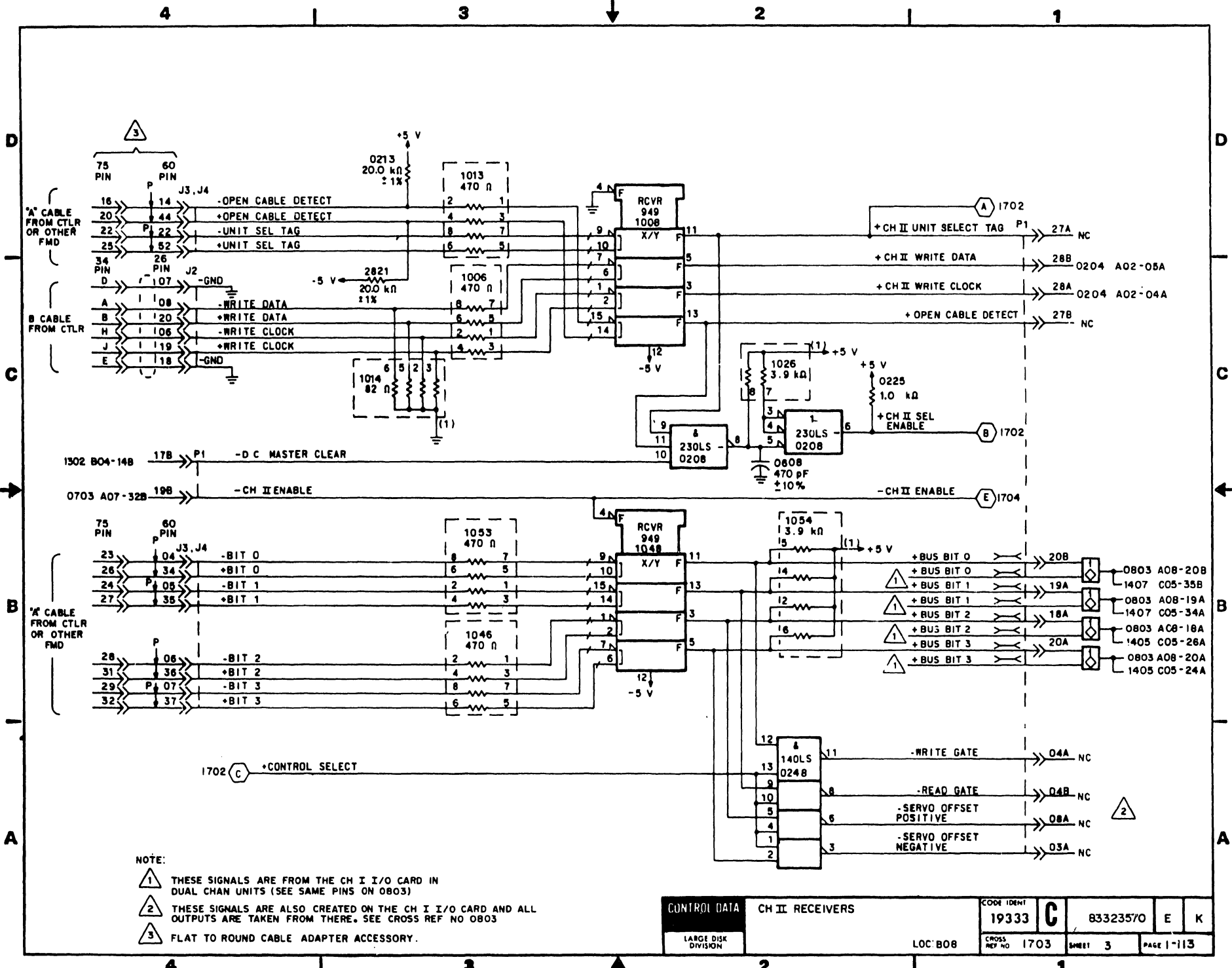
DRAWN	C. Breen	5-1-80	CONTROL DATA	CHANNEL II I/O DIAGRAMS(SERIES CODES 01-06)	CODE IDENT	19333	C	83323570	E	K
CHECKED			LARGE DISK DIVISION	TYPE: TFAX/UFAX	CROSS REF NO	1701	SHEET	1 of 6	PAGE	1-III
ENGINEER				LOC 808						
APPROVED										



NOTES: 1703 B +CH II SEL ENABLE

- 1 CH II LINE APPLICABLE ONLY TO DUAL CHANNEL UNITS. THIS LINE FEEDS BACK INTO THE CH I I/O CARD TO PRODUCE CONTROL SELECT.
- 2 FLAT TO ROUND CABLE ADAPTER ACCESSORY.

CONTROL DATA LARGE DISK DIVISION	CH II RECEIVERS AND UNIT SELECT	CODE IDENT 19333	C	83323570	E	K
		CIRCS REF NO 1702				
LOC: B08						



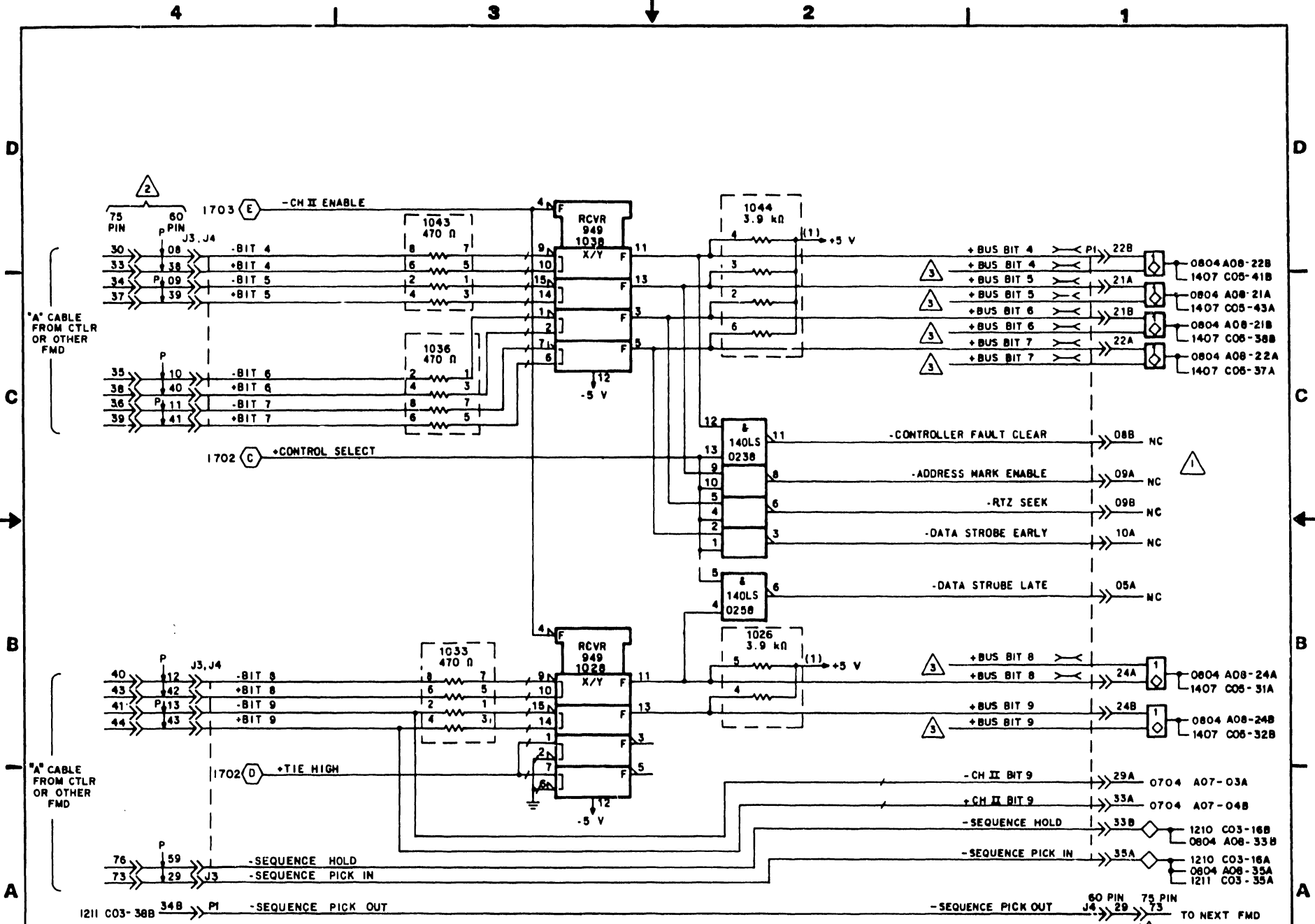
NOTE:

① THESE SIGNALS ARE FROM THE CH I I/O CARD IN DUAL CHAN UNITS (SEE SAME PINS ON 0803)

② THESE SIGNALS ARE ALSO CREATED ON THE CH I I/O CARD AND ALL OUTPUTS ARE TAKEN FROM THERE. SEE CROSS REF NO 0803

③ FLAT TO ROUND CABLE ADAPTER ACCESSORY.

CONTROL DATA		CH II RECEIVERS		CODE IDENT	19333		C	83323570	E	K
LARGE DISK DIVISION		LOC: B08		CROSS REF NO	1703	SHEET	3	PAGE 1-113		



NOTES:

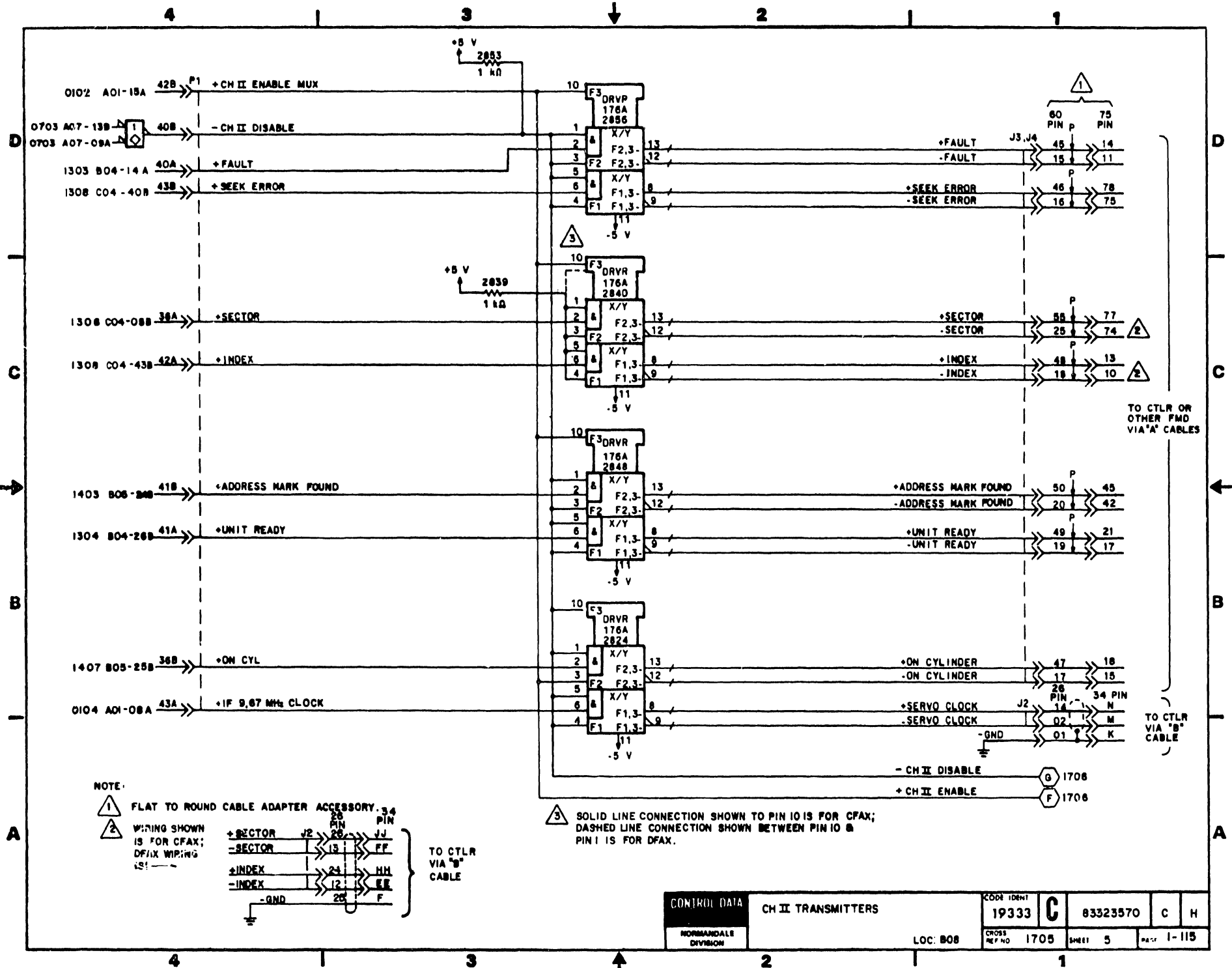
① THESE SIGNALS ARE ALSO CREATED ON THE CH I I/O CARD AND ALL OUTPUTS ARE TAKEN FROM THERE. SEE CROSS REF NO 0804

② FLAT TO ROUND CABLE ADAPTER ACCESSORY.

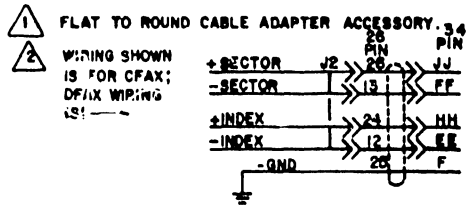
③ THESE SIGNALS ARE FROM THE CH I I/O CARD IN DUAL CHAN UNITS. (SEE SAME PINS ON 0804)

NORMANDEALE DIVISION	CONTROL DATA	CH II RECEIVERS AND SEQ POWER	CODE IDENT	C	83323570	C	G
	19333	LOC 808	CROSS REF NO 1704				





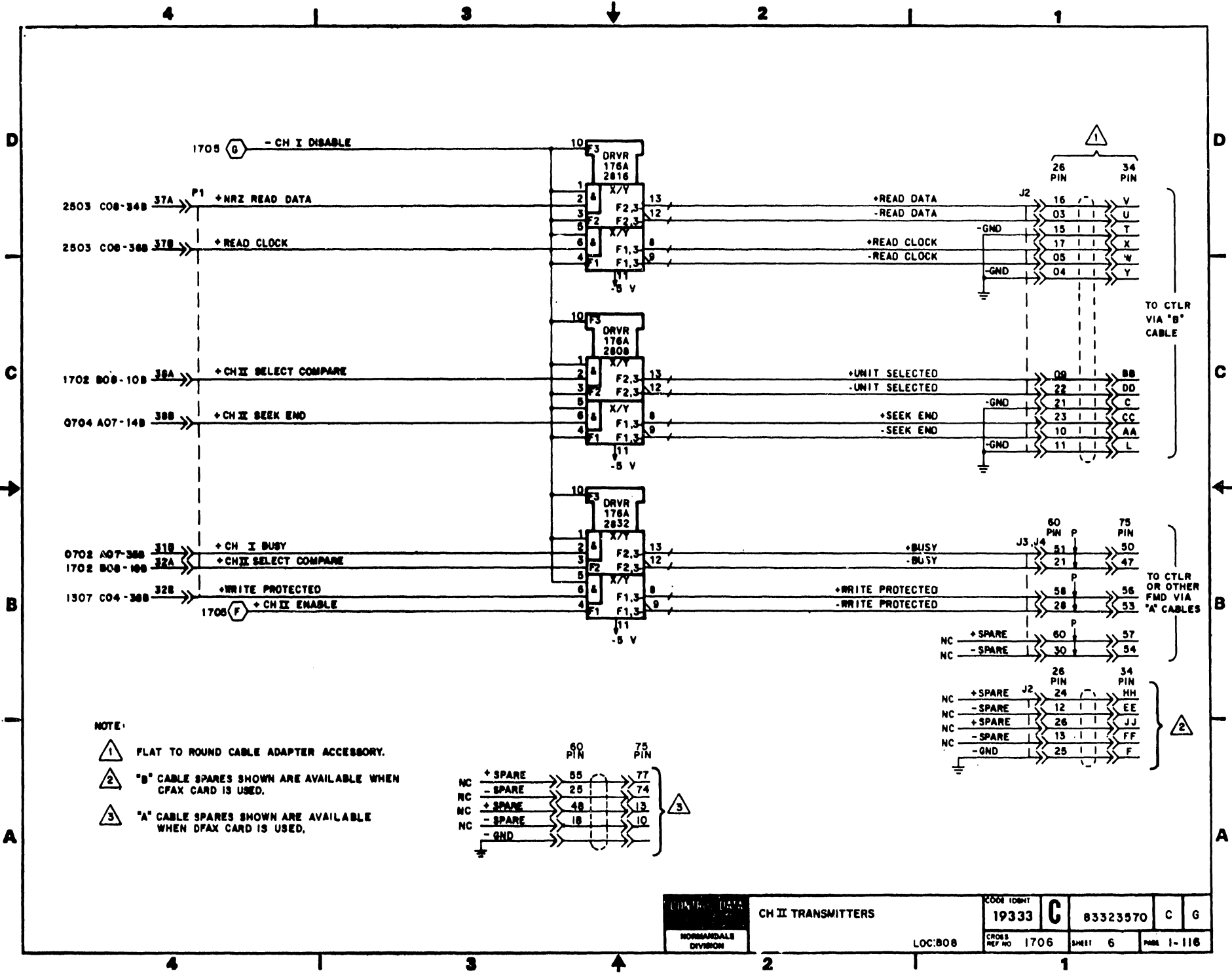
NOTE:



TO CTRL VIA "B" CABLE

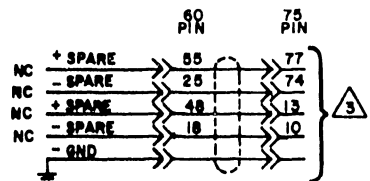
△ 3 SOLID LINE CONNECTION SHOWN TO PIN 10 IS FOR CFAX; DASHED LINE CONNECTION SHOWN BETWEEN PIN 10 & PIN 1 IS FOR DFAX.

CONTROL DATA	CH II TRANSMITTERS	CODE IDENT	19333	C	83323570	C	H
		CROSS REF NO	1705	SHEET	5	PAGE	1-115
NORMANDELE DIVISION	LOC: 808						



NOTE:

- ① FLAT TO ROUND CABLE ADAPTER ACCESSORY.
- ② "B" CABLE SPARES SHOWN ARE AVAILABLE WHEN CPAX CARD IS USED.
- ③ "A" CABLE SPARES SHOWN ARE AVAILABLE WHEN DPAX CARD IS USED.



REVISION STATUS OF SHEETS

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

UNUSED RESISTOR PACKS

LOCATION	PINS
0264	4,7
1014	4,7,8
1026	6
1044	5,7,8
1054	3,7,8

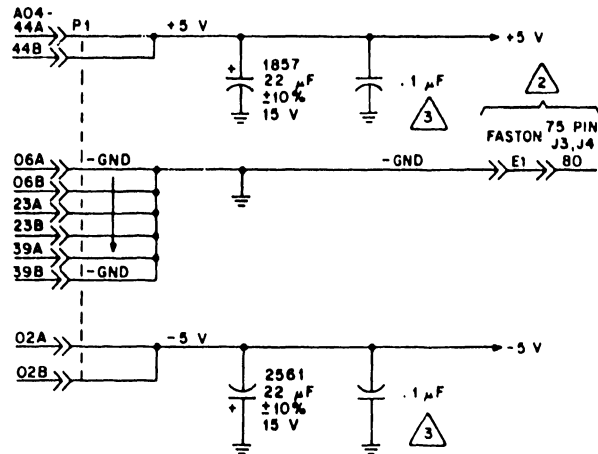
UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PIN(S)
175H	0228	5,6

REVISIONS					
REV	ECO	DESCRIPTION	DRFT	DATE	CHR'D
A	0227	RELEASED	E1	1 1 68	
B	0227A	CPAN TO MPAN	D1M	5 11 68	
C	0202B7	ADD TEST & DIAG INFO	DRF	1 23 62	
D	0208A0B	FIX SELECT TAG PROB, REDUCE NOISE; MPAN TO WFAK	CB	8-8-62	

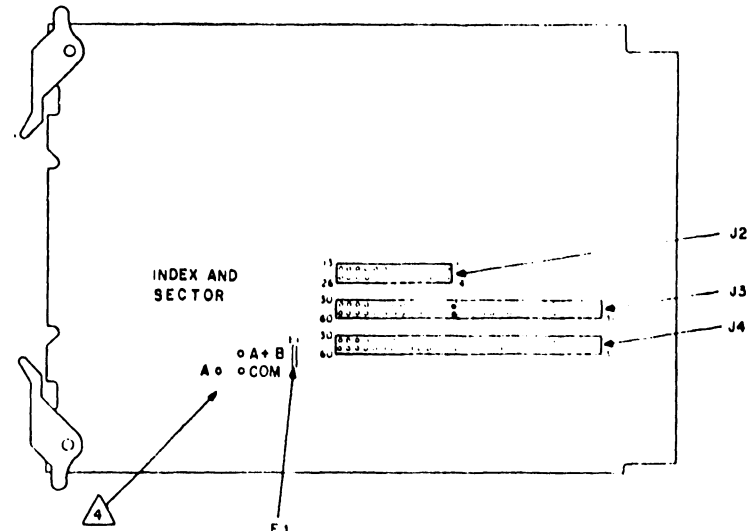
NOTES

- 1 UNUSED LOGIC ELEMENT INPUT PINS ARE GROUNDED.
- 2 FLAT TO ROUND CABLE ADAPTER ACCESSORY
- 3 SEE TABLE FOR .1 μF CAPACITOR LOCATIONS.
- 4 INDEX / SECTOR DETERMINATION JUMPER



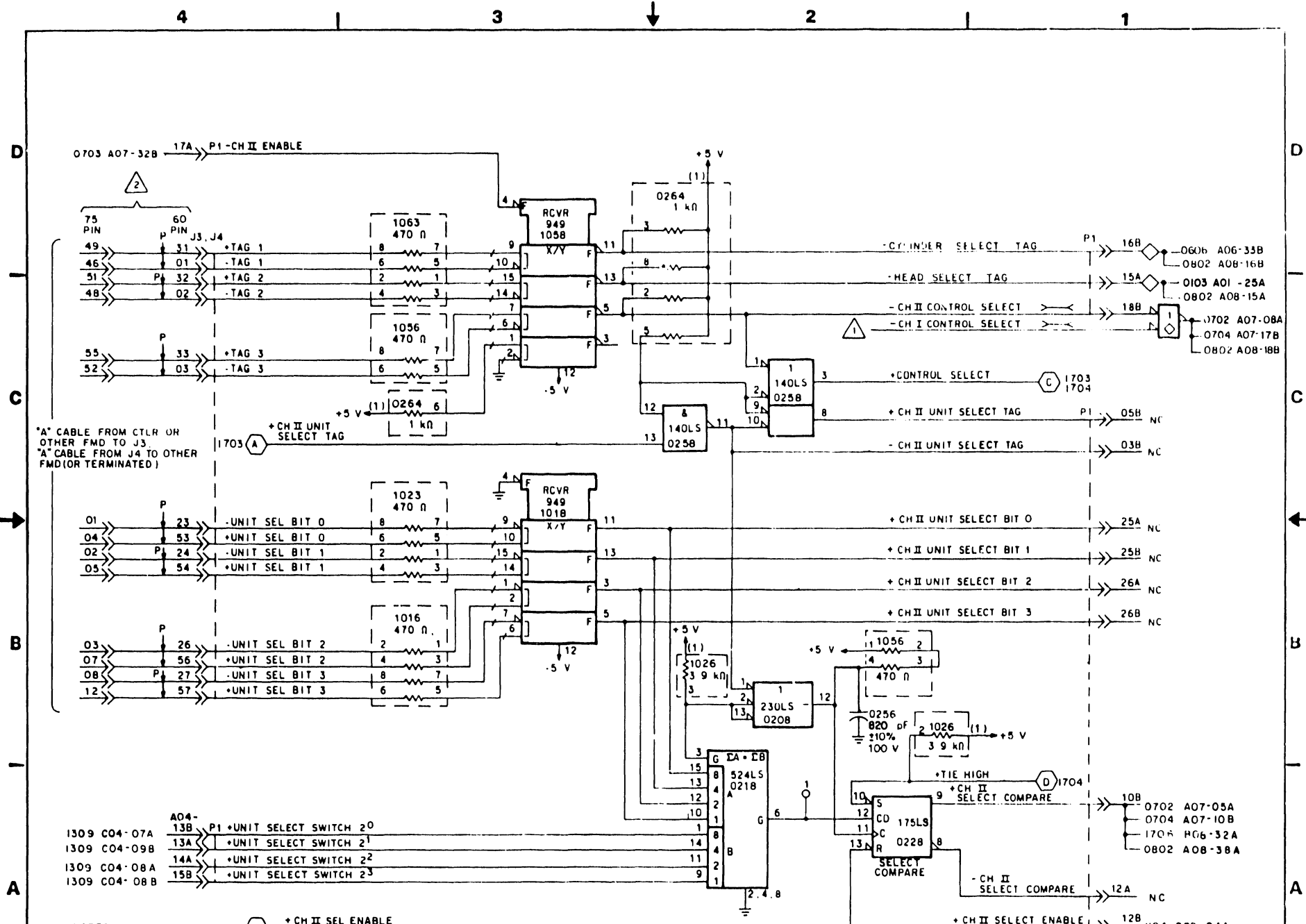
.1 μF FILTER CAPS

+5 V	-5 V
0214	1012
0226	1122
0235	1032
0245	1042
0255	1147
1015	1262
1025	2812
1035	2822
1145	2830
1155	2837
2814	2845
2823	2855
2831	
2838	
2846	
2854	



APPLICABLE ONLY TO DUAL CHANNEL UNITS

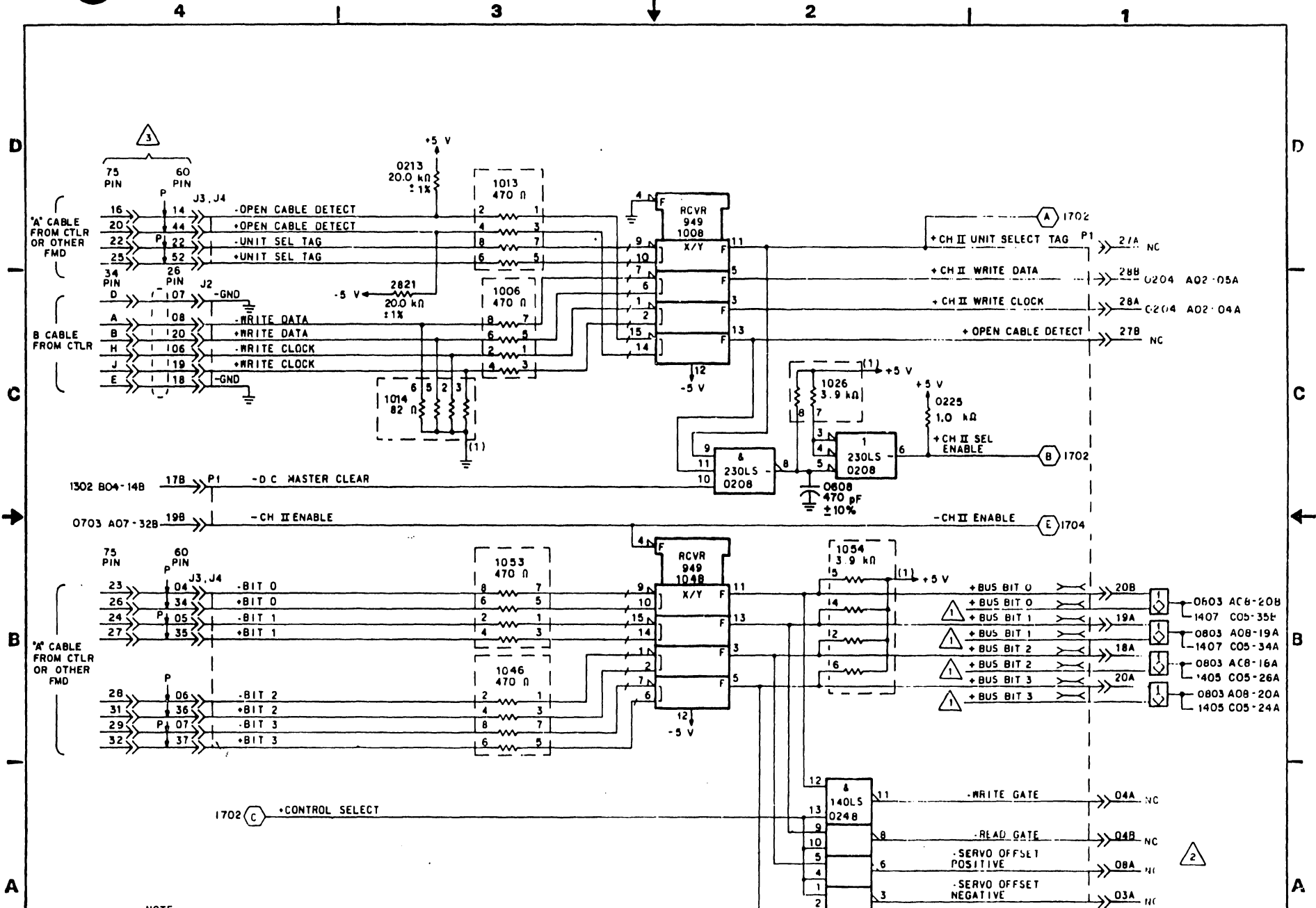
THRU	101780	CONTROL DATA	CHANNEL II I/O	19333	C	83323570	E	D
CHECKED			DIAGRAMS (SERIES CODE 07 & ABOVE)					
ENGINEER			TYPE WFAK	LOC 808				
DATE								



NOTES

- ① CH II LINE APPLICABLE ONLY TO DUAL CHANNEL UNITS. THIS LINE FEEDS BACK INTO THE CH I I/O CARD TO PRODUCE CONTROL SELECT
- ② FLAT TO ROUND CABLE ADAPTER ACCESSORY.

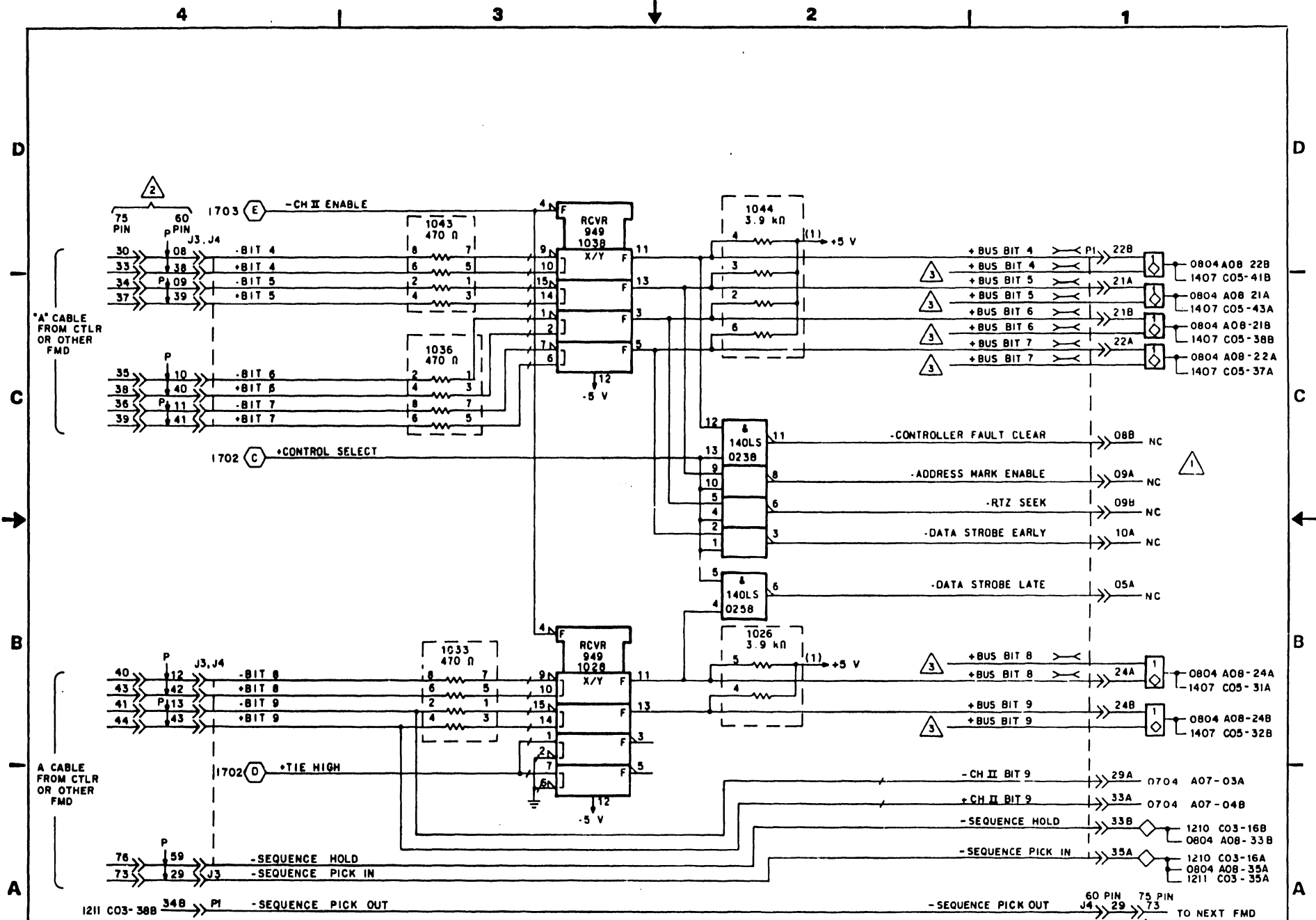
CONTROL DATA LARGE DISK DIVISION	CH II RECEIVERS AND UNIT SELECT		CODE 16441 19333	C	83323570	E	D
	LOC B08		CHISS REF NO 1702		SHEET 2	PAGE 1-116.2	



NOTE:

- ① THESE SIGNALS ARE FROM THE CH I I/O CARD IN DUAL CHAN UNITS (SEE SAME PINS ON 0803)
- ② THESE SIGNALS ARE ALSO CREATED ON THE CH I I/O CARD AND ALL OUTPUTS ARE TAKEN FROM THERE. SEE CROSS REF NO 0803
- ③ FLAT TO ROUND CABLE ADAPTER ACCESSORY.

CONTROL DATA LARGE DISK DIVISION	CH II RECEIVERS		CODE IDENT 19333	C	83323570	E	D
	LOC. 808	1703	SHEET 3				

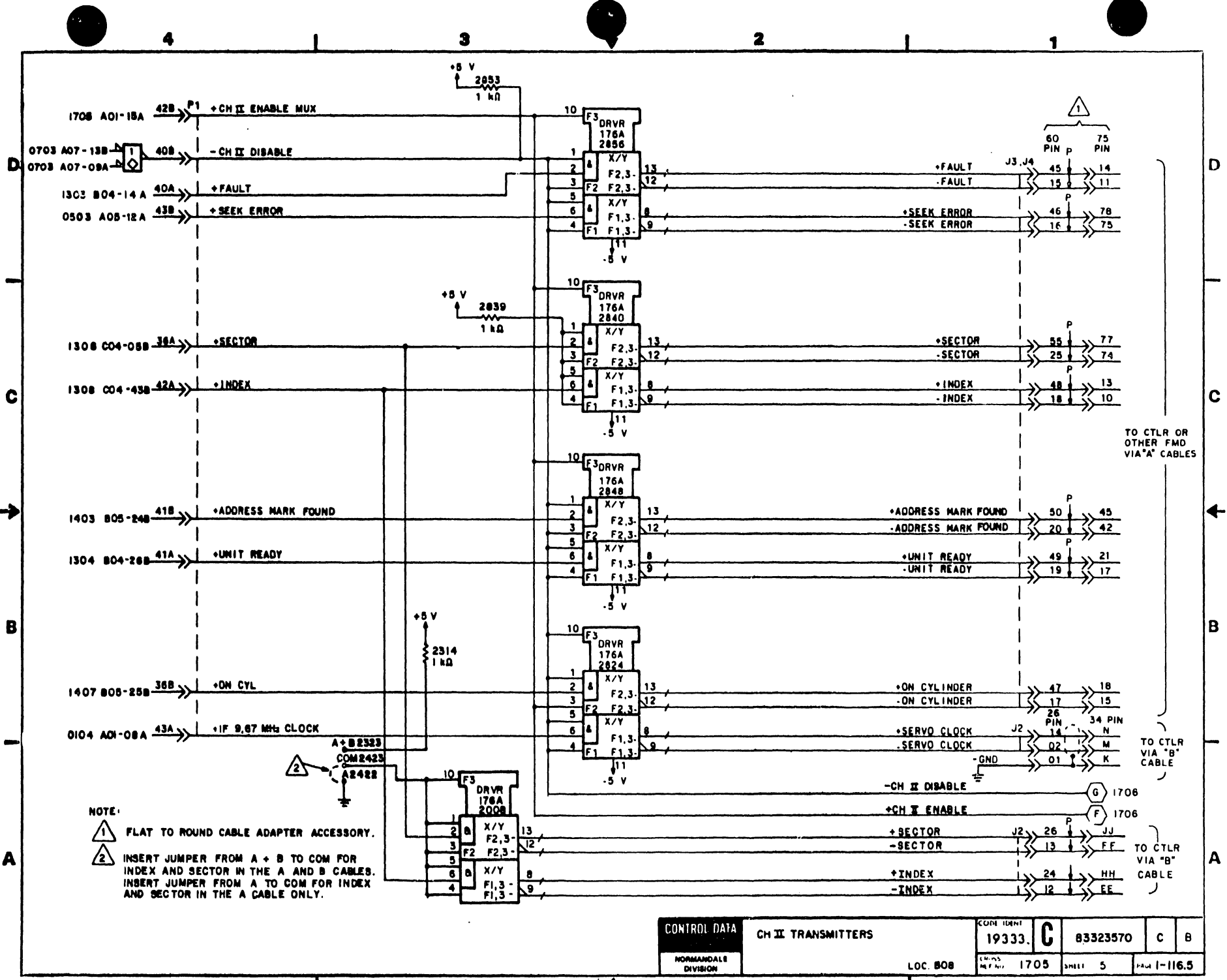


NOTES:

- ① THESE SIGNALS ARE ALSO CREATED ON THE CH I I/O CARD AND ALL OUTPUTS ARE TAKEN FROM THERE. SEE CROSS REF NO 0804
- ② FLAT TO ROUND CABLE ADAPTER ACCESSORY.

- ③ THESE SIGNALS ARE FROM THE CH I I/O CARD IN DUAL CHAN UNITS. (SEE SAME PINS ON 0804)

<b>CONTROL DATA</b>		CH II RECEIVERS AND SEQ POWER		CODE IDENT	19333	C	83323570	C	A
NORMANDALE DIVISION		LOC 808		CHASSY REF NO	1704	SHEET	4	PAGE I-116.4	

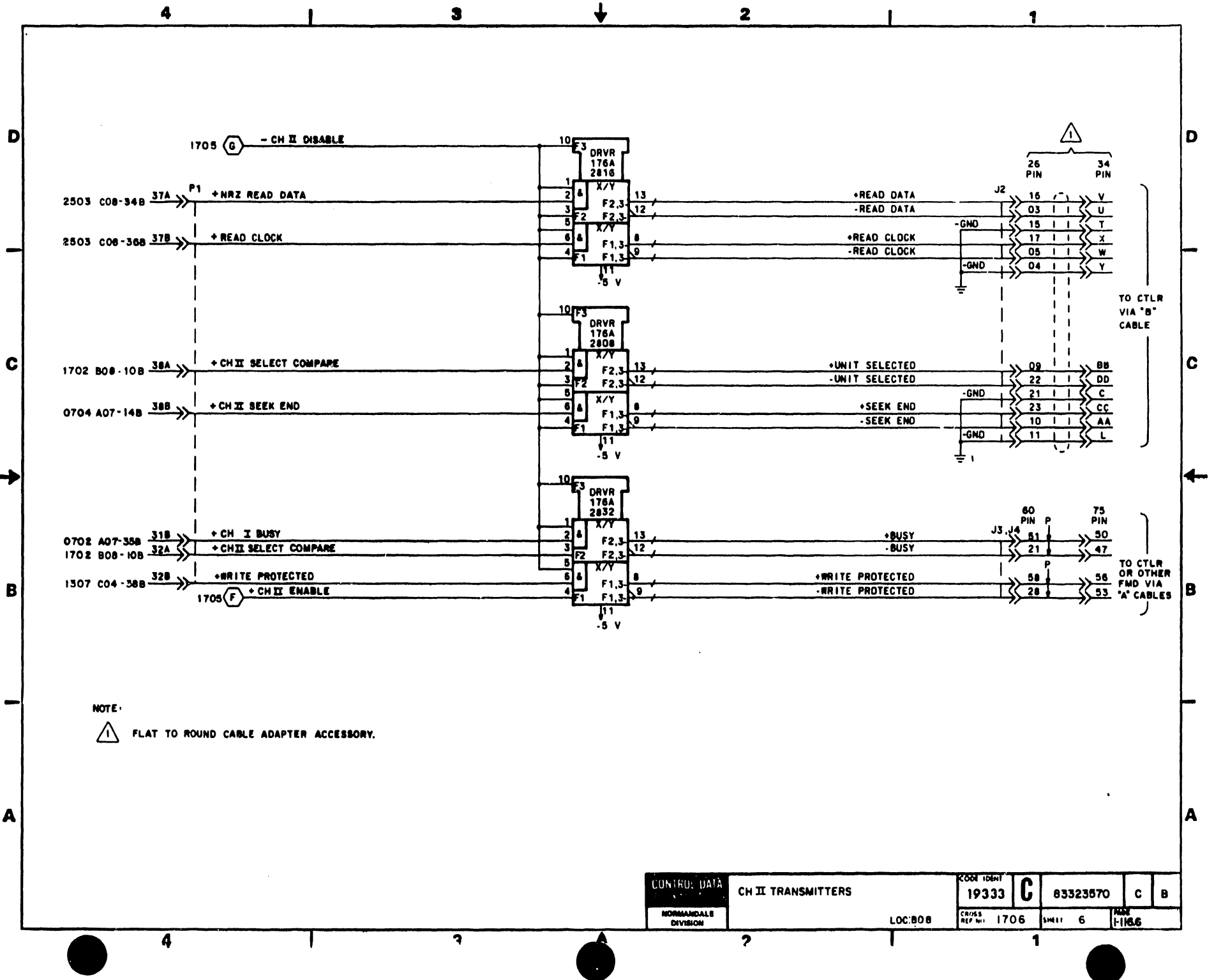


NOTE:

1 FLAT TO ROUND CABLE ADAPTER ACCESSORY.

2 INSERT JUMPER FROM A + B TO COM FOR INDEX AND SECTOR IN THE A AND B CABLES. INSERT JUMPER FROM A TO COM FOR INDEX AND SECTOR IN THE A CABLE ONLY.

CONTROL DATA NORMANDEALE DIVISION	CH II TRANSMITTERS	COM IDENT	83323570	C	B
		19333			
LOC. 808	ENCLOS. REF. No.	1705	SHEET 5	PAGE 1-116.5	



NOTE:  
 ⚠ FLAT TO ROUND CABLE ADAPTER ACCESSORY.

CONTROL DATA NORMANDALE DIVISION	CH II TRANSMITTERS	COOR IDENT	C	83323570	C	B
		19333				
LOC:808	CRYS REF: 1706	SM11	6	REV	1-1166	



REVISION STATUS OF SHEETS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A																
B	B																			
C	C																			
D	D																			
E																				

FILTER CAPS

.1 $\mu$ F	
+5 V	-5 V
0354	0210
0954	0622
1422	0727
1724	1052
1908	1215
2554	1322
3054	1734
3109	2054
3232	3042
	3124

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PINS
10102	0441	9, 14, 15
10124	2253	12, 15
10125	1829	4
10131	1308	14, 15

UNUSED RESISTOR PACKS

LOCATION	PIN(S)
2529	4, 5, 8

UNUSED TERMINATORS

LOCATION	PIN(S)
0717	3, 7

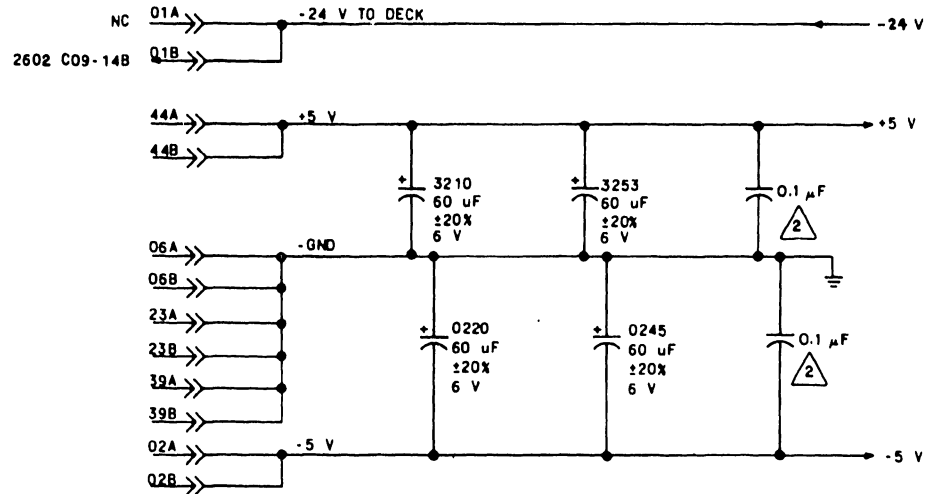
REVISIONS					
REV	ECO	DESCRIPTION	DRFT	DATE	CHK L
A		RELEASED	CB	1-30-80	
B	PE61728	LOGIC DIAGRAM UPDATE	CB	11-24-80	
C	PE61751	READ PLO/PLO CLOCK LOCK UP DURING POWER UP/PAJVVX TO CJVX	BT	8-24-81	
D	PE61851	ADD LOCK TO DATA SIGNAL			
E		ADD NOTE 3	CB	8-2-82	

NOTE:



2 SEE TABLE FOR .1  $\mu$ F CAPACITOR LOCATIONS.

3. THIS CARD USED ON UNITS HAVING SERIES CODES 01-13 ONLY.



DRAWN	C. Bunn	G. J. K. O.
CHECKED		
ENGINEER		
APPROVED		

MAGNETIC PERIPHERALS INC.  
a subsidiary of  
 Control Data Corporation

READ PLO DIAGRAMS

TYPE: CJVX

LOC C08

LARGE DISK DIVISION

C

83323570

E E

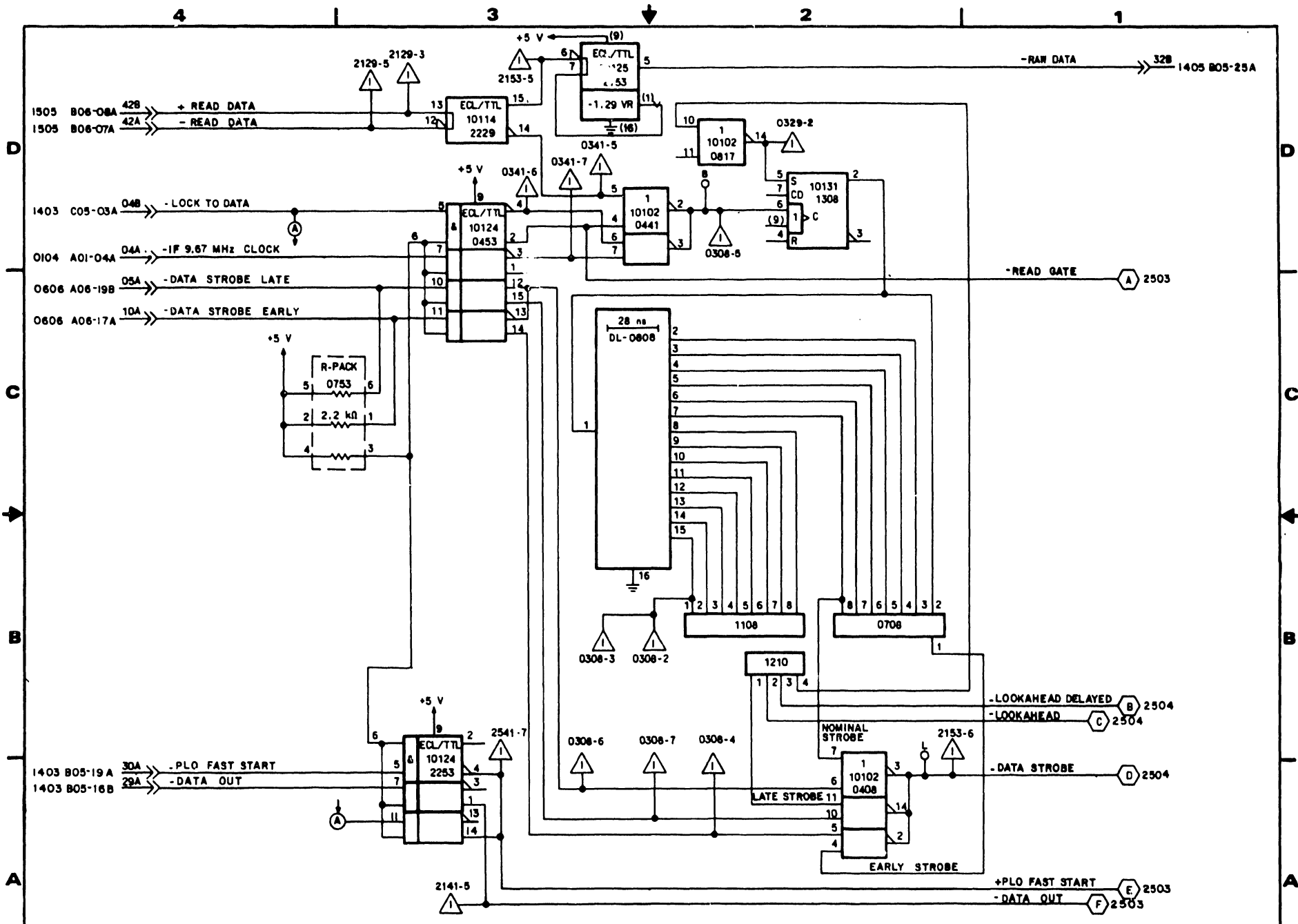
CODE IDENT 19333

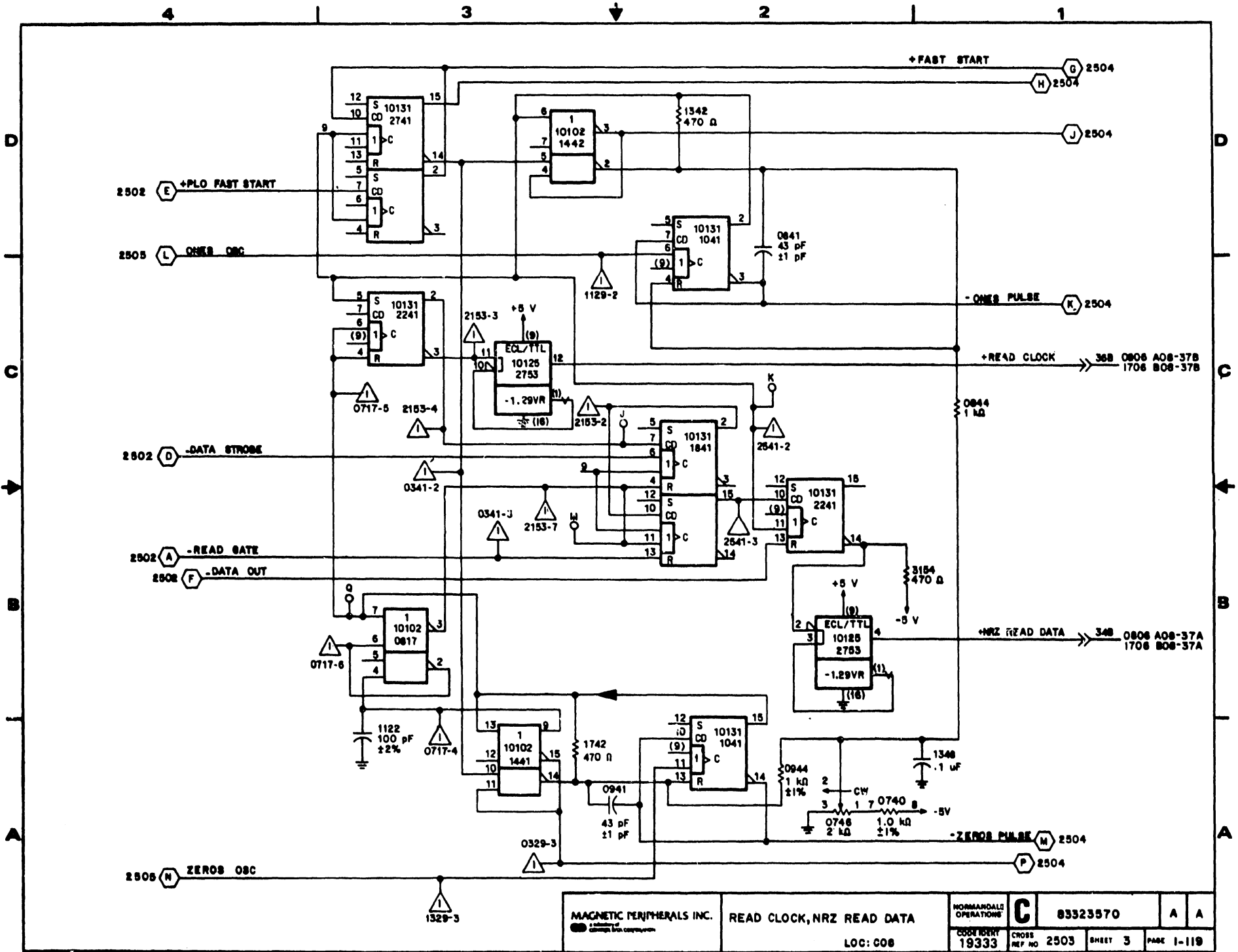
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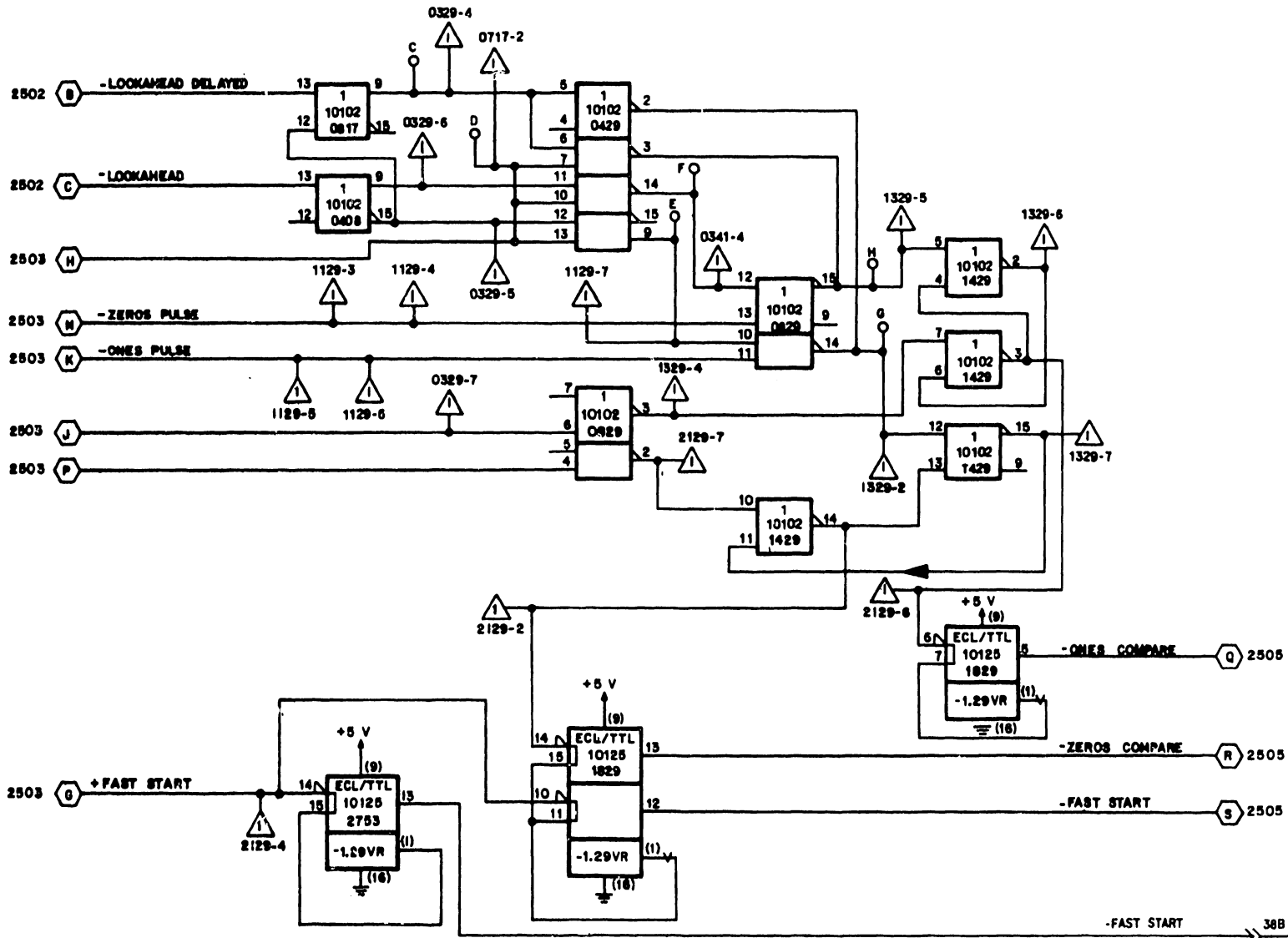
SHEET 1 OF 5

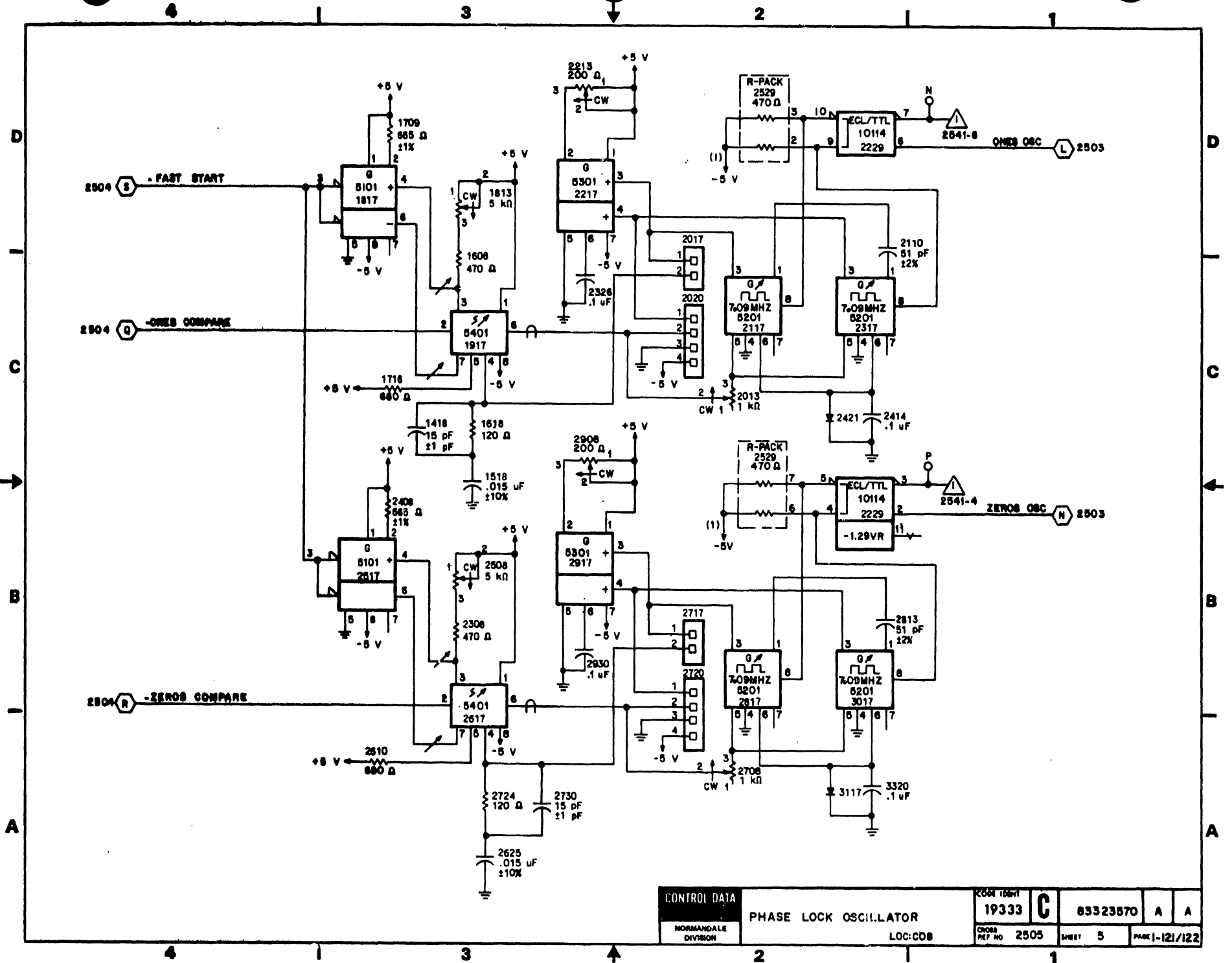
PAGE 1-117

REF: 81200216









CONTROL DATA		CODE IDENT	19333	C	8332570	A	A
NORMANDEALE DIVISION		PHASE LOCK OSCILLATOR		LOC:COB			
CHG#	REF NO	SHEET	PAGE				
	2505	5	1-121/122				

REVISION STATUS OF SHEETS																				
I	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A																
B	B																			
C	C																			
D	D																			
E	E	E	E	E																

FILTER CAPS	
.1 $\mu$ F	
+5 V	-5 V
0354	0210
0954	0622
1422	0727
1724	1052
2554	1734
3054	2054
3232	3042
1606	0236
1706	1222
2218	1806
2506	1830
3030	2018
3115	2606
3215	2824
	2918
	2930
	3121
	1215
	1317

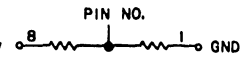
REVISIONS				
REV	ECN	DESCRIPTION	DATE	CHK'D
A		RELEASED	CB 1-30-80	
B	PE6751	AJVK TO CJVK	CB 4-8-81	
C	PE6804	UPDATE LOGIC DIAG'S	CB 4-8-81	
D	PE61831	ADD LOCK TO DATA SIGNAL	DLM 6-10-81	11/12
E	DHO2393	CJVK TO BJVK	CB 4-6-82	

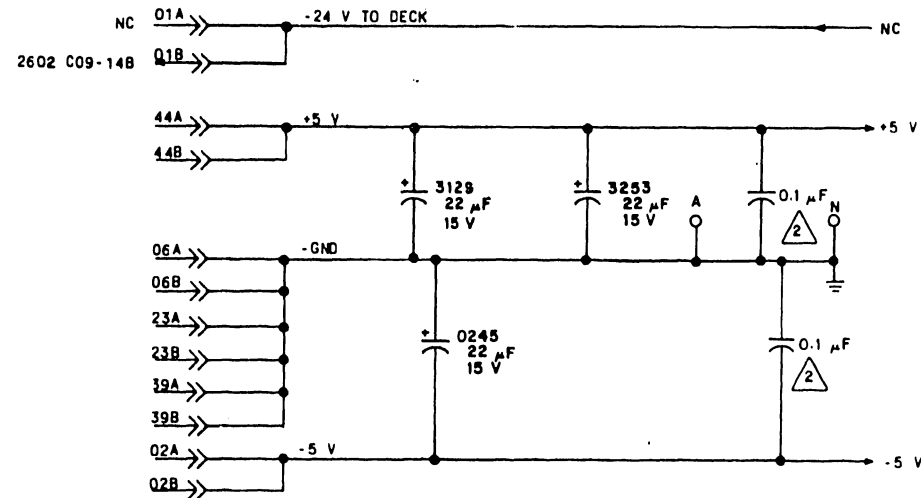
UNUSED RESISTOR PACKS	
LOCATION	PIN(S)
2517	3, 4, 5, 6
0753	7, 6

UNUSED LOGIC ELEMENTS		
ELEMENT	LOCATION	OUTPUT PINS
10102	0441	9, 14, 15
10125	1353	4, 5, 13
10114	1653	2, 3, 6, 7

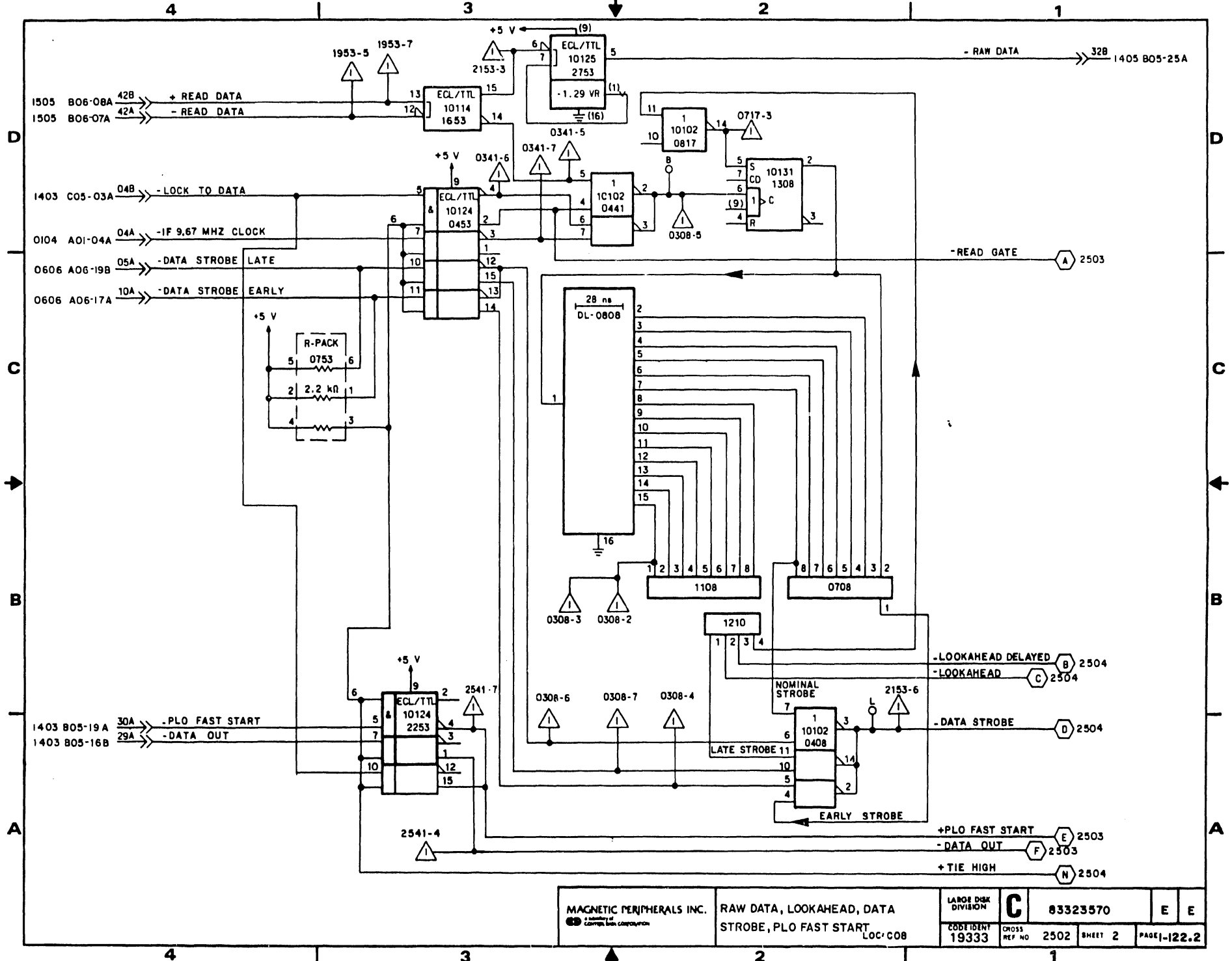
UNUSED TERMINATORS	
LOCATION	PIN(S)
0717	7
0329	2
1129	2
1329	3
1953	2, 3
2153	5
2541	5, 6
0853	2, 4, 5, 6

NOTE:

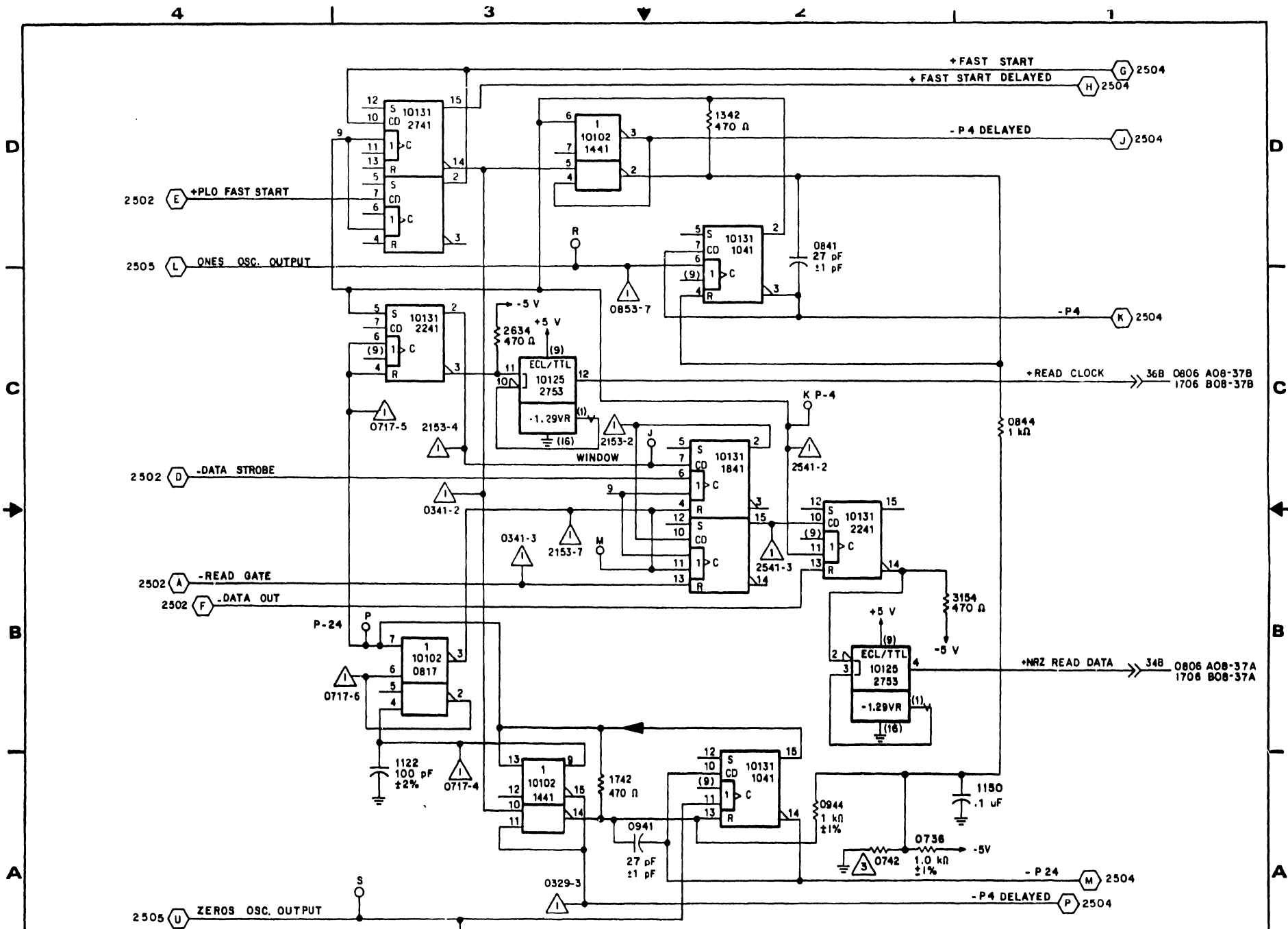
- 1 TYPICAL TERM. CONFIGURATION. -5 V  GND
- 2 SEE TABLE FOR .1 $\mu$ F CAPACITOR LOCATIONS.
- 3 THIS COMPONENT IS TEST SELECTED DURING CARD TEST.
- 4 BJVK CARD USED IN UNITS HAVING SERIES CODES 14 AND UP.



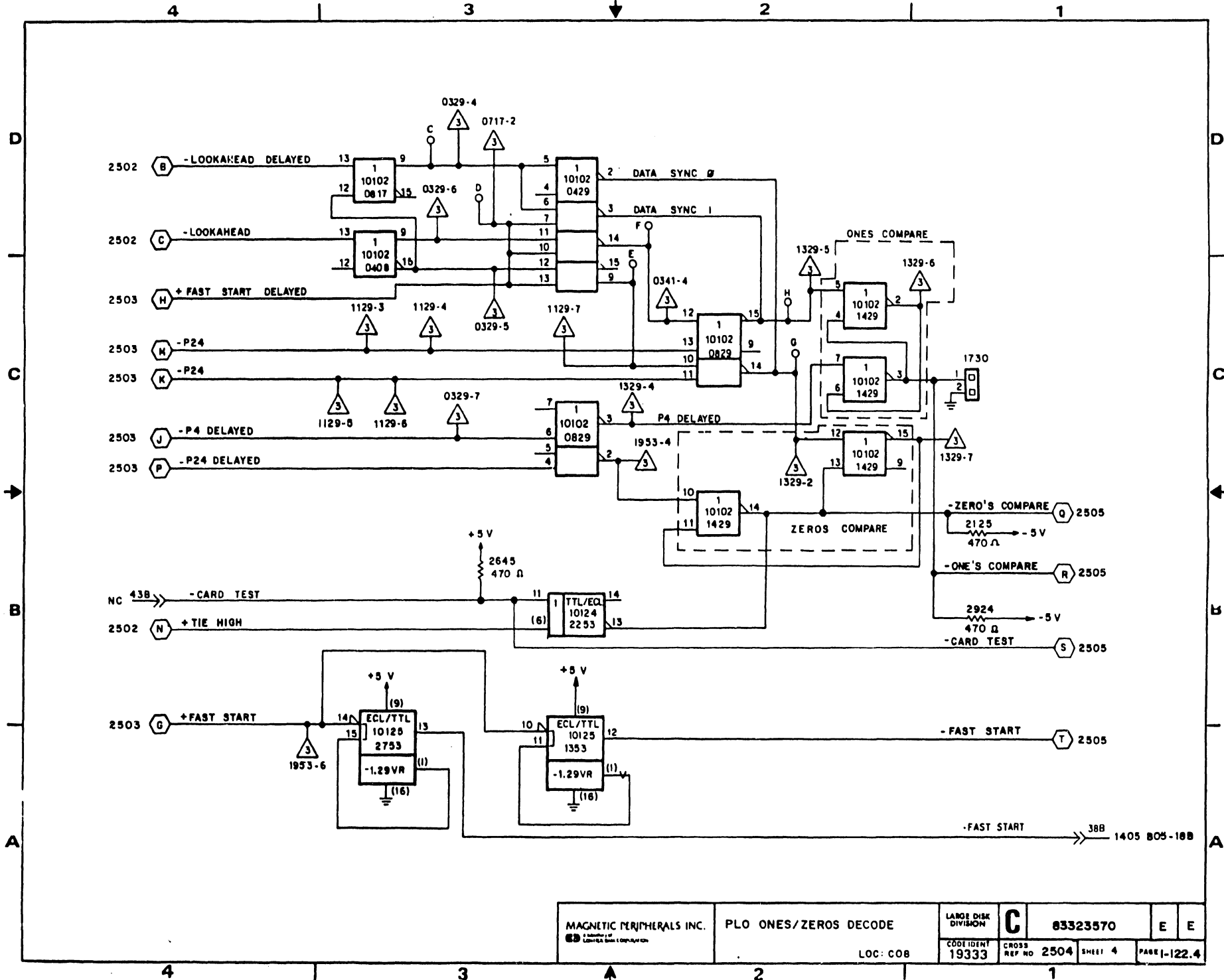
DRAWN	C. B. ...	MAGNETIC PERIPHERALS INC. A DIVISION OF CENTROTEC CORPORATION	READ PLO DIAGRAMS	LARGE DISK DIVISION	C	83323570	E	E				
CHECKED			TYPE: BJVK	CODE IDENT			19333	L. PROS REF NO	2501	SHEET	1	of 5
ENGINEER	W.S. ...		LOC: C08	REF: 81200216	1							
APPROVED												



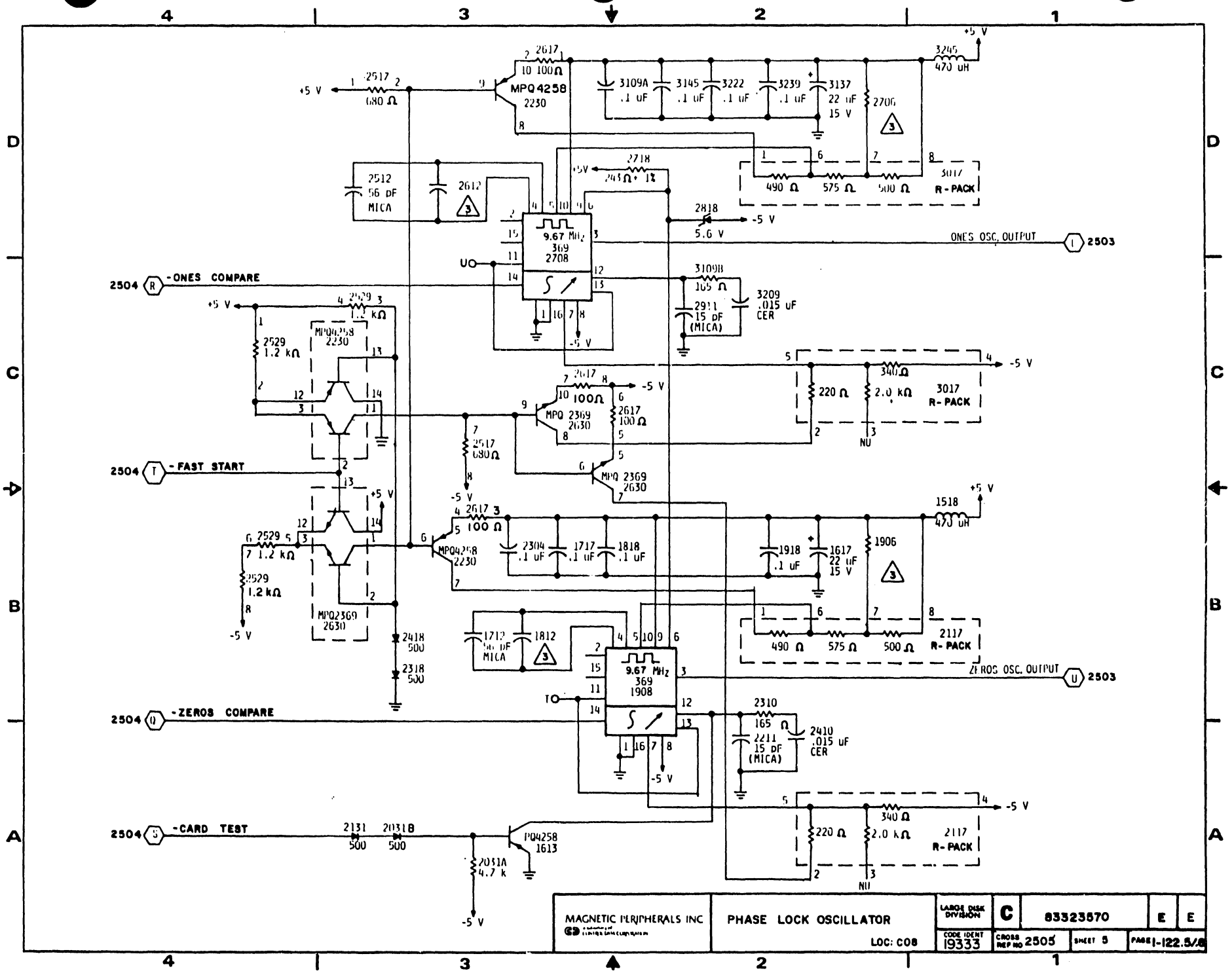
<b>MAGNETIC PERIPHERALS INC.</b> <small>Company of</small> <small>General Electric Corporation</small>	<b>RAW DATA, LOOKAHEAD, DATA STROBE, PLO FAST START</b> <small>LOC/COB</small>		<b>LARGE DISK DIVISION</b> <b>C</b>	<b>83323570</b>	<b>E</b>	<b>E</b>
	<b>CODE IDENT</b> <b>19333</b>	<b>CROSS REF NO</b> <b>2502</b>	<b>SHEET</b> <b>2</b>	<b>PAGE</b> <b>122.2</b>		







MAGNETIC PERIPHERALS INC. <small>an IBM Company</small>	PLO ONES/ZEROS DECODE  LOC: COB	LARGE DISK DIVISION	<b>C</b>	83323570	E E
		CODE IDENT 19333			



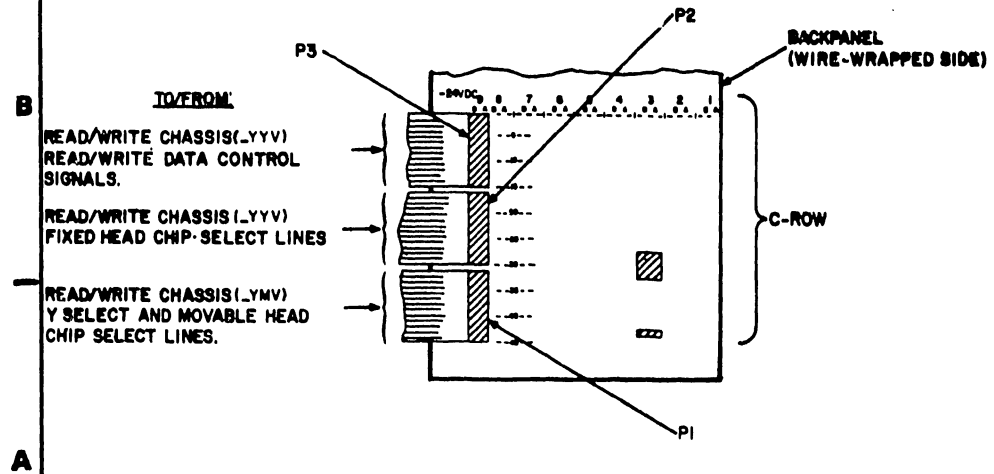
REVISION STATUS OF SHEETS

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B	B																			
C	C																			
D	D																			

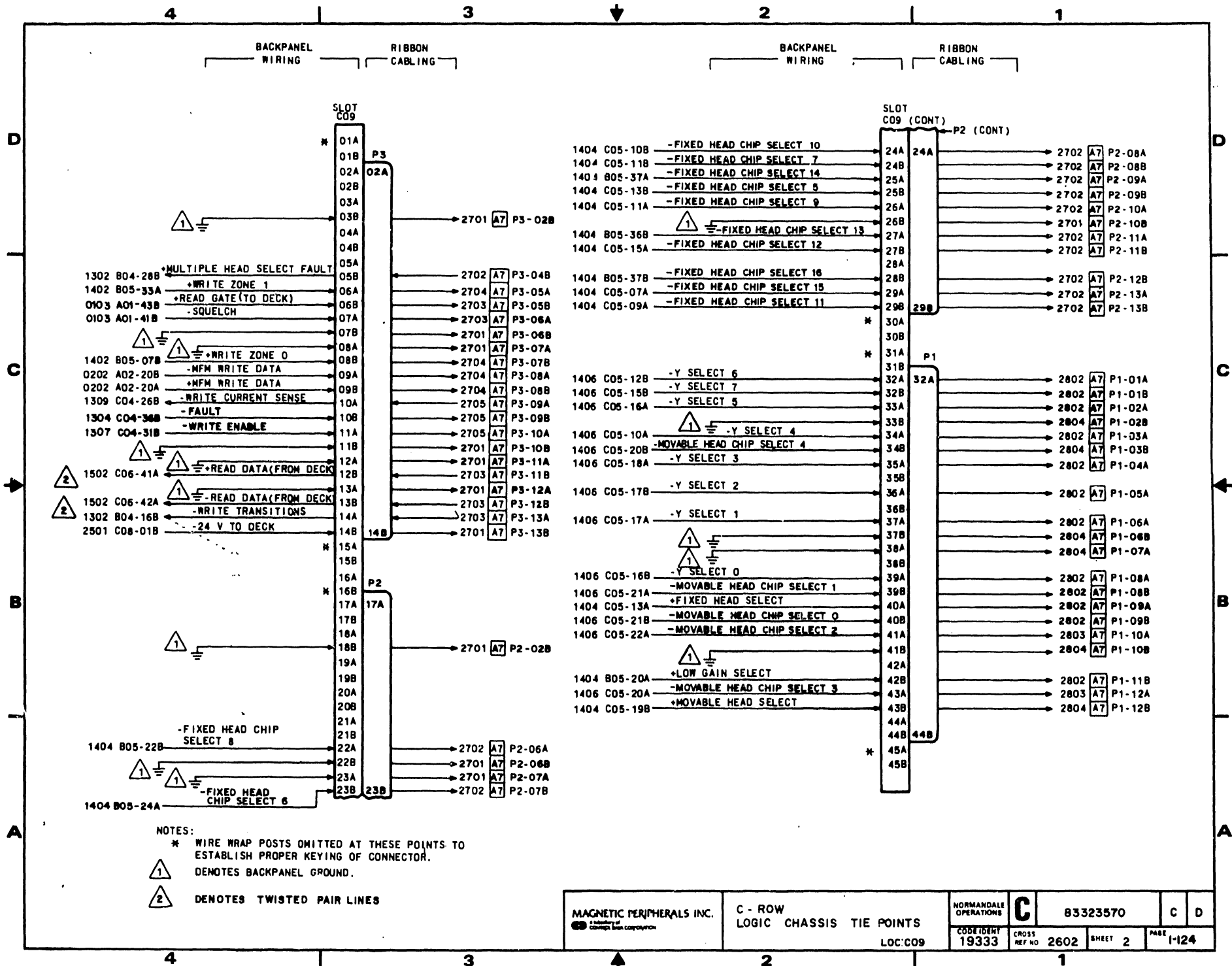
REVISIONS					
REV.	ECO.	DESCRIPTION	DRAFT.	DATE	CHK'D
A	PE3000	RELEASED			
B	PE3000	DECREASE NOISE LEVELS	CB	11-24-60	
C	PE3178	LOGIC DIAGRAM UPDATE			
D	PE3104	IMPROVE CLOCK CKT	BT	2-24-61	MA P

NOTES:

- 1 DENOTES THAT PIN IS CONNECTED TO BACKPANEL GROUND
- 2 \* AN ASTERISK DENOTES THAT A WIRE WRAP PIN HAS BEEN OMITTED AT THAT POINT TO ESTABLISH PROPER KEYING OF CONNECTOR.



DRAWN	J. Moberg	BY: E-20	MAGNETIC PERIPHERALS INC.	C-ROW LOGIC CHASSIS TIE POINTS DIAGRAM	LOC: COB	NORMANDALE OPERATIONS	C	83323570	C	D
CHECKED										
ENGINEER										
APPROVED										
CODE IDENT	19333	CROSS REF NO	2601	SHEET	1 of 2	PAGE	1-123	REF 81200217		



REVISION STATUS OF SHEETS

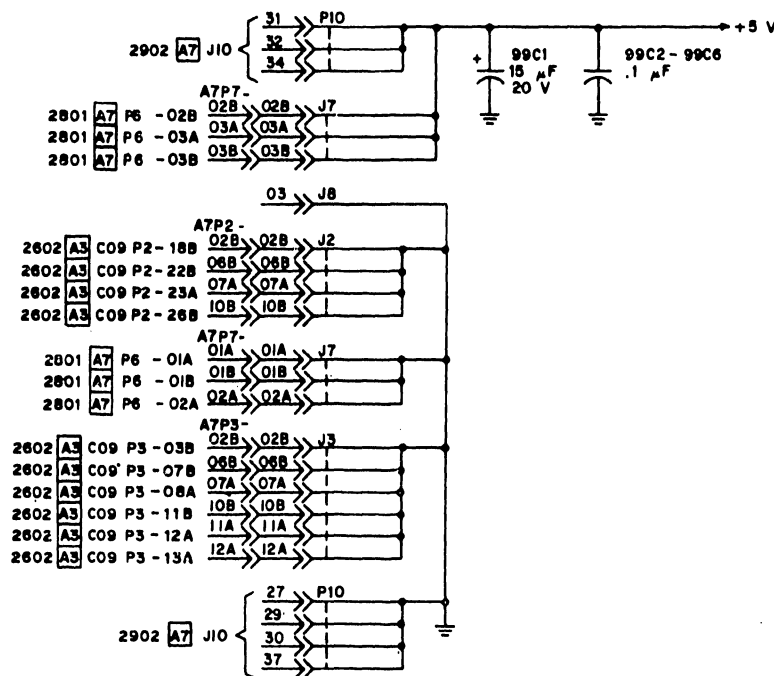
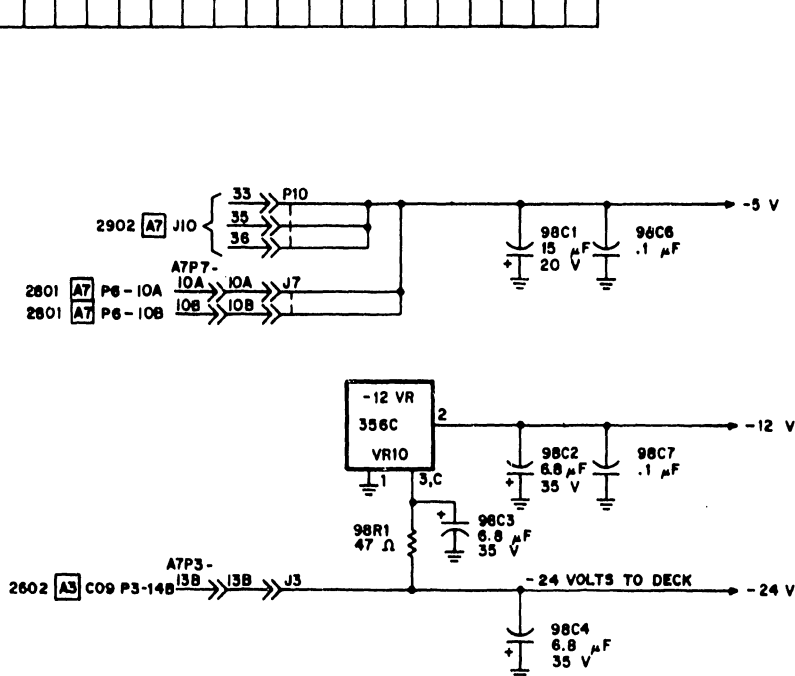
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
A	A	A	A	A																
B	B	B	B	B																
C	C	C	C	C																
D	D			D																
E			E																	
F				F																
G	G																			

UNUSED LOGIC ELEMENTS

ELEMENT	LOCATION	OUTPUT PINS
141LS	C1A	12
141LS	C2A	12

REVISIONS

REV.	ECO.	DESCRIPTION	DRFT.	DATE	CHK'D
A	PE13000	RELEASED	CB	8-24-62	
B	PE1429	CHG RESISTORS	CB		
C	PE1649	INCREASE WRITE CURRENT			
D	PE1726	LOGIC DIAGRAM UPDATE			
E	PE1746	WRT CURRENT TOL FOR FXD HDS	DPS	8-4-61	MAJ
F	PE1830	IMPROVE YIELD ON WRT CURRENT	DPS	8-4-61	MAJ
G	DM2356	REDUCE NOISE	CB	8-2-62	



DRAWN	7. Hanley	5-2-60
CHECKED		
ENGINEER		
APPROVED		

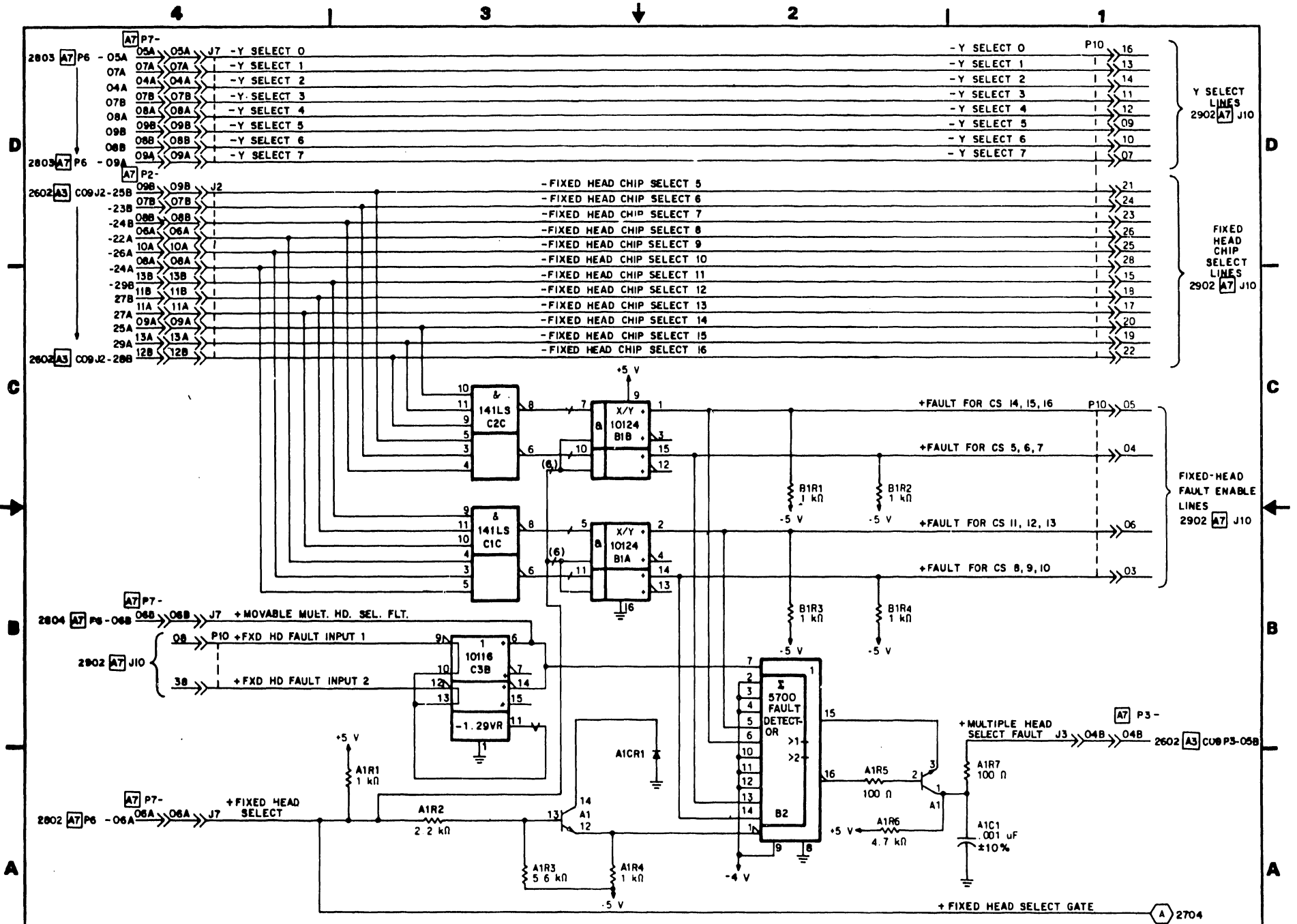
CONTROL DATA
LARGE DISK DIVISION

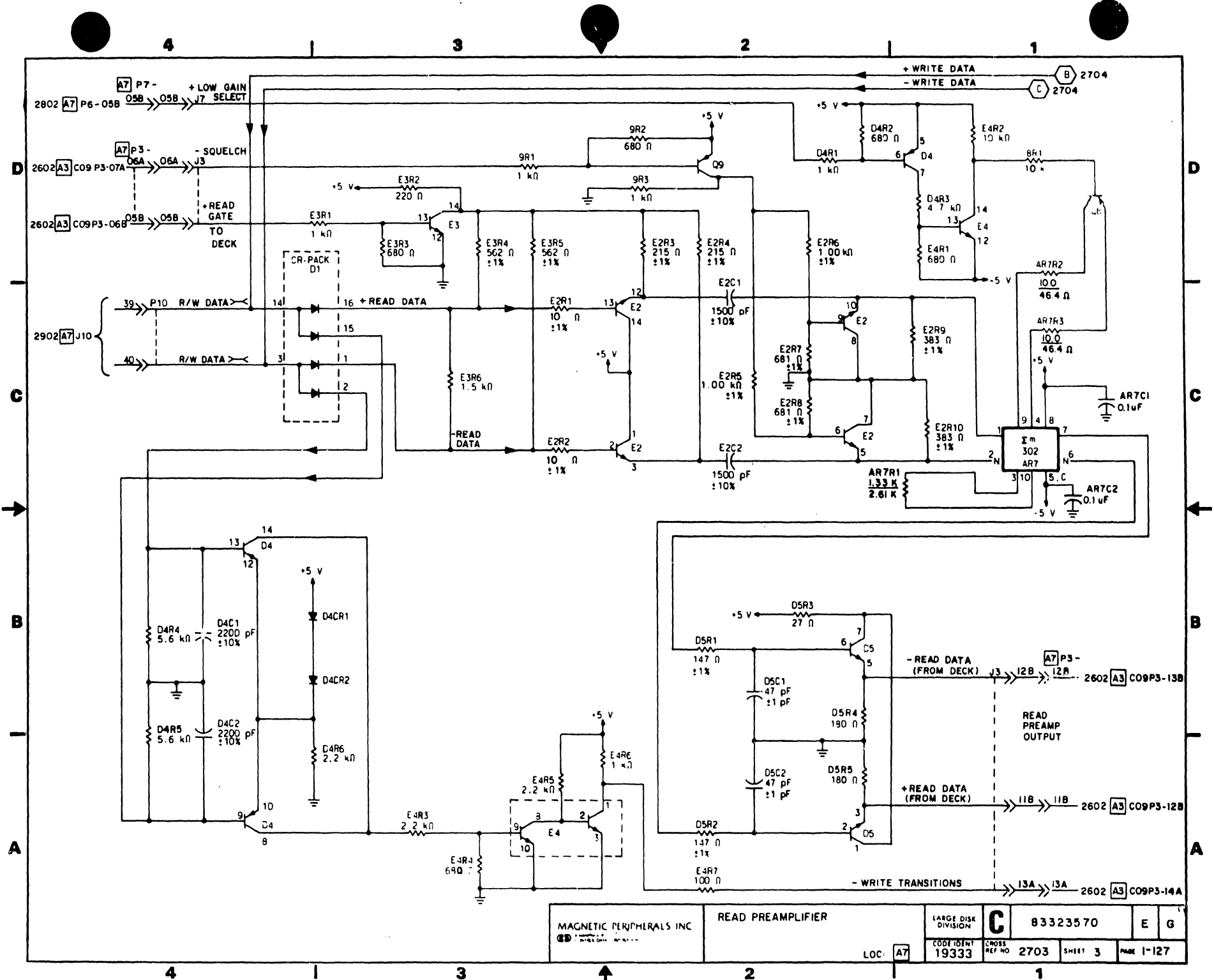
READ / WRITE CHASSIS DIAGRAMS  
TYPE: EYV

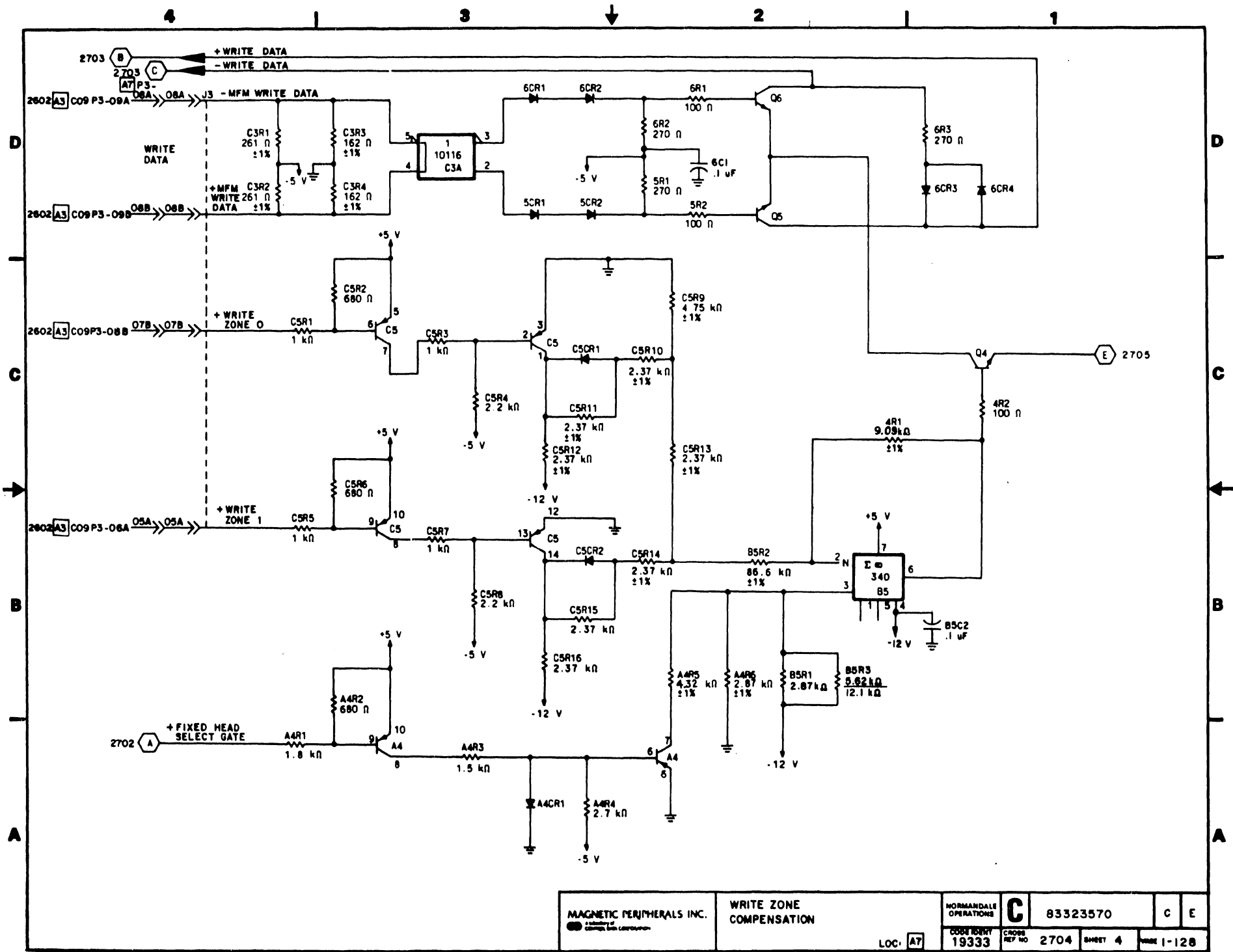
LOC: A7

CODE IDENT	19333	C	83323570	E	G
CROSS REF NO	2701	SHEET	1 of 5	PAGE	1-125

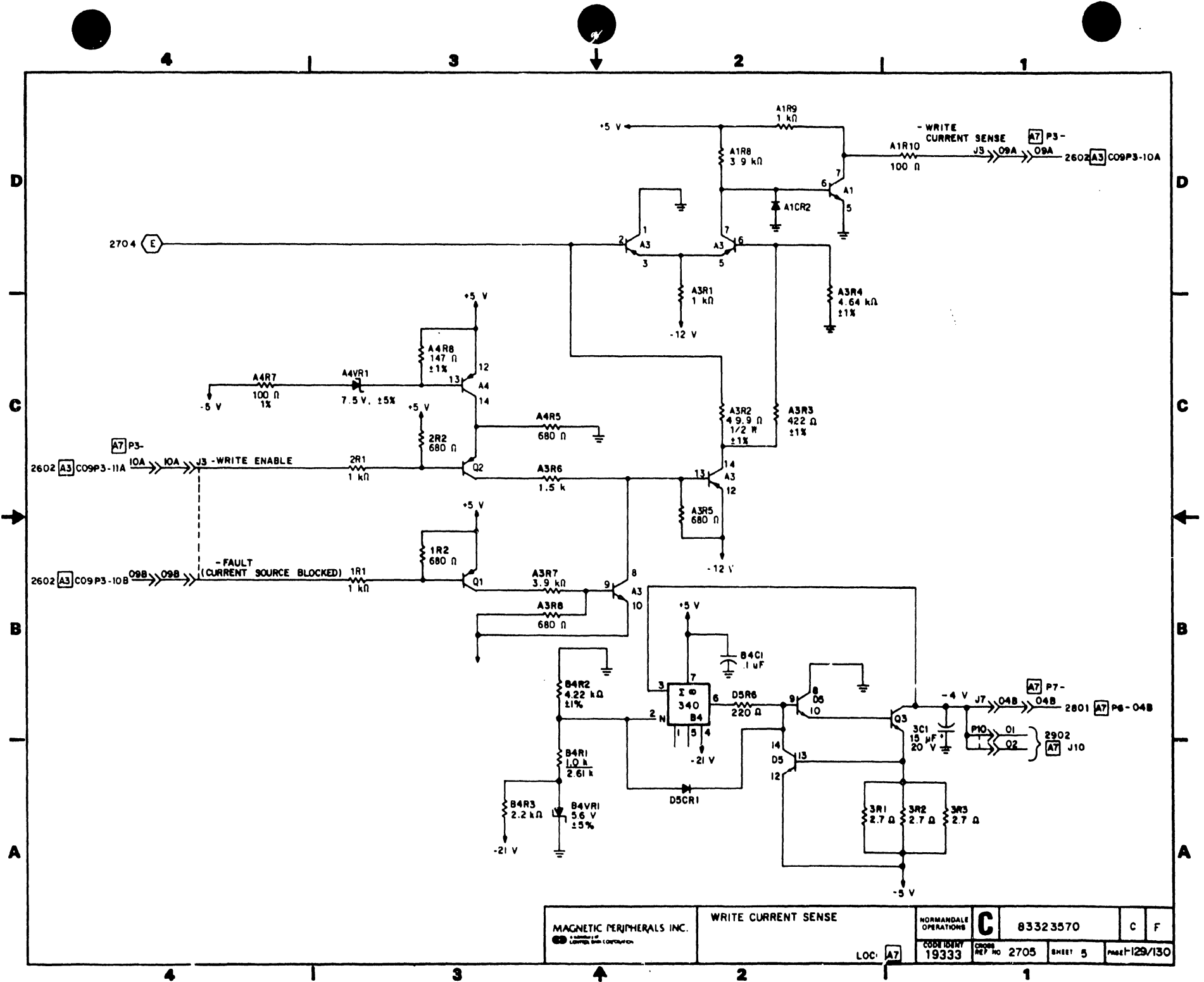
REF: 6120218



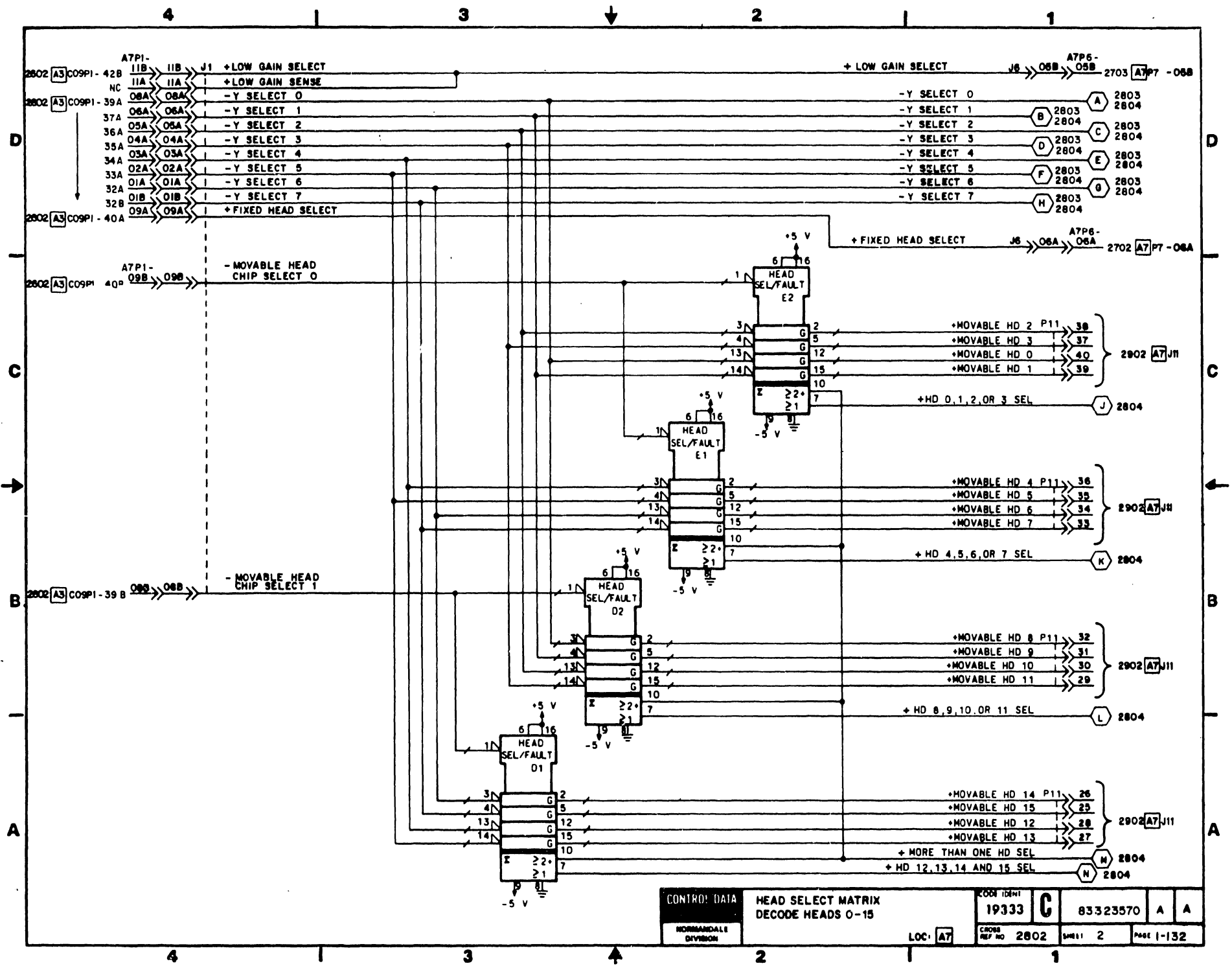




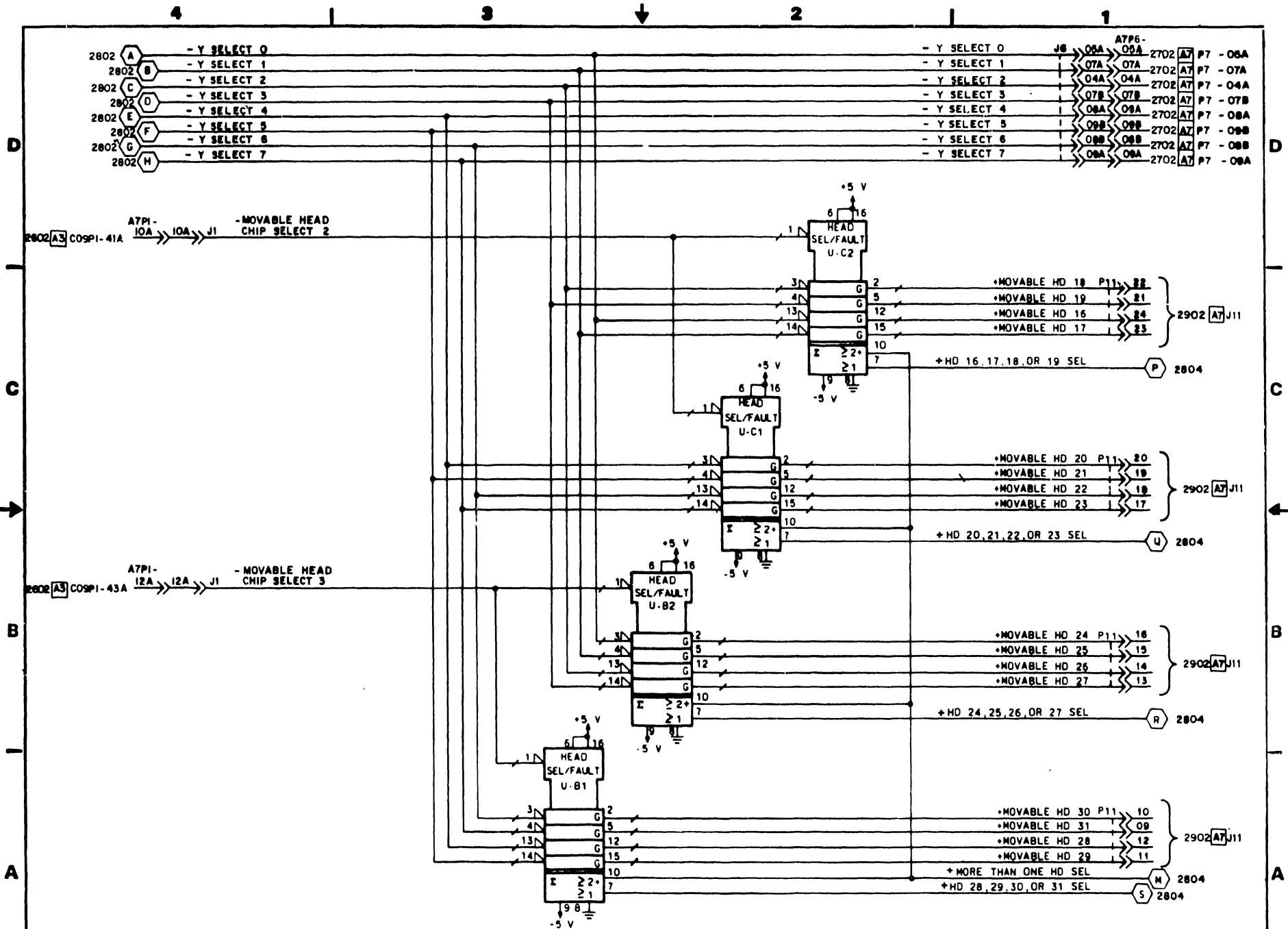




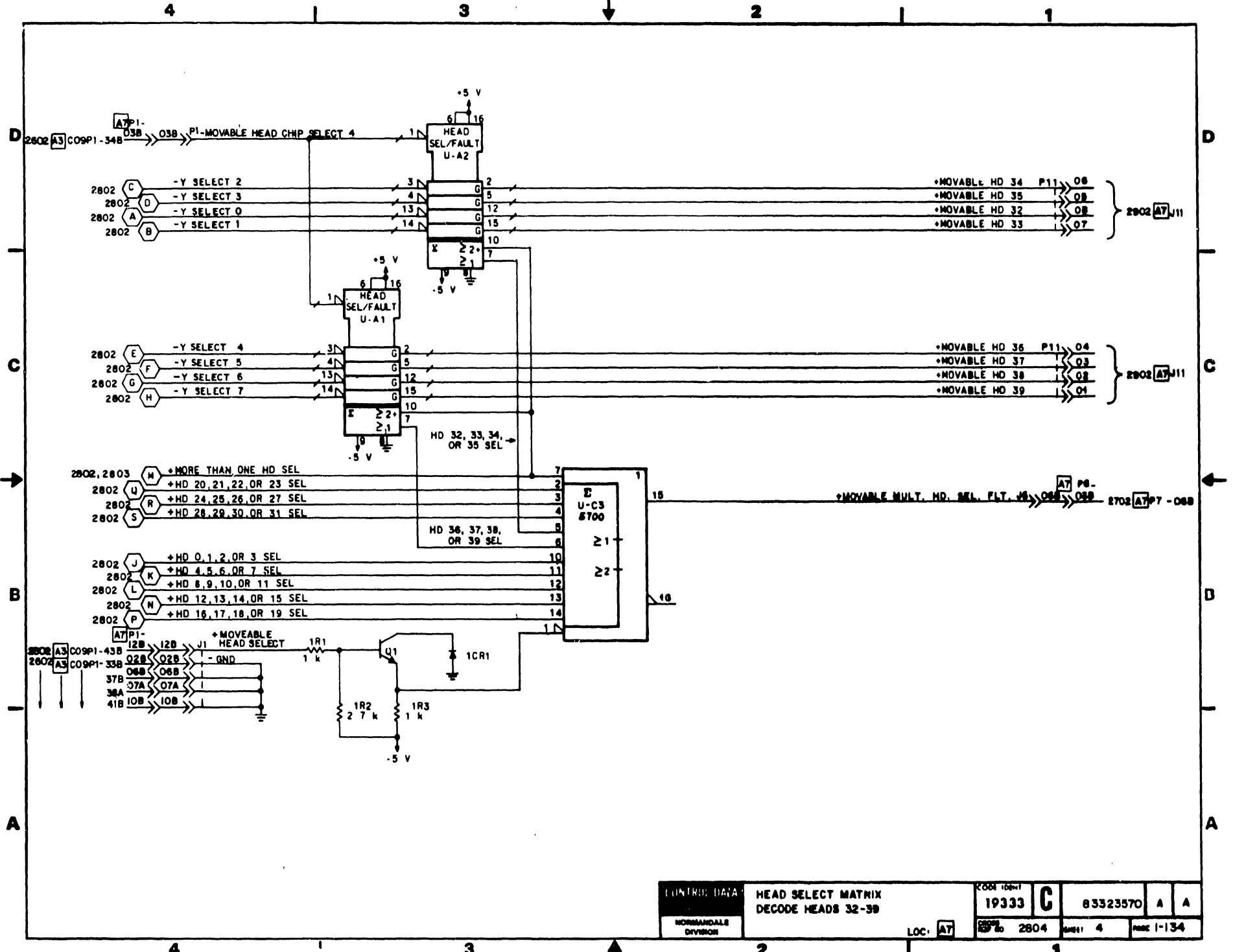




CONTROL DATA NORMANDALE DIVISION	HEAD SELECT MATRIX DECODE HEADS 0-15		COB ID#1 19333	C	83323570	A	A
	LOC: A7	CROSS REF NO 2802	SHEET 2	PAGE 1-132			

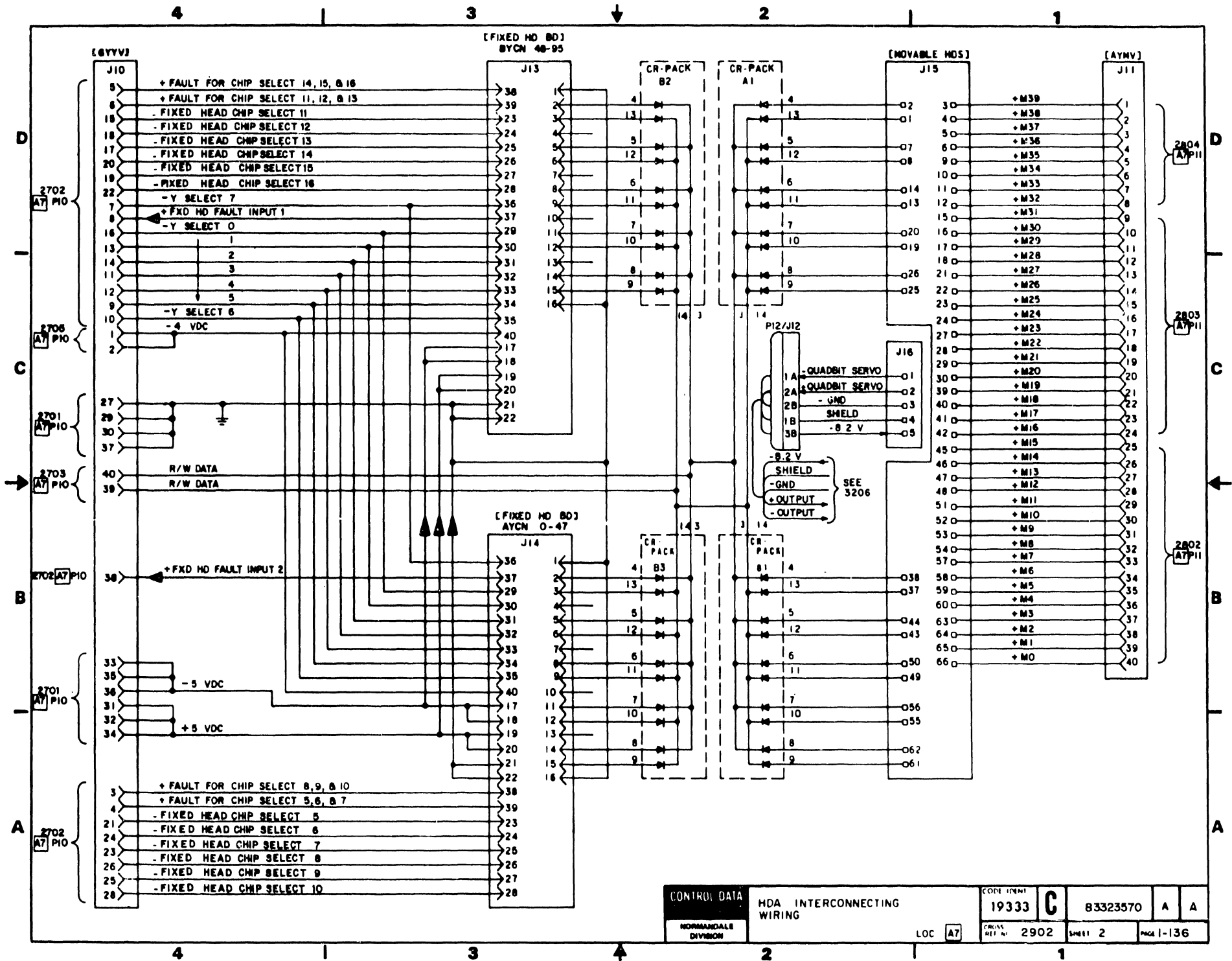


CONTROL DATA	HEAD SELECT MATRIX		CODE IDENT		83323570	A	A
	DECODE HEADS 16-31		19333	C			
NORMANDALE DIVISION	LOC: A7	CROSS REF NO 2803	SMI: 3	PAGE 1-133			



CONTROL DATA	HEAD SELECT MATRIX	19333	C	83323570	A	A
	DECODE HEADS 32-39					
NORMANDALE DIVISION		LOC: A7	2804	4	PAGE 1-134	





CONTROL DATA	HDA INTERCONNECTING WIRING	CODE (HW)	19333	C	83323570	A	A
		CROSS REF. NO.	2902	SHEET	2	PAGE	1-136
NORMANDEALE DIVISION	LOC	AT					

REVISION STATUS OF SHEETS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	A	A																	
B				B																
C	C																			
D	D																			
E	E																			
F	F	F																		
G				G																
H	H																			
J	J	J																		
K																				
L																				
M	M																			

REVISIONS

REV	ECO	DESCRIPTION	DRFT	DATE	CHK'D
A	PE1000	RELEASED			
B	PE1074	ADD AND REPLACE CAPACITORS	CB	8-24-60	
C	PE1103	ADD FTU CAPABILITIES			
D	PE1304B	ADD CBA BOUNDING			
E	PE1090	ADD INDUCTOR			
F	PE1076	LOGIC DIAGRAM UPDATE			
G	PE1077	+BY MPU FIX, DVLY TO CVLV	BT	8-24-60	MAJ
H	PE1122	SHR PER CABLE INSIDE AC BOX	DFB	8-4-60	MAJ
J	PE1090	CORRECT DIAGRAMS	DFB	8-5-60	MAJ
K	SH0244	ELIMINATE OSCILLATION & REDUCE NOISE, DVLY TO DML	DWF	1-29-68	
L	SH0289	LOWER VOLTAGE ADJUSTMENT RANGE			
M	SH0226	CORRECT DMS			

DRAWN	A	4 No 80
CHECKED		
ENGINEER		
APPROVED		

MAGNETIC PERIPHERALS INC.  
A MEMBER OF  
CORNING INC. CORPORATION

AC POWER  
DIAGRAMS

NORMANDALE  
OPERATIONS

C

83323570

D M

CODE IDENT  
19333

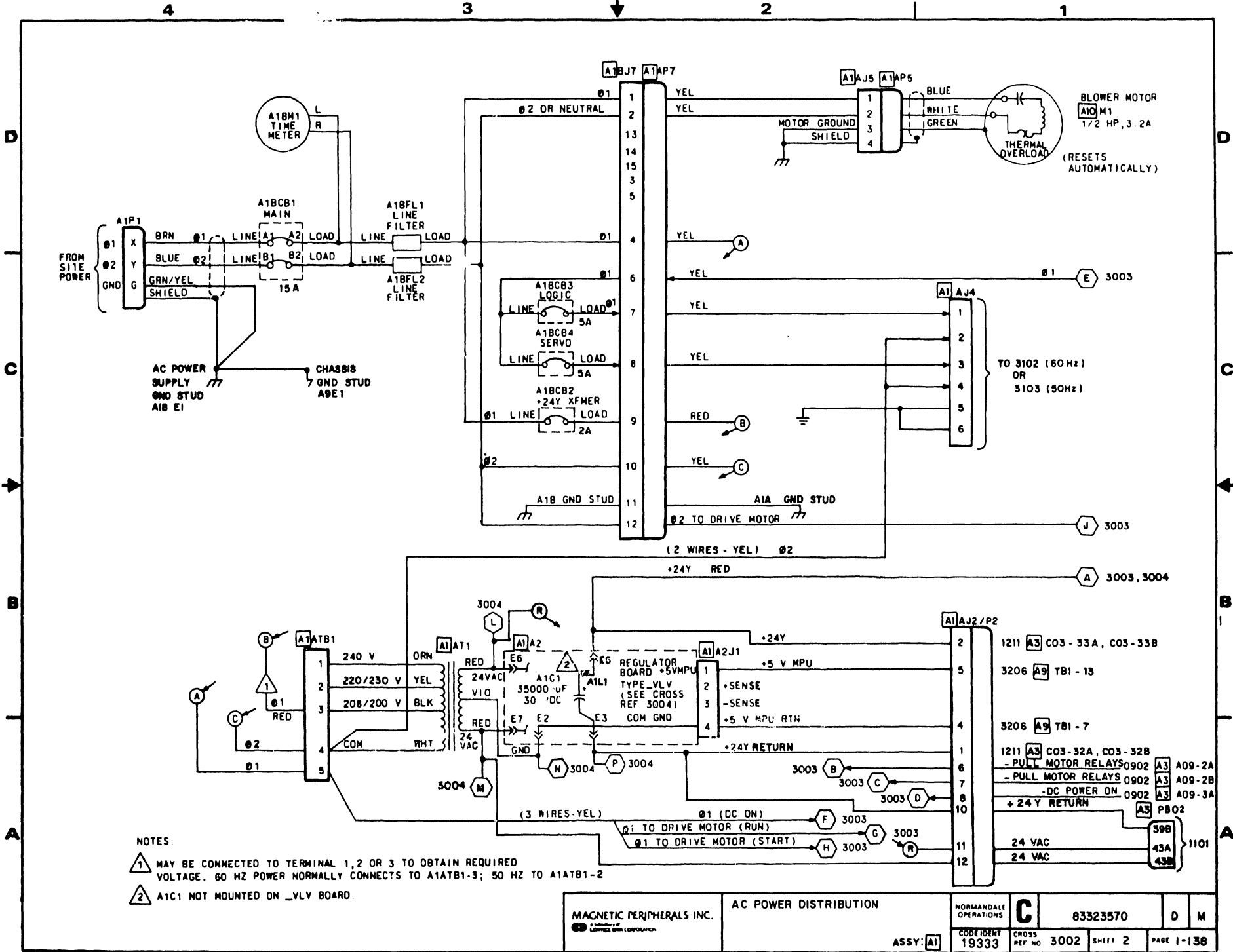
CROSS  
REF NO 3001

SHEET  
1 of 4

PAGE  
1-137

REF: 812002E1





FROM SITE POWER

A1B M1 TIME METER

BLOWER MOTOR  
A1C M1  
1/2 HP, 3.2A  
(RESETS AUTOMATICALLY)

AC POWER SUPPLY GND STUD A1B E1

CHASSIS GND STUD A9E1

A1BCB3 LOGIC  
A1BCB4 SERVO  
A1BCB2 +24V XFMR

(2 WIRES - YEL) Ø2

TO 3102 (60 Hz)  
OR  
3103 (50Hz)

+24V RED

REGULATOR BOARD +5V MPU

A1C1 35000 µF 30 /DC

+24V RETURN

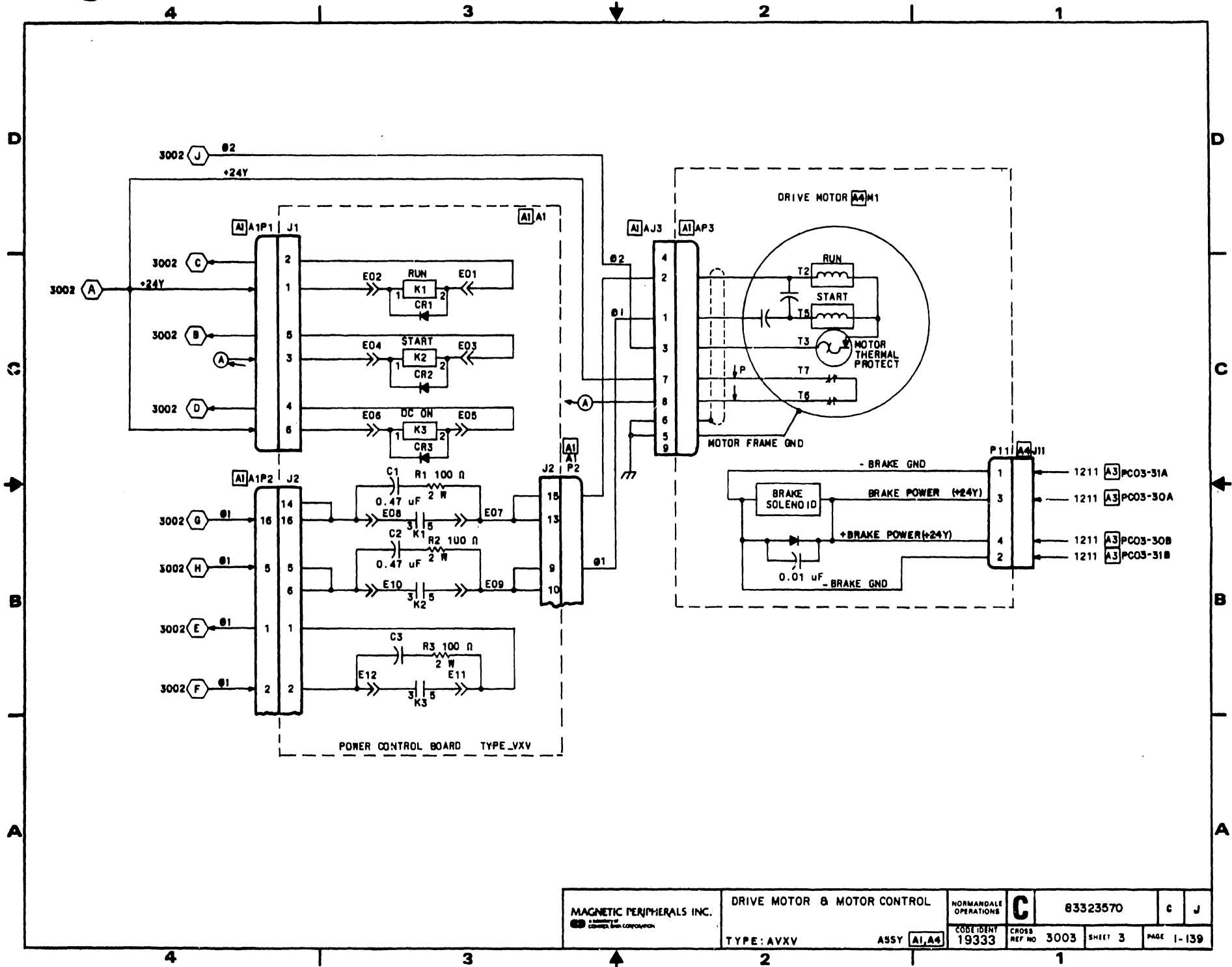
Ø1 (DC ON)  
Ø1 TO DRIVE MOTOR (RUN)

Ø1 TO DRIVE MOTOR (START)

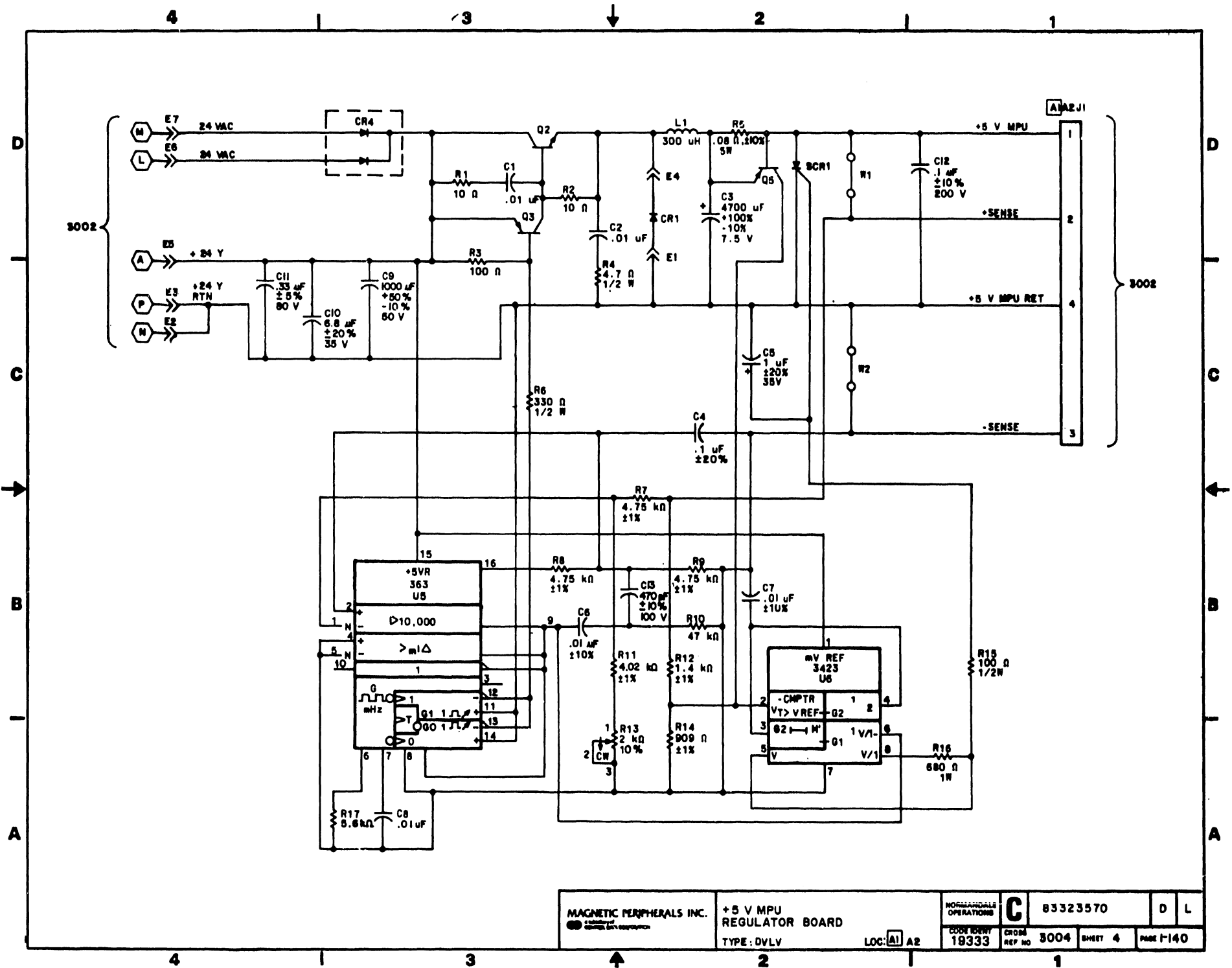
NOTES:

- ⚠ MAY BE CONNECTED TO TERMINAL 1, 2 OR 3 TO OBTAIN REQUIRED VOLTAGE. 60 HZ POWER NORMALLY CONNECTS TO A1ATB1-3; 50 HZ TO A1ATB1-2
- ⚠ A1C1 NOT MOUNTED ON \_VLV BOARD.

MAGNETIC PERIPHERALS INC. <small>a subsidiary of LITTON INDUSTRIES COMPANY</small>	AC POWER DISTRIBUTION		NORMANDALE OPERATIONS	C	83323570	D	M
	ASSY: A1	CODE IDENT 19333	CROSS REF NO 3002				



MAGNETIC PERIPHERALS INC. A DIVISION OF CONTROL DATA CORPORATION	DRIVE MOTOR & MOTOR CONTROL	NORMANDALE OPERATIONS	C	83323570	c	J
	TYPE: AVXV	ASSY				



MAGNETIC PERIPHERALS INC. <small>AN IRVING-CLOUD COMPANY</small>	<b>+5 V MPU REGULATOR BOARD</b>		NORLAND/DAVID OPERATIONS	<b>C</b>	83323570	D	L
	TYPE: DVLV	LOC: A1 A2	CODE IDENY 19333	CROSS REF NO	3004	SHEET 4	PAGE 1-140

4

1

3

2

1

1

REVISION STATUS OF SHEETS

I	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	A	A	A	A	A	A	A	A	A	A	A								
B											B								
C					C														
D										D	D	D							
E		E									E	E							
F	F	F		F	F			F		F	F								
G				G	G					G	G	G							
H		H																	
J	J	J	J	J	J	J	J	J		J	J								
K			K																
L				L	L							L							
M						M	M	M											
N							N	N											

REVISIONS

REV	ECO	DESCRIPTION	DRFT.	DATE	CHK'D
A	PE23000	RELEASED			
B	PE21274	ADD AND REPLACE CAPACITORS	CB	11-24-80	
C	PE2376	ADD CAPACITOR			
D	PE21483	ADD FTU CAPABILITIES			
E	PE21584	ADD FUSE CALLOUTS			
F	PE21726	LOGIC DIAGRAM UPDATE			
G	PE21837	CRT BRKR/HD RETRACT FIX, CVMV TO DVMV, CKTX TO ERX, BDDV TO CDDV	DPS	6-4-81	MCP
H	PE27000	CORRECT LABELING	DPS	6-4-81	MCP
J	PE219201	CORRECT DIAGRAMS	DPS	6-4-81	MCP
J	PE27022				
K	DHC2092	FAULTY ERROR FIX	Dmt	1-25-82	MCP
L	DHC2226	CORRECT DIAG			
M	PE27031	CARRIAGE SLAM FIX; BTUV TO EYUV			
N	DHC2621	IMPROVE EYUV	JJ	8-21-82	MCP

D

D

C

C

B

B

A

A

DRAWN	C BIROS	5-2-80
CHECKED		
ENGINEER		
APPROVED		

MAGNETIC PERIPHERALS INC.

DC POWER DIAGRAMS

NORMANDALE OPERATIONS	<b>C</b>	83323570	D	N
CODE IDENT	CROSS REF NO	SHEET	PAGE	
19333	3101	1 of 12	1-141	

4

1

3

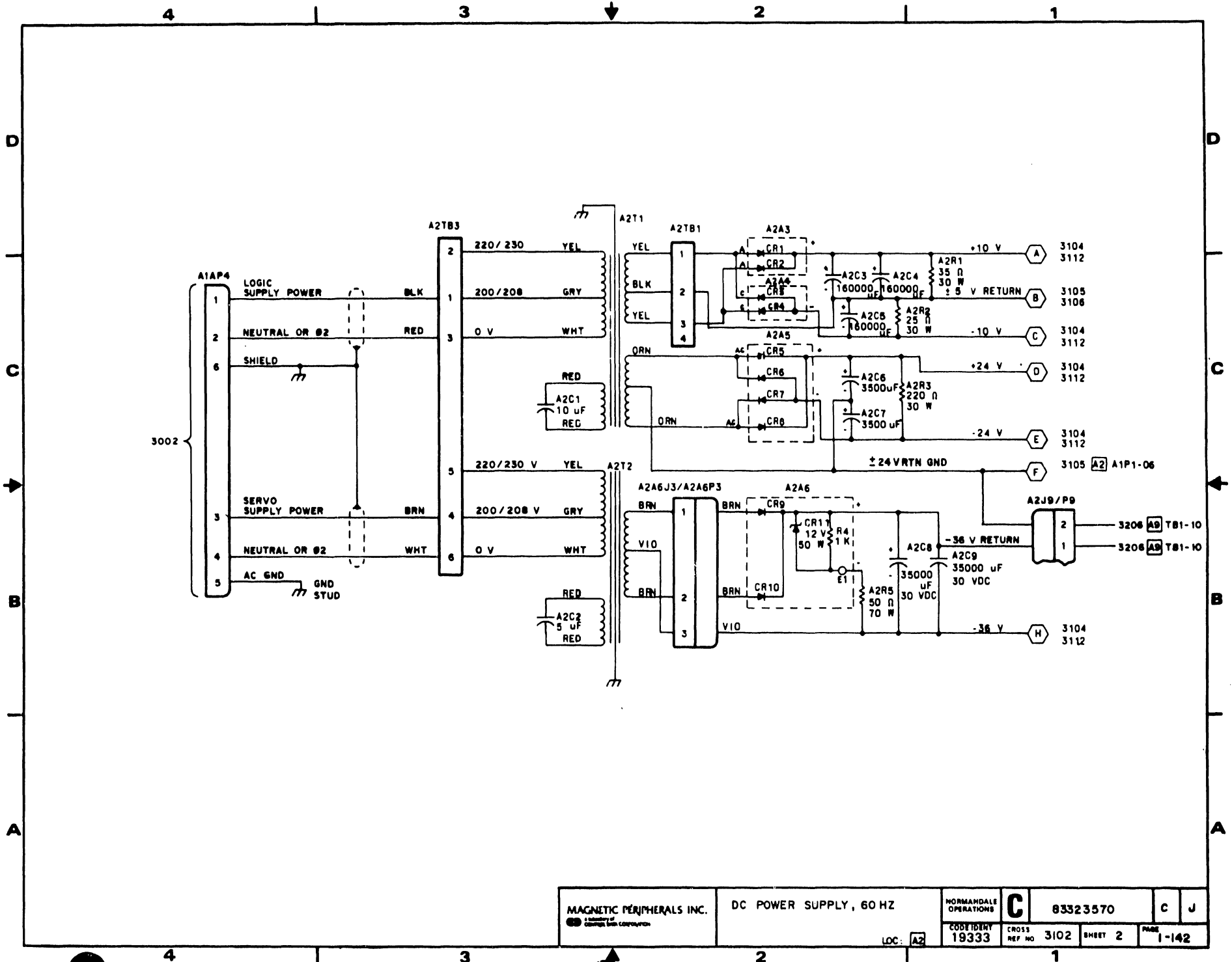
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2

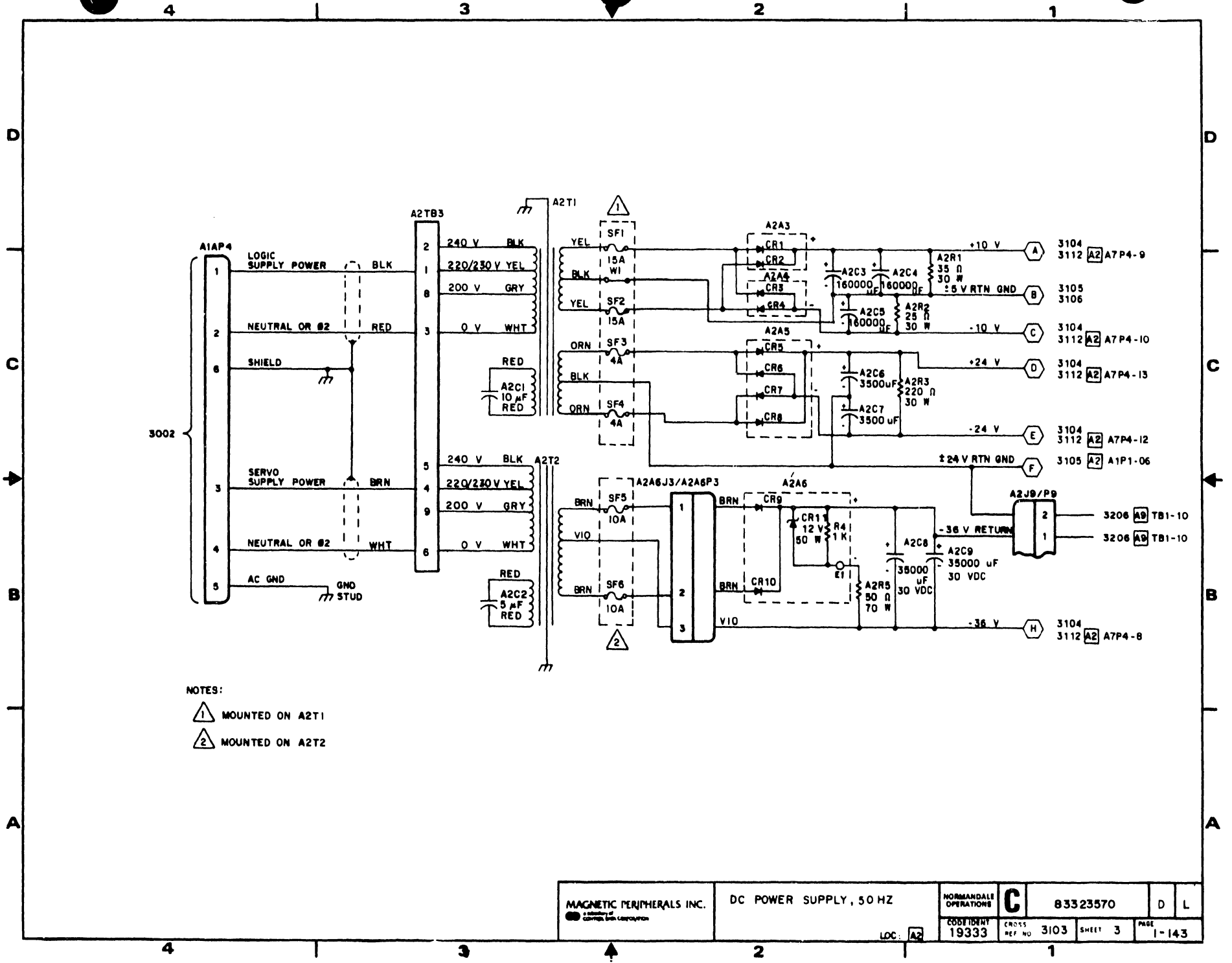
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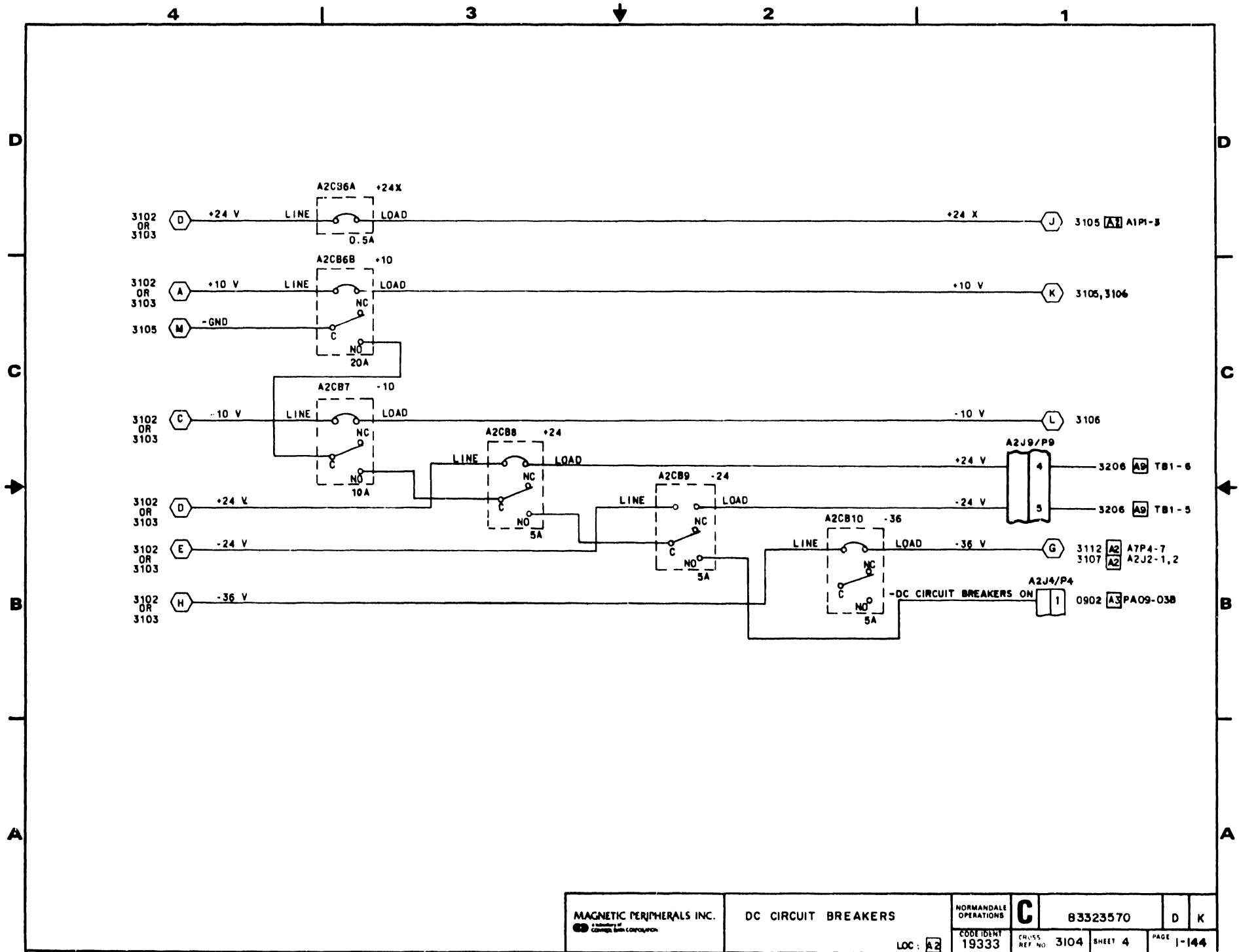
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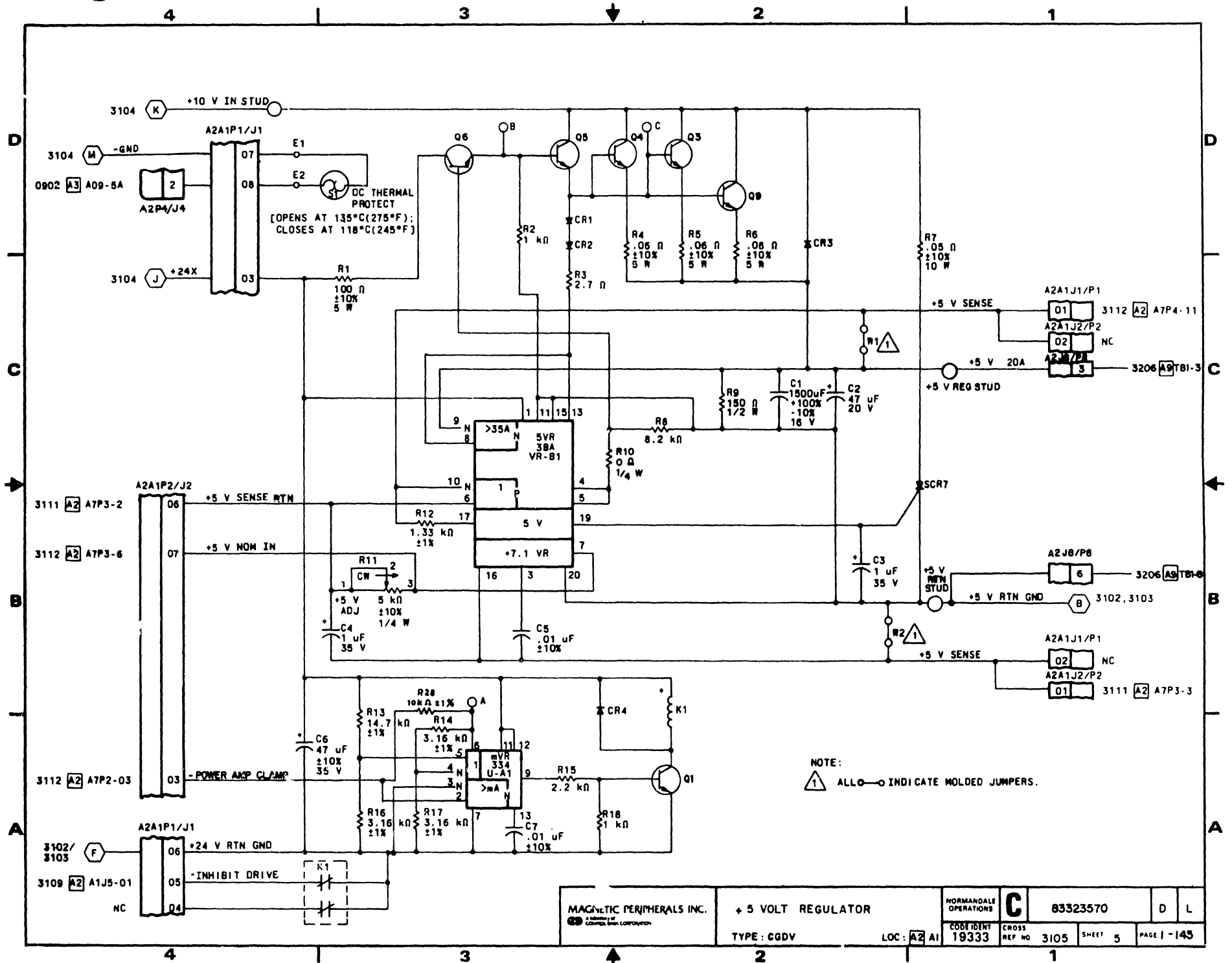
MAGNETIC PERIPHERALS INC. <small>A subsidiary of          General Electric Corporation</small>	DC POWER SUPPLY, 60 HZ		NORMANDALE OPERATIONS	<b>C</b> 83323570	<b>C</b> <b>J</b>
	CODE IDENT 19333	CROSS REF NO 3102	SHEET 2		



NOTES:  
 ① MOUNTED ON A2T1  
 ② MOUNTED ON A2T2

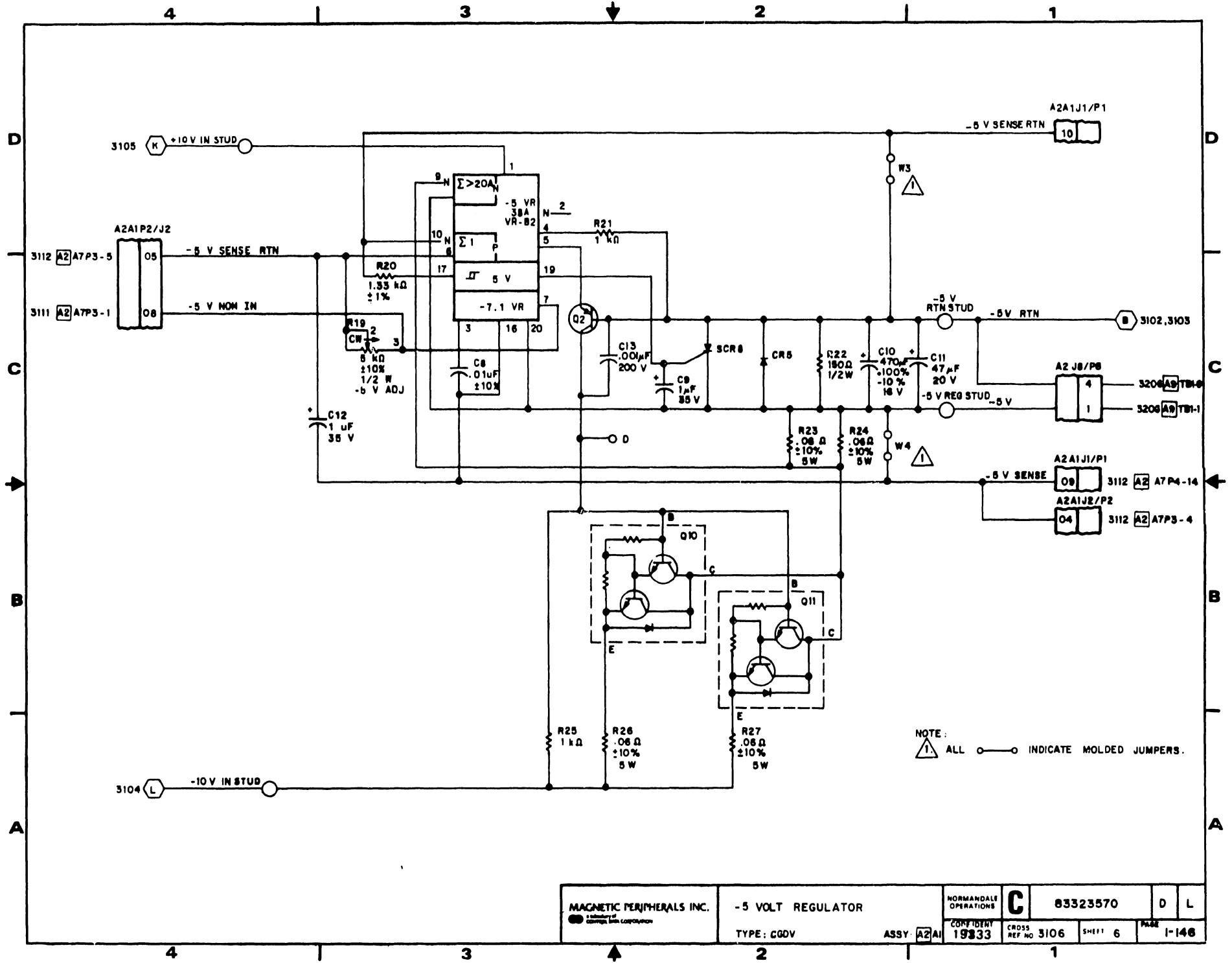


MAGNETIC PERIPHERALS INC. <small>A subsidiary of          ComCorp, Inc. Corporation</small>	DC CIRCUIT BREAKERS		NORMANDALE OPERATIONS	<b>C</b>	83323570	D	K
	LOC: A2	CODE IDENT 19333	CROSS REF NO 3104	SHEET 4	PAGE 1-144		

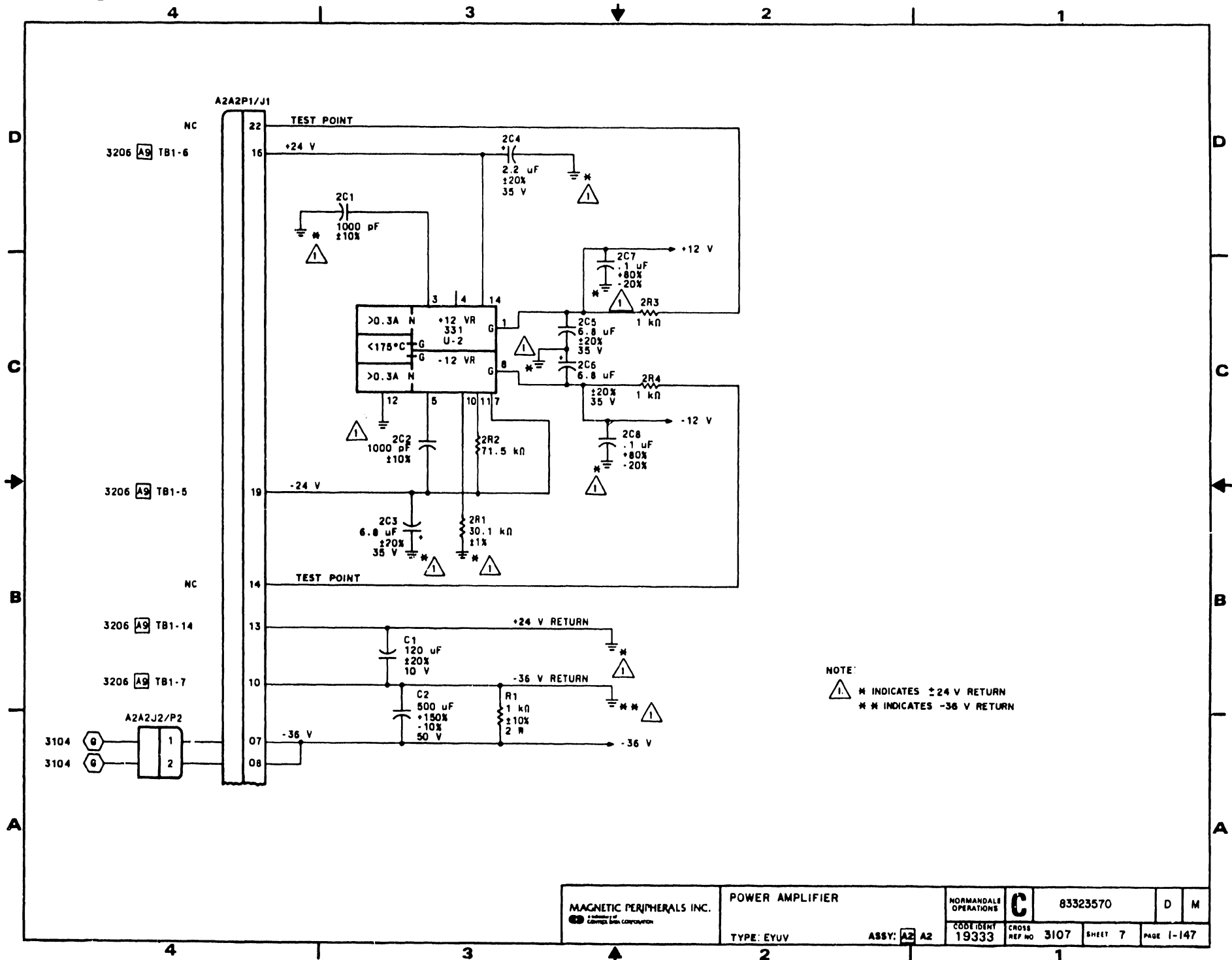


<b>MAGNETIC PERIPHERALS INC.</b> <small>a subsidiary of          GEORGE BROS. CORPORATION</small>	<b>+ 5 VOLT REGULATOR</b>		NORMANDE OPERATIONS	<b>C</b>	83323570	D	L
	TYPE: CGDV	LOC: A2 A1	CODE IDENT 19333				



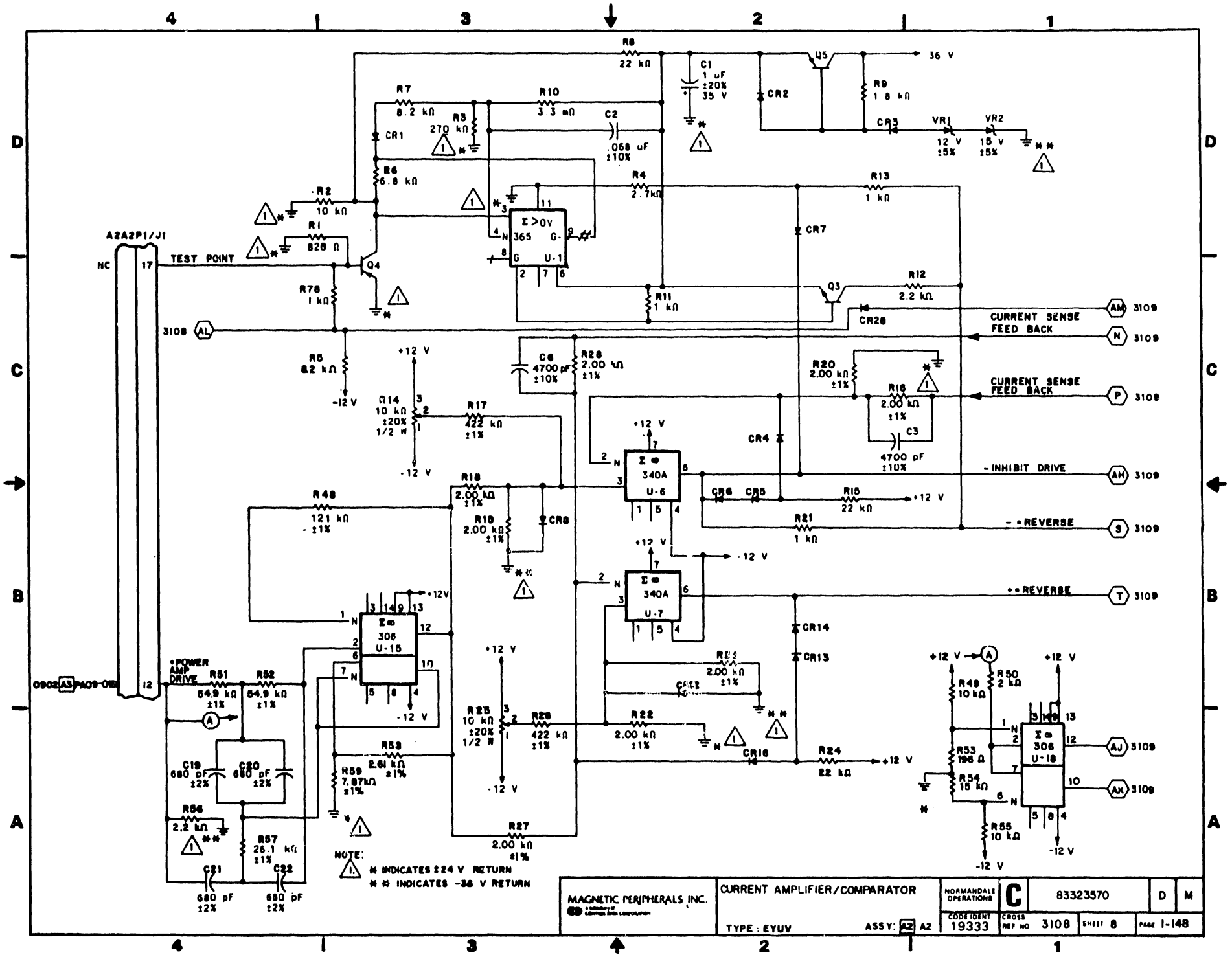


MAGNETIC PERIPHERALS INC. <small>A Division of          General Electric Corporation</small>	-5 VOLT REGULATOR		NORMANDALE OPERATIONS	<b>C</b> 83323570	D L
	TYPE: CGOV	ASSY: A2A1	CONFIDENTIAL 19333		

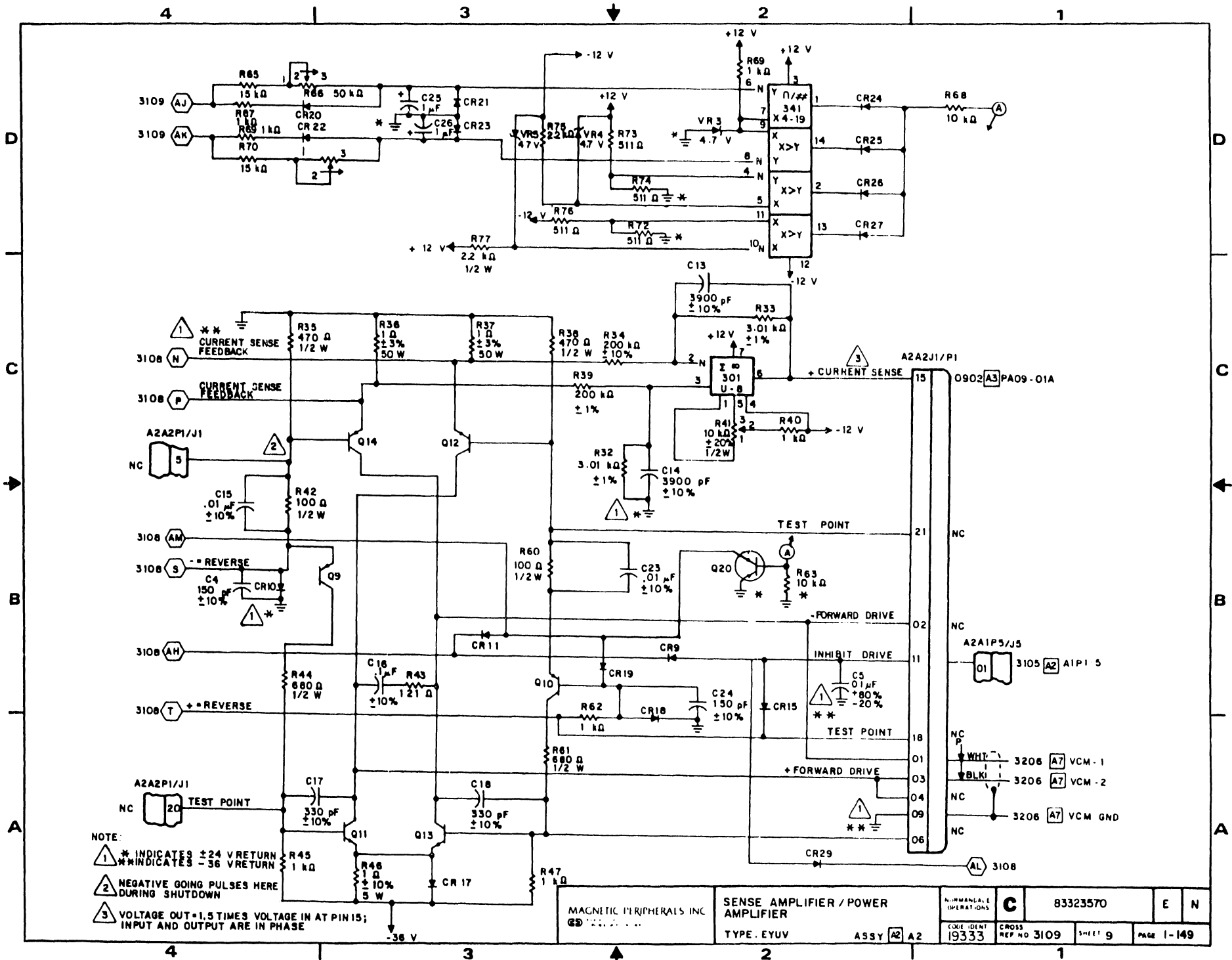


NOTE:  
 △ . INDICATES  $\pm 24$  V RETURN  
 △ △ INDICATES  $-36$  V RETURN

MAGNETIC PERIPHERALS INC. <small>© 1965 by Control Data Corporation</small>	POWER AMPLIFIER		NORMANDALE OPERATIONS <b>C</b>	83323570	D	M
	TYPE: EYUV	ASSY: A2 A2				



MAGNETIC PERIPHERALS, INC. <small>© 1968 by Magnetic Peripherals, Inc.</small>	CURRENT AMPLIFIER/COMPARATOR		NORMANDALE OPERATIONS <b>C</b>	83323570	D	M
	TYPE: EYUV	ASSY: A2 A2				

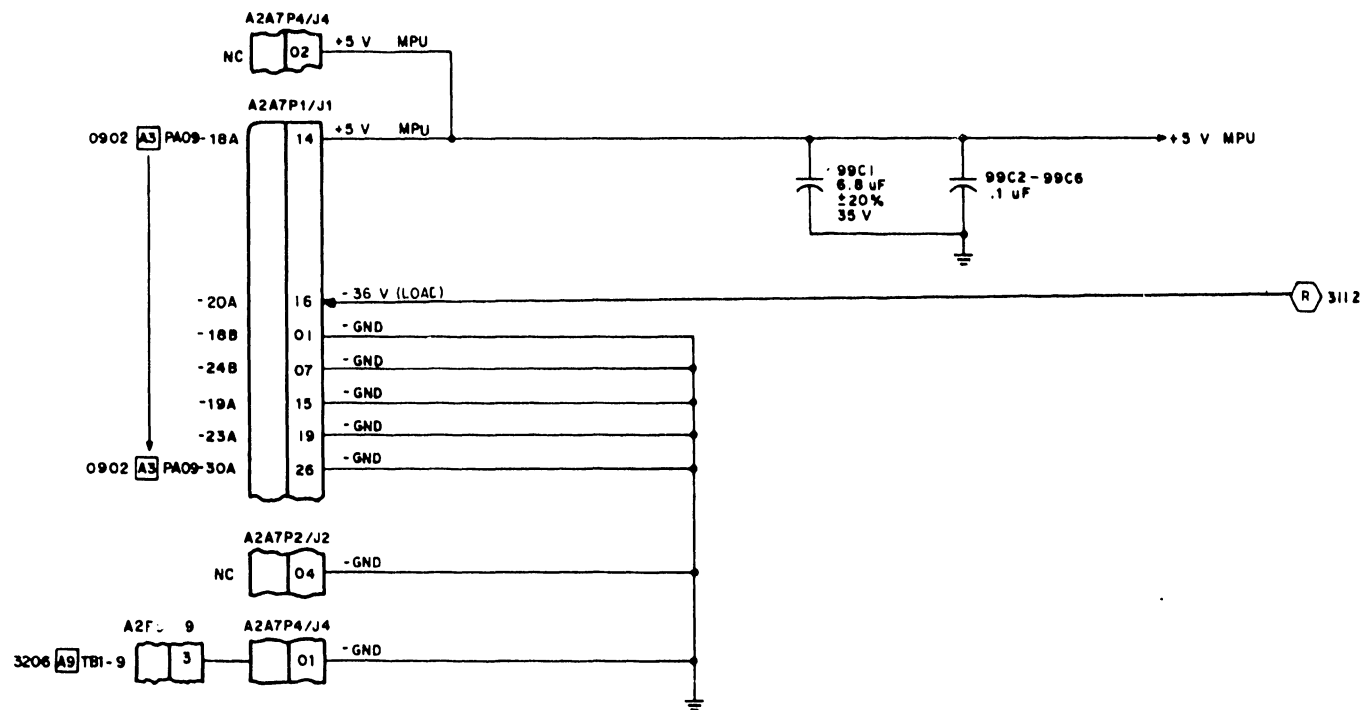


MAGNETIC PERIPHERALS INC  
 65 ...

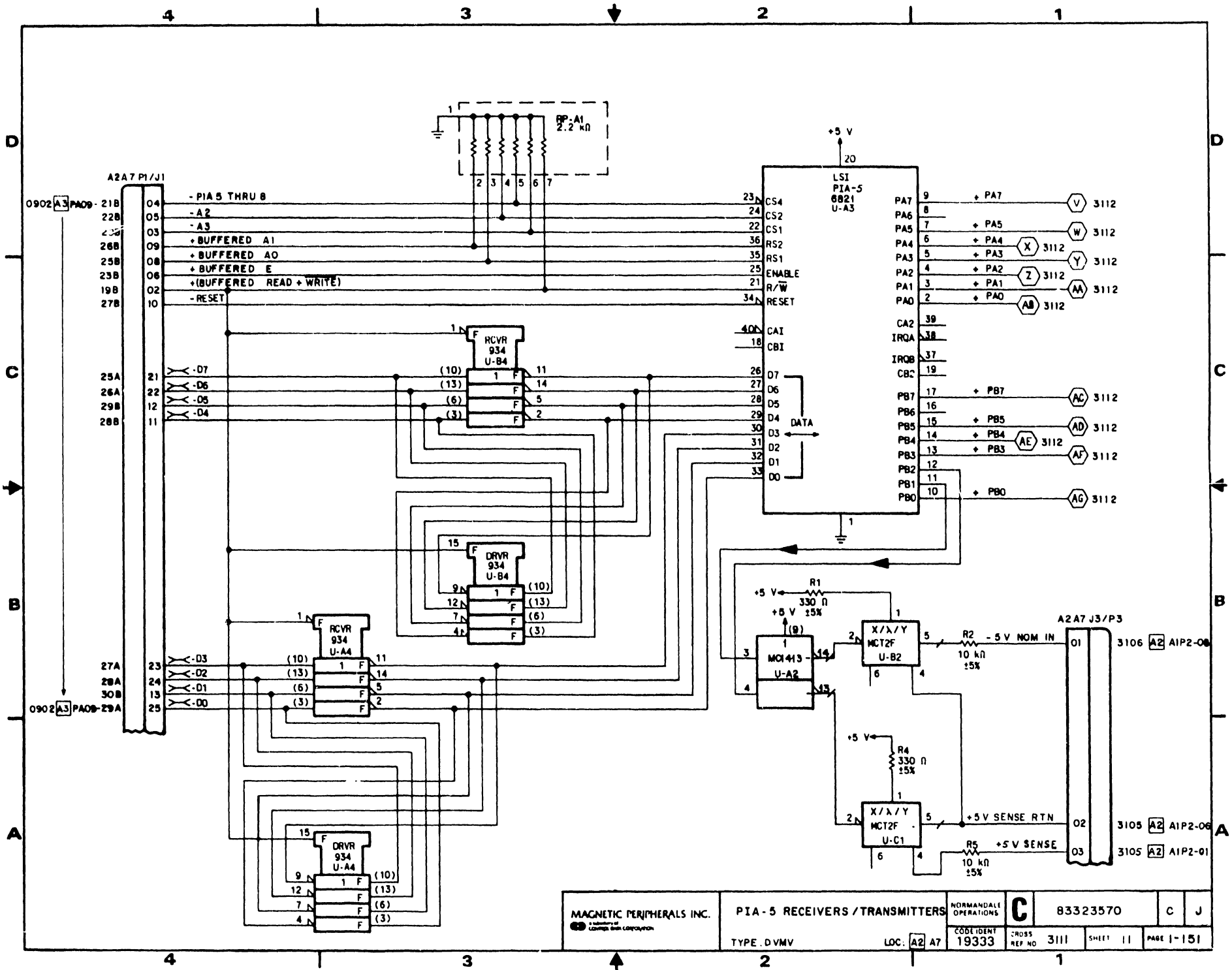
SENSE AMPLIFIER / POWER AMPLIFIER  
 TYPE: EYUV

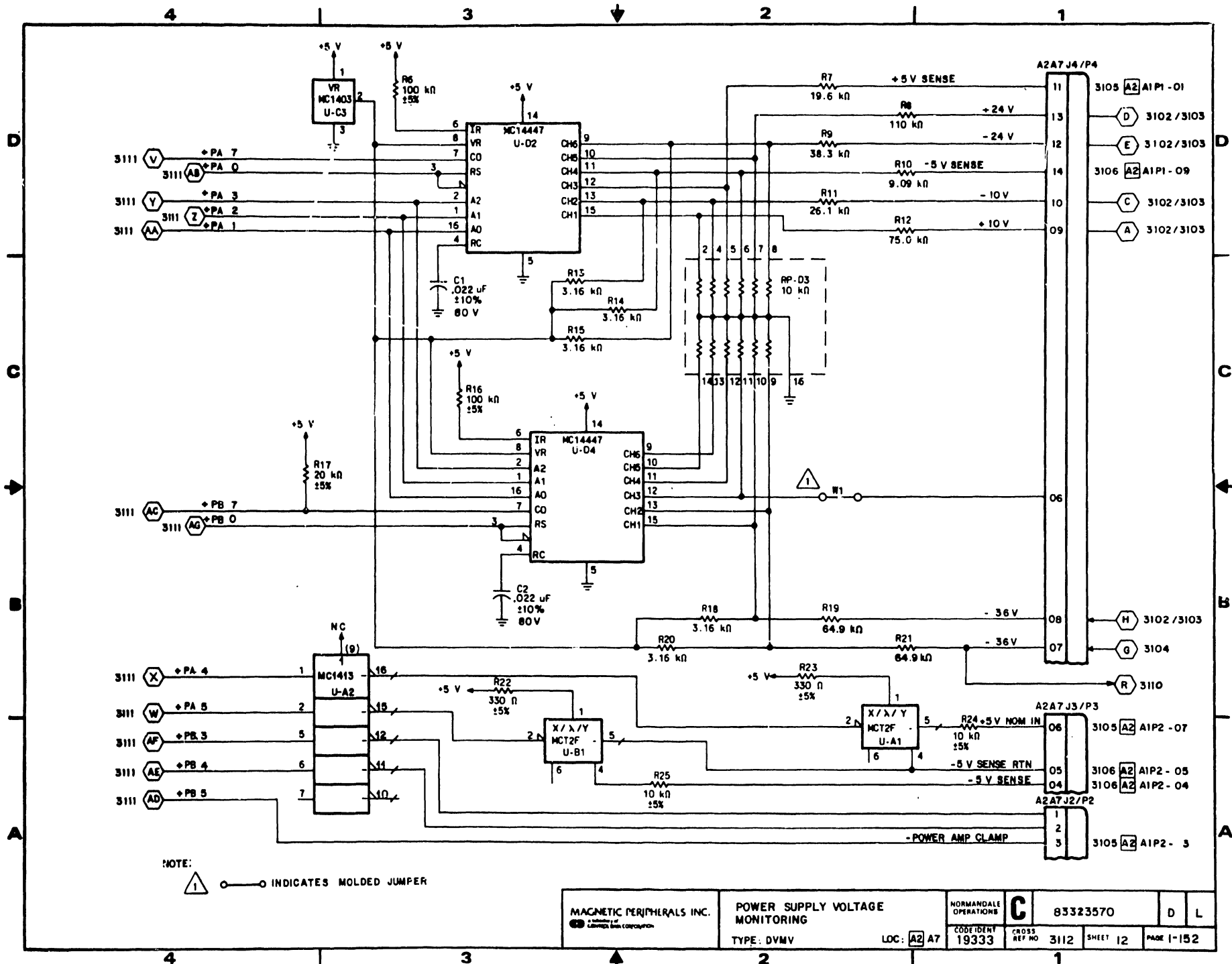
NUMERICAL OPERATIONS	C	83323570	E	N
CODE IDENT 19333	CROSS REF NO 3109	SHEET 9	PAGE 1-149	

ASSY A2 A2



MAGNETIC PERIPHERALS INC. <small>A subsidiary of Control Data Corporation</small>	POWER SUPPLY DIAGNOSTIC INTERFACE		NORMANDEALE OPERATIONS	<b>C</b>	83323570	C	G
	TYPE: DVMV	ASSY: A2A7	CODE IDENT 19333	CROSS REF NO	3110	SHEET 10	PAGE 1-150






MAGNETIC PERIPHERALS INC. <small>a subsidiary of Lambert Electronics Corporation</small>	POWER SUPPLY VOLTAGE MONITORING	NORMANDEALE OPERATIONS	<b>C</b>	83323570	D	L
	TYPE: DVMV	LOC: A2 A7	CODE IDENT 19333	CROSS REF NO 3112	SHEET 12	PAGE 1-152

REVISION STATUS OF SHEETS

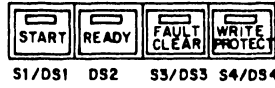
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A	A	A	A	A	A	A	A													
B	B					B														
C					C		C													
D	D					D														
E			E		E	E														
F						F														
G	G																			
H	H	H	H																	

REVISIONS

REV	ECO	DESCRIPTION	DWTR	DATE	CHK'D
A	PE23000	RELEASED			
B	PE24458	GROUNDING CHG			
C	PE21728	LOGIC DIAGRAM UPDATE	CB	11-25-80	
D	PE21835	PREVENTS NOISE FROM ENTERING REAL CHAIN	DFS	6-4-81	DKP
E	PE27022	CORRECT DIAGRAMS	DFS	6-4-81	DKP
F	DH02226	CORRECT DIAG	DWT	1-25-82	
G	DH02328	REDUCE NOISE	CB	8-3-82	
H	DH22482	DECREASE RISE TIME OF CAL 2 SIGNAL; AVWV TO BYWV	CB	8-2-82	

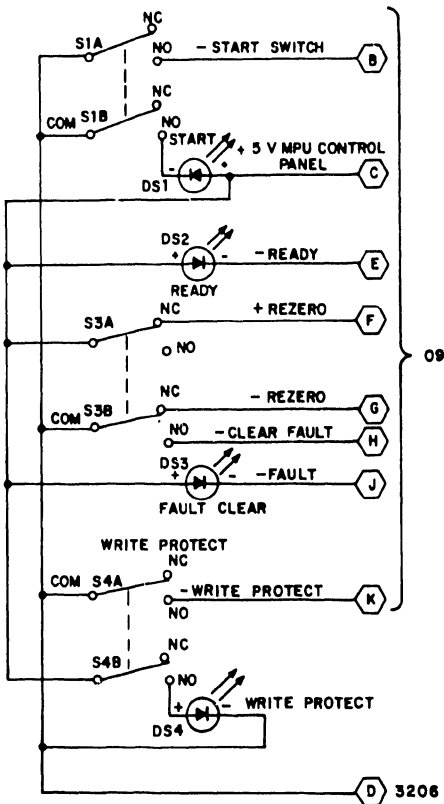
DRAWN	C BIROS	5-2-80	 <b>MAGNETIC PERIPHERALS INC.</b> <small>A DIVISION OF</small> <b>COMPTON DATA CORPORATION</b>	<b>CONTROLS &amp; MISCELLANEOUS DIAGRAMS</b>	LARGE DISK DIVISION	<b>C</b>	83323570	E	H
CHECKED					CODE IDENT			CROSS REF NO	SHEET
ENGINEER	<i>John</i>				19333	3201	1 of 7	1-153	
APPROVED									



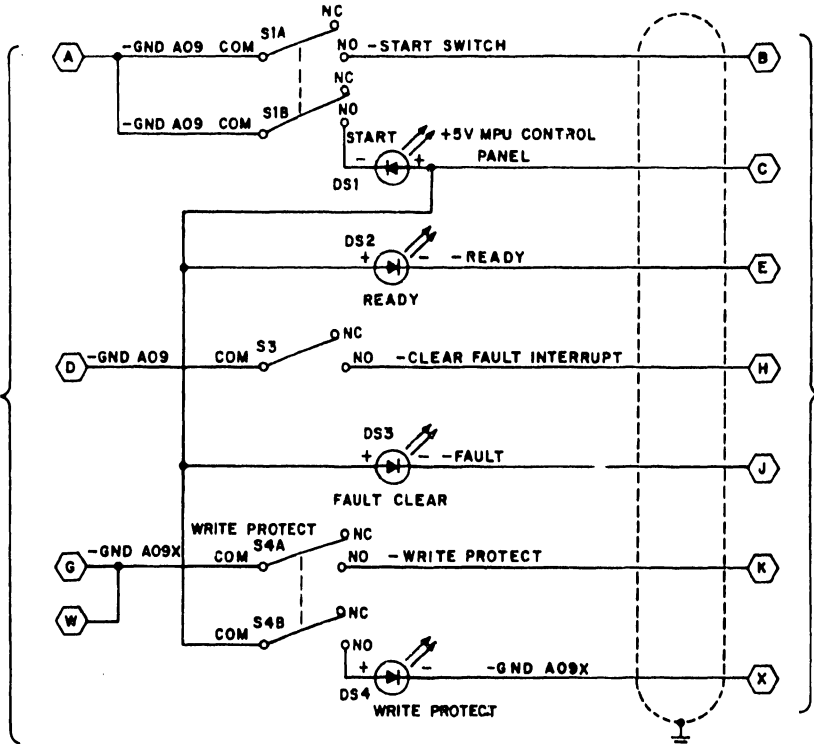


D  
C  
B  
A

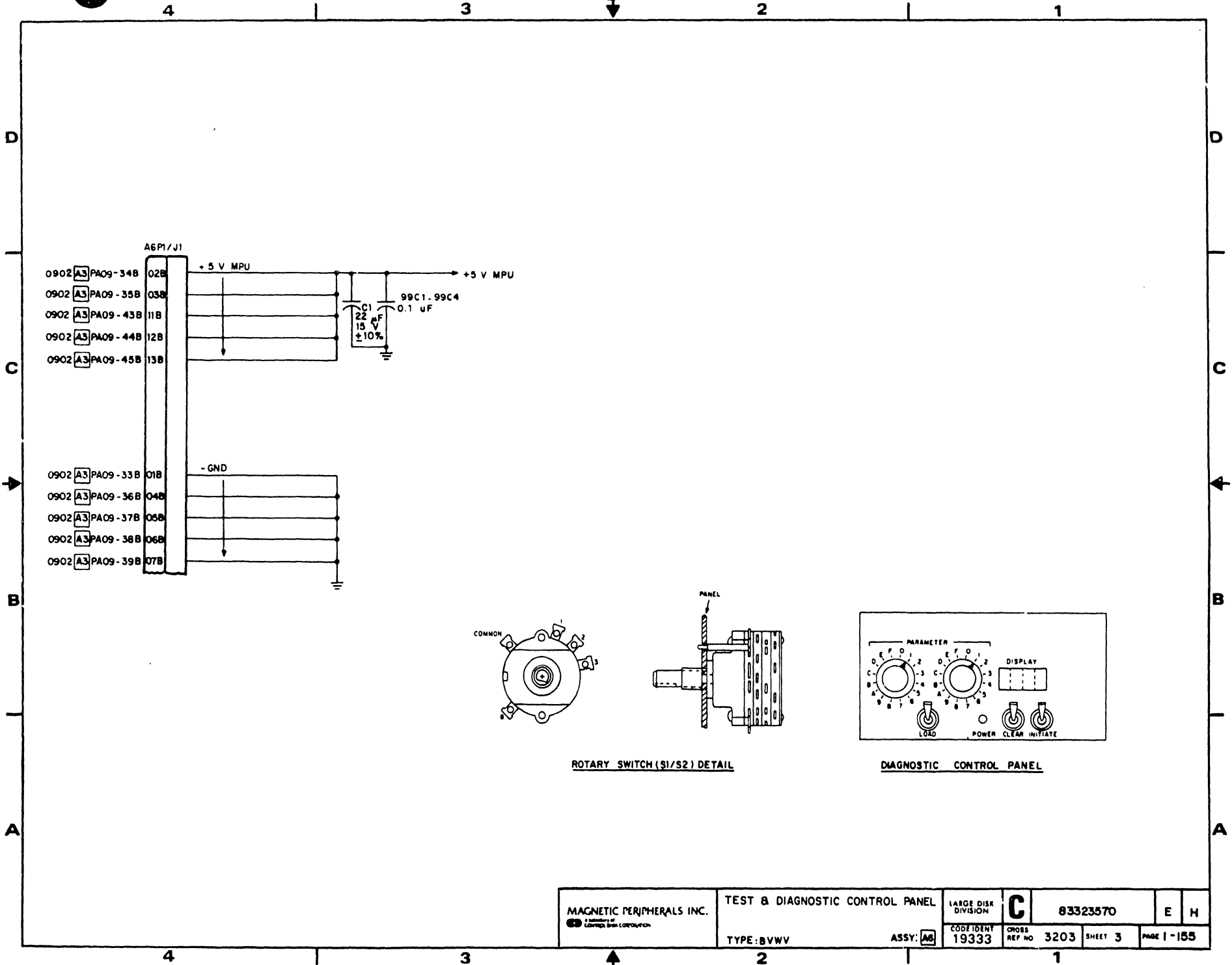
D  
C  
B  
A



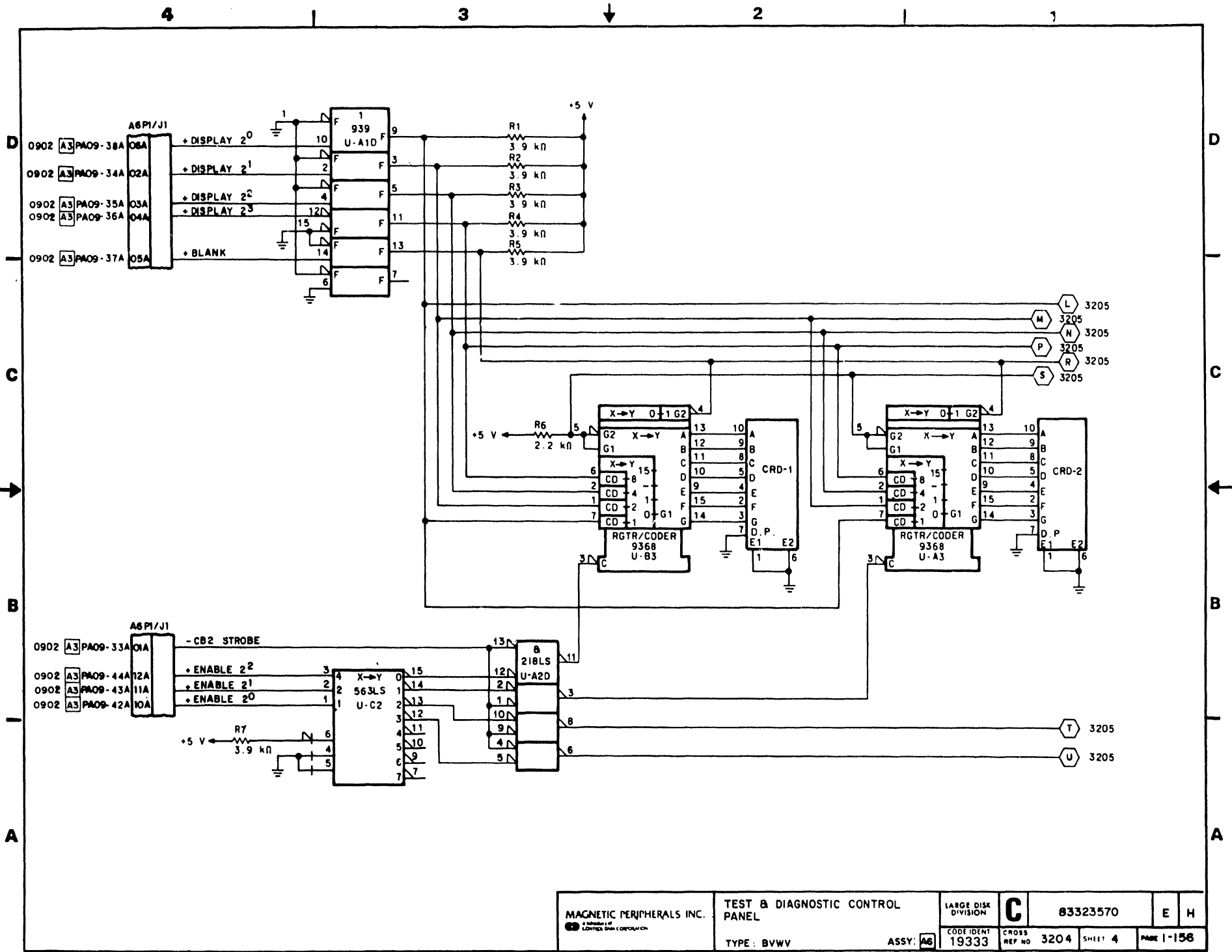
0902 **A3** PA09



0902 **A3** PA09



MAGNETIC PERIPHERALS INC. <small>A Subsidiary of          Control Data Corporation</small>	TEST & DIAGNOSTIC CONTROL PANEL	LARGE DISK DIVISION	<b>C</b> 83323570	E	H
	TYPE: BVWV	ASSY: <b>A6</b>			



4

3

2

1

D

D

C

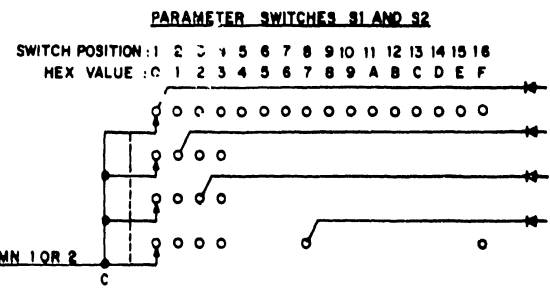
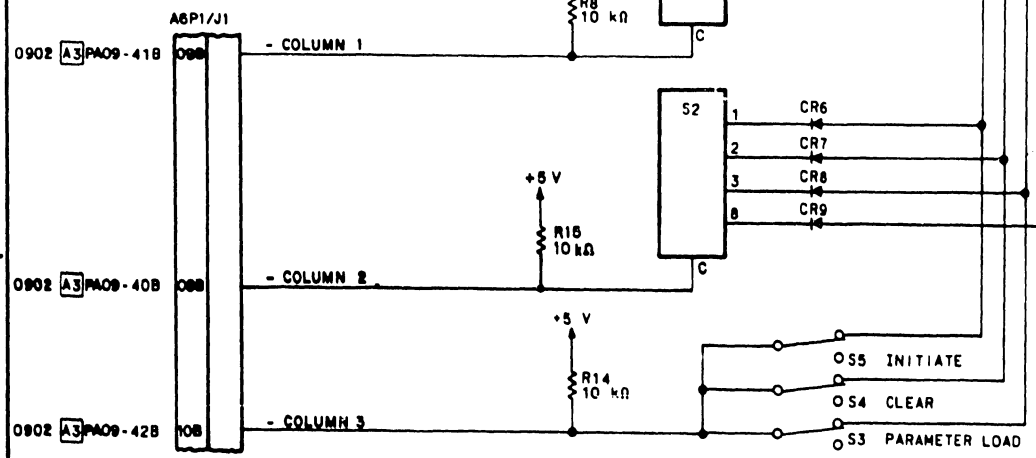
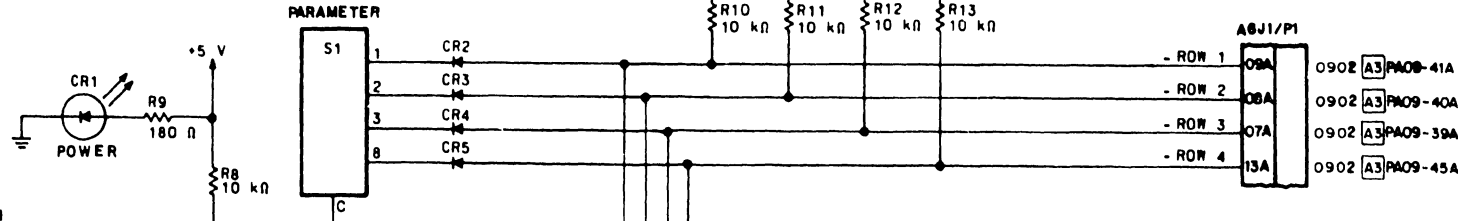
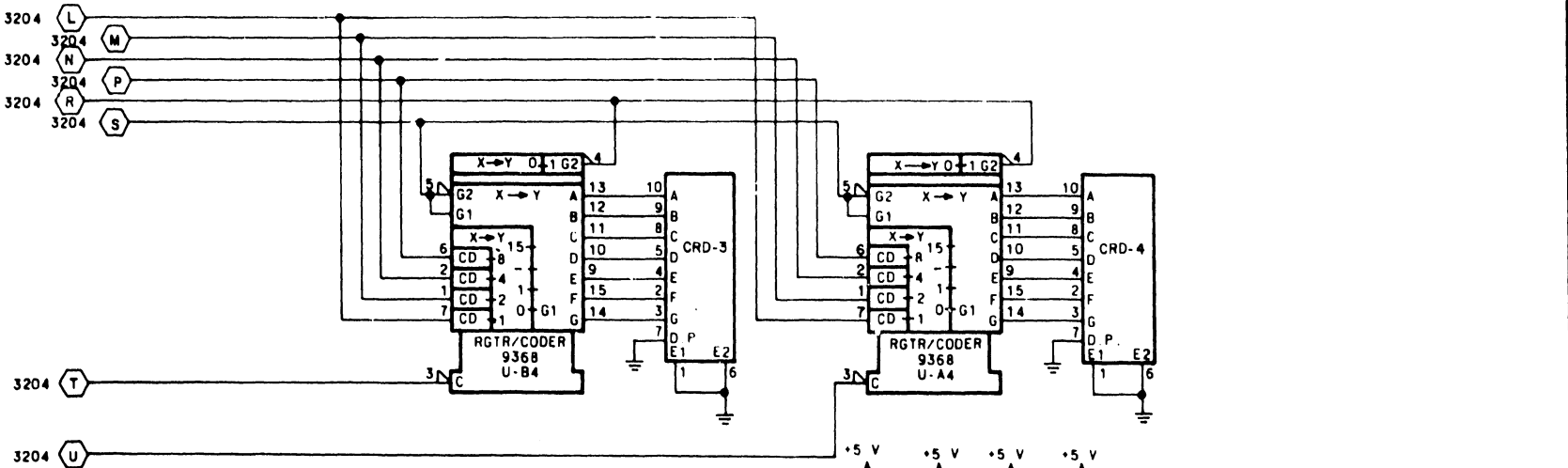
C

B

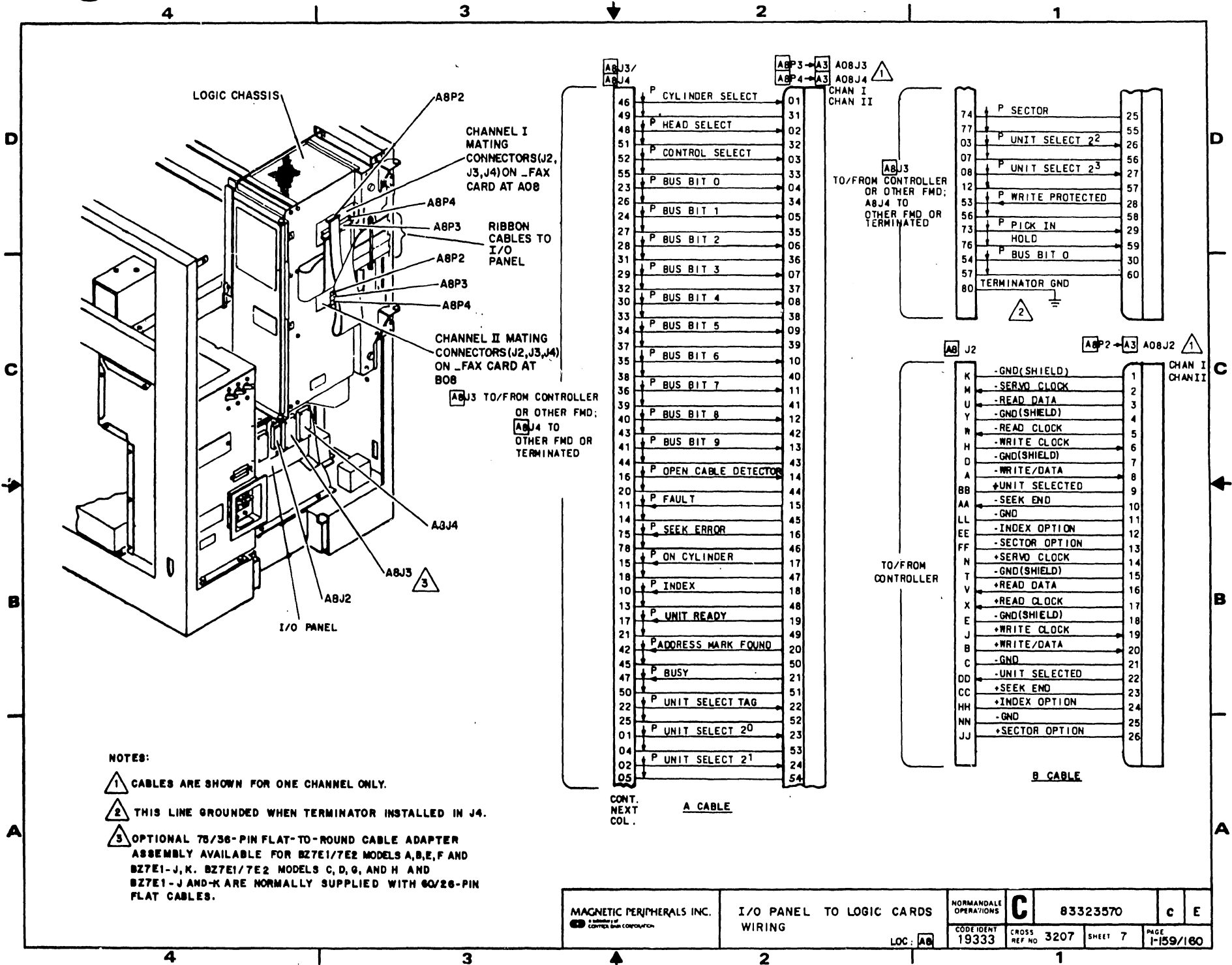
B

A

A







**NOTES:**

- ① CABLES ARE SHOWN FOR ONE CHANNEL ONLY.
- ② THIS LINE GROUNDED WHEN TERMINATOR INSTALLED IN J4.
- ③ OPTIONAL 75/36-PIN FLAT-TO-ROUND CABLE ADAPTER ASSEMBLY AVAILABLE FOR B27E1/7E2 MODELS A,B,E,F AND B27E1-J,K. B27E1/7E2 MODELS C,D,G, AND H AND B27E1-J AND-K ARE NORMALLY SUPPLIED WITH 60/26-PIN FLAT CABLES.

**2**

**WIRE  
LISTS**





The Origin column in the wire list is sorted alphanumerically. Since the wire list is double-ended, the same signal name will be listed at A0603A and again at B0530A (both locations shown in the Origin column).

The identification is decoded as follows:

1. The first character is always an A, B, or C; an A indicates the A row, a B indicates the B row, and C the C row.

In chassis locations B02 through B06, references to C locations mean the pin will be found on the lower portion of the card that spans both the B and C rows.

2. The second and third characters are the logic chassis location of the card. In the example, one end of the wire is connected to the backpanel at location A06 and the other end at B05.
3. The remaining characters are the specific pin number. In this example, the connecting pins are 03A and 30A.

#### Z LEVEL

The Z level indicates the separation between the backpanel and the wire. Z level 1 is closest to the board; Z level 2 indicates the connection is halfway up the pin; Z level 3 (if used) is the farthest from the board.

TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING			47492010	1	L
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
-FTU MODE	A0103A	A0109B	2		
+GATED SEEK END	A0103B	A0720B	1		
-1F 9.67 MHZ CLOCK	A0104A	B0310B	2		
-1F 9.67 MHZ CLOCK	A0104A	A0236B	1		
-GND A01X	A0106B	A0114B	1		
-HEAD SELECT PULSE	A0107A	A0629A	1		
+2F 19.34MHZ CLOCK	A0107B	A0237A	1		
+1F 9.67 MHZ CLOCK	A0108A	A0237B	2		
+1F 9.67 MHZ CLOCK	A0108A	A0843A	1		
+FTU MODE	A0109A	A0238B	1		
-FTU MODE	A0109B	A0103A	2		
-FTU MODE	A0109B	A0234B	1		
-SERVO FAST START	A0110A	A0312A	1		
+CH I ENARLE MUX	A0110B	A0842B	1		
+SERVO FAST START	A0111A	C0327B	1		
-FREQUENCY CLAMP	A0111B	A0340A	1		
+15 SECOND TIME OUT	A0112A	B0331A	1		
+DIAGNOSTIC SLOW DOWN CLOCK	A0112B	A0430B	1		
-DIAGNOSTIC MODE	A0113A	A0426A	2		
-DIAGNOSTIC MODE	A0113A	C0227B	1		
+SERVO DATA	A0113B	A0437A	1		
+CH I ENARLE	A0114A	C0429A	2		
+CH I ENARLE	A0114A	A0740A	1		
-GND A01X	A0114B	A0106B	1		
+CH II ENARLE MUX	A0115A	B0842B	1		
+SIMULATED INDEX GATE	A0115B	C0207A	1		
+INDEX GATE	A0116A	A0440B	1		
+INDEX GATE	A0116A	A0132B	2		
+CH II ENARLE	A0116B	A0715A	2		
-GND A01	A0117A	A0123A	1		
+4.83 MHZ CLOCK	A0118A	A0321A	2		
-GATED SEEK END	A0120A	A0127A	1		
-MUX 5 SELECT	A0120B	B0541A	1		
-MUX 4 SELECT	A0121A	C0508B	1		
-MUX 3 SELECT	A0121B	C0514A	1		
-MUX 2 SELECT	A0122A	C0525A	1		
-MUX 1 SELECT	A0122B	C0518B	1		
-GND A01	A0123A	A0117A	1		
-MUX 0 SELECT	A0124A	B0422A	1		
+MUX SELECT 20	A0124B	C0224A	1		
-HEAD SELECT TAG	A0125A	A0815A	1		
+MUX SELECT 21	A0125B	C0225B	1		
+MUX SELECT 22	A0126A	C0225A	1		
-MUX ENARLE	A0126B	C0227A	1		
-GATED SPEK END	A0127A	A0120A	1		
-POWER ON MASTER CLEAR	A0127B	B0413A	2		
-WRITE SAMPLE	A0128B	A0212A	1		
+UNIT READY	A0129A	A0526B	1		
+UNIT READY	A0129A	B0426B	2		
+GATED SERVO CLOCK	A0131A	A0313A	2		
+FWD DR REV OFFSET	A0131B	A0511B	2		

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TITLE	WL	DOCUMENT NO.	SHEET NO. 2	REV.
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DEVICE LOGIC WIREWRAP LISTING

SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES
-SECTOR COUNT PULSE	A0132A	A0443A	2	
+INDEX GATE	A0132B	A0116A	2	
+INDEX GATE	A0132B	B0217B	1	
+GATE TEST POINT	A0133A	A0438A	1	
+MUXED DIAGNOSTIC DATA	A0133B	A0138A	1	
+PLO FAULT DETECT	A0134A	A0242B	1	
-BUFFERED WRITE GATE	A0134B	A0216B	2	
-BUFFERED WRITE GATE	A0134B	A0140B	1	
+SEEK END	A0135A	A0616B	1	
+MUXED DIAGNOSTIC DATA	A0138A	A0133B	1	
+MUXED DIAGNOSTIC DATA	A0138A	B0427B	2	
+INDEX BIT	A0138B	B0443B	1	
-BUFFERED WRITE GATE	A0140B	A0134B	1	
-BUFFERED WRITE GATE	A0140B	B0408A	2	
-SOUELCH	A0141B	C0630A	1	
+T AND D MUX INPUT SELECT 22	A0142A	B0416A	1	
+T AND D MUX INPUT SELECT 20	A0142B	B0425A	1	
+T AND D MUX INPUT SELECT 21	A0143A	B0417B	1	
+READ GATE TO DECK	A0143B	C09J6B	1	
+CH II WRITE CLOCK	A0204A	B0828A	1	
+CH II WRITE DATA	A0205A	B0828B	1	
+GATED CH II ENABLE	A0205B	C0429B	1	
+CH I WRITE CLOCK	A0209A	A0828A	1	
+CH I OR FTU WRITE DATA	A0209B	B03J7A	1	
+GATED CH I ENARLE	A0211A	C0422A	1	
-WRITE SAMPLE	A0212A	A0128B	1	
-BUFFERED WRITE GATE	A0214A	A0216B	1	
-BUFFERED WRITE GATE	A0216B	A0214A	1	
-BUFFERED WRITE GATE	A0216B	A0134B	2	
+ADDRESS MARK ENABLE	A0217B	A06J9B	1	
-ADDRESS MARK ENARLE	A0218A	A0609A	1	
+MFM WRITE DATA	A0220A	C0909B	1	
-MFM WRITE DATA	A0220B	C09J9A	1	
+TIE HIGH SINGLE CHAN	A0234A	A0734A	1	
-FTU MODE	A0234B	A0109B	1	
-FTU MODE	A0234B	A0621B	2	
-1F 9.67 MHZ CLOCK	A0236B	C0804A	2	
-1F 9.67 MHZ CLOCK	A0236B	A0104A	1	
+2F 19.34MHZ CLOCK	A0237A	A0107B	1	
+1F 9.67 MHZ CLOCK	A0237B	A0108A	2	
+FTU MODE	A0238B	A0109A	1	
-VCO 1F CLOCK	A0241B	B0517B	1	
+PLO FAULT DETECT	A0242B	A0134A	1	
-PHASE LOCK FAULT DETECT	A0243A	A0322B	1	
+PHASE LOCK FAULT DETECT	A0243B	A0315B	1	
-SERVO FAST START	A0312A	A0110A	1	
-SERVO FAST START	A0312A	A0435B	2	
+GATED SERVO CLOCK	A0313A	A0131A	2	
+GATED SERVO CLOCK	A0313A	A0436A	1	
+PHASE LOCK FAULT DETECT	A0315B	A0243B	1	
+4.83 MHZ CLOCK	A0321A	A0118A	2	
+4.83 MHZ CLOCK	A0321A	A0430A	1	

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				3	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
-PHASE LOCK FAULT DETECT	A0322B	A0243A	1		
-FREQUENCY CLAMP	A0340A	A0111B	1		
-AGC ACTIVE	A0403A	C0416A	1		
-8.3 SERVO PREAMP VOLTAGE	A0404B	B0225A	1		
+AGC VOLTAGE	A0405A	A0425A	1		
-POSITION	A0415A	A0612B	1		
-POSITION	A0415A	B0232B	2		
+POSITION	A0416A	B0237B	2		
+POSITION	A0416A	A0612A	1		
+(ODD OR EVEN) OVER TWO	A0424A	B0219A	1		
+AGC VOLTAGE	A0425A	A0405A	1		
-DIAGNOSTIC MODE	A0426A	B0509A	1		
-DIAGNOSTIC MODE	A0426A	A0113A	2		
-DIAGNOSTIC CLEAR COUNTER	A0429B	C0207B	1		
+4.83 MHZ CLOCK	A0430A	A0321A	1		
+4.83 MHZ CLOCK	A0430A	C0405A	2		
+DIAGNOSTIC SLOW DOWN CLOCK	A0430B	B0508B	2		
+DIAGNOSTIC SLOW DOWN CLOCK	A0430B	A0112B	1		
+TIMER GATE	A0435A	C0415B	1		
-SERVO FAST START	A0435B	A0312A	2		
+GATED SERVO CLOCK	A0436A	B0229A	2		
+GATED SERVO CLOCK	A0436A	A0313A	1		
+SERVO DATA	A0437A	C0413A	2		
+SERVO DATA	A0437A	A0113B	1		
+GATE TEST POINT	A0438A	A0133A	1		
+GATE TEST POINT	A0438A	B0235A	2		
+INDEX GATE	A0440B	B0426A	2		
+INDEX GATE	A0440B	A0116A	1		
+SLOPE	A0442A	A0511A	1		
+SLOPE	A0442A	B0220A	2		
-SECTOR COUNT PULSE	A0443A	B0441A	1		
-SECTOR COUNT PULSE	A0443A	A0132A	2		
+COMPARATOR DAC 21	A0503A	A0637B	1		
+COMPARATOR DAC 20	A0503B	A0637A	1		
+COMPARATOR DAC 23	A0504A	A0635A	1		
+COMPARATOR DAC 22	A0504B	A0636A	1		
+COMPARATOR DAC 25	A0505A	A0643B	1		
+COMPARATOR DAC 24	A0505B	A0642A	1		
+COMPARATOR DAC 27	A0507A	A0635B	1		
+COMPARATOR DAC 26	A0507B	A0643A	1		
-RTZ SEEK MPN	A0508A	A0638A	2		
-INNER GUARDBAND	A0508B	C0422B	1		
-GUARDBAND PATTERN 1	A0509A	C0421B	1		
-GUARDBAND PATTERN 2	A0509B	C0419B	1		
-FORWARD	A0510A	B0215A	2		
-FORWARD	A0510A	A0626B	1		
-REVERSE	A0510B	B0213A	2		
-REVERSE	A0510B	A0616A	1		
+SLOPE	A0511A	A0442A	1		
+FWD OR REV OFFSET	A0511B	A0519A	1		
+FWD OR REV OFFSET	A0511B	A0131B	2		
+MOVEABLE HEAD SEEK ERROR	A0512A	C0431A	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				4	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
♦FINE	A0512B	A0620A	1		
♦FINE	A0512B	B0227B	2		
♦COARSE	A0513A	A0625A	1		
♦COARSE	A0513A	B0233A	2		
-ON TRACK	A0513B	A0627B	1		
♦MPU SERVO INTERFACE BIT 0	A0514A	C0212B	1		
♦MPU SERVO INTERFACE BIT 1	A0514B	C0211A	1		
♦MPU SERVO INTERFACE BIT 2	A0515A	C0211B	1		
♦MPU SERVO INTERFACE BIT 3	A0515B	C0210A	1		
♦MPU SERVO INTERFACE BIT 4	A0516A	C0210B	1		
♦MPU SERVO INTERFFACE BIT 5	A0516B	C0209A	1		
♦MPU SERVO INTERFACE BIT 6	A0517A	C0209B	1		
♦MPU SERVO INTERFACE BIT 7	A0517B	C0208A	1		
♦DATA ACCEPTED OR COMMUNICATE IN	A0518A	C0213B	1		
DATA VALID OR SEEK ERROR INTERR	A0518B	C0203A	1		
♦FWD OR REV OFFSET	A0519A	A0640B	2		
♦FWD OR REV OFFSET	A0519A	A0511B	1		
-GND A05Y	A0520A	A0523B	1		
-TRACK CROSSING PULSE	A0520B	A0610B	1		
-GND A05X	A0521A	A0523A	1		
♦DAC	A0522A	B0231B	2		
♦DAC	A0522A	A0640A	1		
-DAC	A0522B	A0630A	1		
-GND A05X	A0523A	A0521A	1		
-GND A05Y	A0523B	A0520A	1		
♦UNIT READY	A0526B	A0129A	1		
♦INTEGRATOR ENABLE	A0528A	A0605A	1		
♦COMPARAYOR POSITION	A0528B	A0615B	1		
♦TRACK CROSSING PULSE	A0529A	A0614B	1		
-GO HOME	A0530A	C0318A	1		
-MOVEABLE HEADS AND CYL SELECT	A0531A	C0507B	1		
-MOVEABLE HEADS AND CYL SELECT	A0531A	B0218B	2		
♦DC MASTER CLEAR	A0531B	B0420A	2		
♦ON CYLINDER	A0532A	B0517A	1		
♦BIT 3	A0532B	B0533B	2		
♦1 KHZ CLOCK	A0533A	C0303B	2		
-RTZ SFEK	A0535B	A0603A	2		
♦FILL IN	A0537A	A0607A	1		
♦BIT 7	A0538A	B0511A	2		
♦BIT 6	A0538B	C0538A	1		
-GND A05	A0539A	A0541A	1		
♦BIT 1	A0540A	B0529B	2		
♦BIT 2	A0540B	B0532A	2		
-GND A05	A0541A	A0539A	1		
♦BIT 0	A0541B	B0536A	2		
♦BIT 8	A0542A	B0514A	2		
♦BIT 9	A0542B	A0719B	1		
♦BIT 9	A0542B	B0513B	2		
♦BIT 5	A0543A	B0535A	2		
♦BIT 4	A0543B	B0534B	2		
-RTZ SEEK	A0603A	B0530A	1		
-RTZ SEEK	A0603A	A0535B	2		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				5	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
♦RTZ SEEK	A0604A	A0604B	2		
♦RTZ SEEK	A0604B	A0604A	2		
♦RTZ SEEK	A0604B	A0613B	1		
♦INTEGRATOR ENABLE	A0605A	A0528A	1		
♦SEEK ERROR	A0605B	A0843B	2		
♦FILL IN	A0607A	A0537A	1		
♦CURRENT SENSE	A0608A	A0901A	1		
-ADDRESS MARK ENABLE	A0609A	A0218A	1		
-ADDRESS MARK ENABLE	A0609A	A0610A	2		
♦ADDRESS MARK ENABLE	A0609B	A0217B	1		
-ADDRESS MARK ENABLE	A0610A	A0628A	1		
-ADDRESS MARK ENABLE	A0610A	A0609A	2		
-TRACK CROSSING PULSE	A0610B	A0520B	1		
-FORWARD OFFSET	A0611A	A0624B	1		
♦DN CYL	A0611B	B0329A	1		
♦POSITION	A0612A	A0416A	1		
-POSITION	A0612B	A0415A	1		
♦RTZ SEEK	A0613B	A0604B	1		
♦TRACK CROSSING PULSE	A0614B	A0529A	1		
-REVERSE OFFSET	A0615A	A0621A	1		
♦COMPARATOR POSITION	A0615B	A0528B	1		
♦COMPARATOR POSITION	A0615B	C0213A	2		
-REVERSE	A0616A	A0510B	1		
♦SEEK END	A0616B	C0328A	2		
♦SEEK END	A0616B	A0135A	1		
-DATA STROBE EARLY	A0617A	C0810A	1		
-DIAGNOSTIC DATA STROBE LATE	A0617B	C0221B	1		
-DIAGNOSTIC DATA STROBE EARLY	A0618A	C0220A	1		
-DATA STROBE EARLY ID	A0618B	A0810A	1		
-DATA STROBE LATE ID	A0619A	A0805A	1		
-DATA STROBE LATE	A0619B	C0805A	1		
♦FINE	A0620A	A0512B	1		
-RTZ SEEK ID OR DIAG	A0620B	A0638B	2		
-REVERSE OFFSET	A0621A	A0615A	1		
-FTU MODE	A0621B	B0303A	1		
-FTU MODE	A0621B	A0234B	2		
-DIAGNOSTIC SERVO OFFSET NEGAT	A0622A	C0220B	1		
-SERVO OFFSET NEGATIVE	A0622B	A0803A	1		
-SERVO OFFSET POSITIVE	A0624A	A0808A	1		
-FORWARD OFFSET	A0624B	A0611A	1		
♦COARSE	A0625A	A0513A	1		
-DIAGNOSTIC SERVO OFFSET POSIT	A0625B	C0219A	1		
♦POWER AMP DRIVE	A0626A	A0901B	1		
-FORWARD	A0626B	A0510A	1		
-DIAGNOSTIC ADDRESS MARK ENABLE	A0627A	C0238A	1		
-DN TRACK	A0627B	A0513B	1		
-ADDRESS MARK ENABLE	A0628A	A0610A	1		
-ADDRESS MARK ENABLE	A0628A	B0512A	2		
-ADDRESS MARK ENABLE ID	A0628B	A0809A	1		
-HEAD SELECT PULSE	A0629A	A0107A	1		
-DIAGNOSTIC HEAD SELECT	A0629B	C0240B	1		
-DAC	A0630A	A0522B	1		

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TITLE		WL		DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING					6	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES		
-HEAD SELECT	A0630B	B0531B	1			
-RTZ SEEK IO	A0631A	A0809B	1			
-DIAGNOSTIC RTZ	A0631B	C0241B	1			
-DIAGNOSTIC CYLINDER SELECT	A0632A	C0240A	1			
-RTZ SEEK IO OR DIAG	A0632B	A0638B	1			
-CYLINDER SELECT	A0633A	A0641A	1			
-CYLINDER SELECT TAG	A0633B	A0816B	1			
+COMPARATOR DAC	A0634A	B0225B	1			
+COMPARATOR DAC 23	A0635A	A0504A	1			
+COMPARATOR DAC 27	A0635B	A0507A	1			
+COMPARATOR DAC 22	A0636A	A0504B	1			
+COMPARATOR DAC 20	A0637A	A0503B	1			
+COMPARATOR DAC 21	A0637B	A0503A	1			
-RTZ SEEK MPN	A0638A	A0508A	2			
-RTZ SEEK MPU	A0638A	C0312B	1			
-RTZ SEEK IO OR DIAG	A0638B	A0620B	2			
-RTZ SEEK IO OR DIAG	A0638B	A0632B	1			
+DAC	A0640A	A0522A	1			
+FWD OR REV OFFSET	A0640B	A0519A	2			
+FWD OR REV OFFSET	A0640B	B0531A	1			
-CYLINDER SELECT	A0641A	A0633A	1			
-CYLINDER SELECT	A0641A	B0529A	2			
+COMPARATOR DAC 24	A0642A	A0505B	1			
+COMPARATOR DAC 26	A0643A	A0507B	1			
+COMPARATOR DAC 25	A0643B	A0505A	1			
-CH II BIT 9	A0703A	B0829A	1			
+CH I SELECT COMPARE	A0703B	A0810B	1			
+CH II BIT 9	A0704B	B0833A	1			
+CH II SELECT COMPARE	A0705A	A0710B	1			
-CH I BIT 9	A0705B	A0829A	1			
-CONTROL SELECT	A0708A	A0717B	2			
-CH II DISABLE	A0709A	A0713B	1			
-DC MASTER CLEAR	A0709B	A0817B	2			
-DC MASTER CLEAR	A0709B	A0721B	1			
+CH II SELECT COMPARE	A0710B	B0810B	2			
+CH II SELECT COMPARE	A0710B	A0705A	1			
-CH I DISABLE	A0712A	A0721A	2			
+BIT 9	A0713A	A0719B	2			
-CH II DISABLE	A0713B	B0840B	2			
-CH II DISABLE	A0713B	A0709A	1			
+CH II SEEK END	A0714B	B0838B	1			
+CH II ENABLE	A0715A	A0116B	2			
+CH II ENABLE	A0715A	A0724B	1			
+CH I SEEK END	A0715B	A0838B	1			
+CH II RESERVED	A0716B	A0727B	1			
+CH I SELECT COMPARE	A0717A	A0810B	2			
+CH I SELECT COMPARE	A0717A	A0832A	1			
-CONTROL SELECT	A0717B	A0708A	2			
-CONTROL SELECT	A0717B	A0818B	1			
+CH I RESERVED	A0718A	A0732A	1			
+CH I ENABLE	A0718B	A0740A	2			
+BIT 9	A0719B	A0542B	1			

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				7	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
‡BIT 9	A0719B	A0713A	2		
‡GATED SEEK END	A0720B	A0103B	1		
-CH I DISABLE	A0721A	A0840B	1		
-CH I DISARLE	A0721A	A0712A	2		
-DC MASTER CLEAR	A0721B	A0709B	1		
‡CH I BIT 9	A0722B	A0833A	1		
‡CH II ENARLE	A0724B	A0715A	1		
‡CH II ENARLE	A0724B	C0437A	2		
‡CH II RESERVED	A0727B	A0716B	1		
-CH I SELECT COMPARE	A0730A	A0812A	1		
‡CH II BUSY	A0730B	A0831B	1		
-CH I ENARLE	A0731B	A0819B	1		
‡CH I RESERVED	A0732A	A0718A	1		
-CH II ENARLE	A0732B	B0817A	1		
‡TIE HIGH SINGLE CHAN	A0734A	A0234A	1		
‡CH I BUSY	A0735B	B0831B	1		
‡CH I ENARLE	A0740A	A0114A	1		
‡CH I ENARLE	A0740A	A0718B	2		
-SERVO OFFSET NEGATIVE	A0803A	A0622B	1		
-WRITE GATE IO	A0804A	C0529B	1		
-READ GATE IO	A0804B	C0528A	1		
-DATA STROBE LATE IO	A0805A	A0619A	1		
-SERVO OFFSET POSITIVE	A0808A	A0624A	1		
-CONTROLLER FAULT CLEAR	A0808B	B0415B	1		
-ADDRESS MARK ENARLE IO	A0809A	A0628B	1		
-RTZ SEEK IO	A0809B	A0631A	1		
-DATA STROBE EARLY IO	A0810A	A0618B	1		
‡CH I SELECT COMPARE	A0810B	A0703B	1		
‡CH I SELECT COMPARE	A0810B	A0717A	2		
-CH I SELECT COMPARE	A0812A	A0730A	1		
‡CH I SELECT ENARLE	A0812B	C0205B	1		
‡UNIT SELECT SWITCH 21	A0813A	B0813A	2		
‡UNIT SELECT SWITCH 20	A0813B	B0813B	2		
‡UNIT SELECT SWITCH 22	A0814A	B0814A	2		
-HEAD SELECT TAG	A0815A	A0125A	1		
-HEAD SELECT TAG	A0815A	B0815A	2		
‡UNIT SELECT SWITCH 23	A0815B	B0815B	2		
-CYLINDER SELECT TAG	A0816B	B0816B	2		
-CYLINDER SELECT TAG	A0816B	A0633B	1		
-CH I ENARLE	A0817A	A0819B	2		
-DC MASTER CLEAR	A0817B	B0817B	1		
-DC MASTER CLEAR	A0817B	A0709B	2		
‡BUS BIT 2	A0818A	B0818A	1		
-CONTROL SELECT	A0818B	A0717B	1		
-CONTROL SELECT	A0818B	B0818B	2		
‡BUS BIT 1	A0819A	B0819A	1		
-CH I ENARLE	A0819B	A0817A	2		
-CH I ENARLE	A0819B	A0731B	1		
‡BUS BIT 3	A0820A	B0820A	1		
‡BUS BIT 0	A0820B	B0820B	1		
‡BUS BIT 5	A0821A	B0821A	1		
‡BUS BIT 6	A0821B	B0821B	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				8	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
+BUS BIT 7	A0822A	B0822A	1		
+BUS BIT 4	A0822B	B0822B	1		
+BUS BIT 8	A0824A	B0824A	1		
+BUS BIT 9	A0824B	B0824B	2		
+CH I WRITE CLOCK	A0828A	A0209A	1		
+CH I WRITE DATA	A0828B	B0304B	1		
-CH I BIT 9	A0829A	A0705B	1		
+CH II BUSY	A0831B	A0730B	1		
+CH I SELECT COMPARE	A0832A	A0717A	1		
+CH I SELECT COMPARE	A0832A	A0838A	2		
+WRITE PROTECTED	A0832B	B0832B	2		
+CH I BIT 4	A0833A	A0722B	1		
-SEQUENCE HOLD	A0833B	B0833B	1		
-SEQUENCE PICK OUT	A0834B	B0834B	2		
-SEQUENCE PICK IN	A0835A	B0835A	1		
+SECTOR	A0836A	B0836A	2		
+DN CYL	A0836B	B0836B	2		
+NR7 READ DATA	A0837A	B0837A	2		
+READ CLOCK	A0837B	B0837B	2		
+CH I SELECT COMPARE	A0838A	A0832A	2		
+CH I SELECT COMPARE	A0838A	C0335B	1		
+CH I SEEK END	A0838B	A0715B	1		
+FAULT	A0840A	B0840A	2		
-CH I DISABLE	A0840B	A0721A	1		
+UNIT READY	A0841A	B0841A	2		
+ADDRESS MARK FOU D	A0841B	B0841B	2		
+INDEX	A0842A	B0842A	1		
+CH I ENABLE MUX	A0842B	A0110B	1		
+1F 9.67 MHZ CLOCK	A0843A	B0843A	2		
+1F 9.67 MHZ CLOCK	A0843A	A0108A	1		
+SEEK ERROR	A0843B	B0843B	1		
+SEEK ERROR	A0843B	A0605B	2		
+CURRENT SENSE	A0901A	A0608A	1		
+POWER AMP DRIVE	A0901B	A0626A	1		
-PULL MOTOR RELAYS	A0902A	A0902B	2		
-PULL MOTOR RELAYS	A0902B	C0337B	1		
-PULL MOTOR RELAYS	A0902B	A0902A	2		
-DC POWER ON	A0903A	C0336B	1		
-DC CIRCUIT BREAKERS ON	A0903B	C0321A	1		
+5V MPU	A0909A	A0918A	1		
+5V MPU CONTROL PANEL	A0909B	A0915B	1		
-GND A09	A0910A	A0910B	1		
-GND A09	A0910B	A0910A	1		
-WRITE PROTECT	A0911A	C0437B	1		
-AIR SWITCH ON	A0911B	C0322A	1		
-CLEAR FAULT INTERRUPT	A0912A	B0340B	1		
-FAULT	A0912B	C0436B	1		
-FAULT	A0912B	B0204A	2		
-GND A09X	A0913B	A0914A	1		
-GND A09X	A0914A	A0913B	1		
-GND A09X	A0914A	A0916A	2		
-READY	A0914B	B0422B	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				9	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
-START SWITCH	A0915A	C0307B	1		
+5V MPU CONTROL PANEL	A0915B	A0909B	1		
-GND A09X	A0916A	A0914A	2		
+5V MPU	A0918A	A0909A	1		
+5V MPU	A0918A	A0934B	2		
+GATED READ AND WRITE NOT	A0919B	B0305A	1		
-36 VOLTS	A0920A	B0218A	1		
-A3	A0920B	C0310A	1		
-PIA 5 THRU 8	A0921B	B0319A	1		
-A2	A0922B	B0340A	1		
+BUFFERED E	A0923B	C0312A	2		
-D7	A0925A	B0313B	2		
+BUFFERED A0	A0925B	B0335B	2		
-D6	A0926A	B0312A	2		
+BUFFERED A1	A0926B	B0334B	2		
-D3	A0927A	B0311A	2		
-RESET	A0927B	B0320B	2		
-D2	A0928A	B0312B	2		
-D4	A0928B	B0315B	2		
-D0	A0929A	B0316B	2		
-D5	A0929B	B0315A	2		
-D1	A0930B	B0314A	2		
-CB 2 STORE	A0933A	C0322B	1		
+DISPLAY 21	A0934A	C0309B	1		
+5V MPU	A0934B	A0918A	2		
+DISPLAY 22	A0935A	C0308A	1		
+DISPLAY 23	A0936A	C0308B	1		
+BLANK	A0937A	C0307A	1		
+DISPLAY 20	A0938A	C0309A	1		
-ROW 3	A0939A	B0325B	2		
-ROW 2	A0940A	C0304B	2		
-COLUMN 2	A0940B	C0311B	1		
-ROW 1	A0941A	C0314A	2		
-COLUMN 1	A0941B	C0311A	1		
+ENABLE 20	A0942A	C0305A	1		
-COLUMN 3	A0942B	B0341A	1		
+ENABLE 21	A0943A	C0305B	1		
+ENABLE 22	A0944A	C0304A	1		
-ROW 4	A0945A	C0313A	1		
+BUFFERED VMA	B0108B	B0318B	1		
-BUFFERED E	B0109A	B0308B	1		
+BUFFERED A0	B0113A	B0238B	2		
+BUFFERED A1	B0113B	B0238A	2		
+BUFFERED A2	B0114A	B0337A	2		
+BUFFERED A3	B0114B	B0336A	2		
+BUFFERED A4	B0115A	B0327A	1		
+BUFFERED A5	B0115B	B0332A	1		
+BUFFERED A6	B0116A	B0334A	1		
+BUFFERED A7	B0116B	B0321B	1		
+BUFFERED A8	B0117A	B0321A	1		
+BUFFERED A9	B0117B	B0328A	1		
+BUFFERED A10	B0118A	B0333A	1		

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TITLE		WL		DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING					10	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES		
‡BUFFERED A11	B0119A	B0332B	1			
‡BUFFERED A12	B0119B	B0318A	1			
‡BUFFERED A13	B0120A	B0311B	1			
‡BUFFERED A14	B0120B	B0319B	1			
‡BUFFERED A15	B0121A	B0316A	1			
-BREAKPOINT HALT	B0125A	B0328B	1			
-D0	B0126A	C0218A	2			
-D1	B0126B	C0217A	2			
-D2	B0127A	C0216A	2			
-D3	B0127B	C0217B	2			
-D4	B0128A	C0214B	2			
-D5	B0128B	B0242A	2			
-D6	B0129A	B0241A	2			
-D7	B0129B	B0242B	2			
-FAULT	B0204A	A0912B	2			
‡UNIT SELECT SWITCH 23	B0204B	C0408B	2			
‡UNIT SELECT SWITCH 22	B0205A	C0408A	2			
‡VOLTAGE FAULT	B0205B	C0410B	1			
‡LATCHED VOLTAGE FAULT	B0207A	B0430A	1			
‡DIAGNOSTIC READ ENABLE	B0209B	B0305B	1			
-MUX 0 SELECT	B0210A	B0422A	2			
‡UNIT SELECT SWITCH 21	B0211A	C0409B	2			
‡LATCHED WRITE FAULT	B0211B	B0425B	1			
‡HEAD SELECT FAULT	B0212A	B0404B	1			
‡WRITE FAULT	B0212B	B0403A	1			
-REVERSE	B0213A	A0510B	2			
‡UNIT SELECT SWITCH 20	B0213B	C0407A	2			
‡LATCHED RD OR WRT AND NOT ON CY	B0214A	B0409B	1			
‡LATCHED HEAD SELECT FAULT	B0214B	B0419B	1			
-FORWARD	B0215A	A0510A	2			
-FAULT BLANKING DELAY	B0216A	B0412B	1			
‡RD OR WRT AND NOT ON CYL FAULT	B0217A	B0431A	1			
‡INDEX GATE	B0217B	A0132B	1			
-36 VOLTS	B0218A	A0920A	1			
-MOVEABLE HEADS AND CYL SELECT	B0218B	A0531A	2			
‡(ODD OR EVEN) OVER TWO	B0219A	A0424A	1			
‡SLOPE	B0220A	A0442A	2			
‡LATCHED READ AND WRITE FAULT	B0220B	B0432B	1			
‡READ AND WRITE FAULT	B0221A	B0432A	1			
-DATA OUT	B0221B	B0516B	2			
-FIXED HEAD SELECT	B0224A	B0521B	2			
-SECTOR COUNT PULSE	B0224B	B0441A	2			
-8.3 SERVO PREAMP VOLTAGE	B0225A	A0404B	1			
‡COMPARATOR DAC	B0225B	A0634A	1			
‡WRITE ZONE 1	B0226A	B0533A	2			
‡LATCHED SEEK ERROR	B0226B	B0403B	1			
‡FINE	B0227B	A0512B	2			
‡GATED SERVO CLOCK	B0229A	A0436A	2			
‡GATED SERVO CLOCK	B0229A	C0411A	1			
‡DAC	B0231B	A0522A	2			
‡WRITE PROTECTED	B0232A	C0438B	2			
-POSITION	B0232B	A0415A	2			

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				12	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
-GATED VOLTAGE FAULT	B0320A	B0427A	1		
-RESET	B0320B	C0232A	1		
-RESET	B0320B	A0927B	2		
+BUFFERED A9	B0321A	B0117A	1		
+BUFFERED A7	B0321B	B0116B	1		
-GND B03X	B0323B	B0330B	1		
-ENABLE TIMERS 7 AND 8	B0324B	B0236A	1		
-GATED CLEAR LATCHES	B0325A	B0415A	1		
-ROW 3	B0325B	A0939A	2		
-ROW 3	B0325B	C0314B	1		
-PIA 9 THRU 12	B0326B	C0233A	1		
+BUFFERED A4	B0327A	B0115A	1		
+BUFFERED A9	B0328A	B0117B	1		
-BREAKPOINT HALT	B0328B	B0125A	1		
+DN CYL	B0329A	A0611B	1		
+DN CYL	B0329A	B0525B	2		
-KEYBOARD INTERRUPT	B0330A	B0338A	2		
-KEYBOARD INTERRUPT	B0330A	B0338B	1		
-GND B03X	B0330B	B0323B	1		
+15 SECOND TIME OUT	B0331A	A0112A	1		
-NMI REQUEST	B0331B	C0214A	1		
+BUFFERED A5	B0332A	B0115B	1		
+BUFFERED A11	B0332B	B0119A	1		
+BUFFERED A10	B0333A	B0118A	1		
+BUFFERED A6	B0334A	B0116A	1		
+BUFFERED A1	B0334B	A0926B	2		
+BUFFERED A1	B0334B	B0238A	1		
+BUFFERED A0	B0335B	B0238B	1		
+BUFFERED A0	B0335B	A0925B	2		
+BUFFERED A3	B0336A	B0114B	2		
+BUFFERED A3	B0336A	C0219B	1		
+BUFFERED A2	B0337A	C0203B	1		
+BUFFERED A2	B0337A	B0114A	2		
+DC MASTER CLEAR	B0337B	B0420A	1		
+DC MASTER CLEAR	B0337B	C0418A	2		
-KEYBOARD INTERRUPT	B0338A	B0330A	2		
-KEYBOARD INTERRUPT	B0338B	C0313B	2		
-KEYBOARD INTERRUPT	B0338B	B0330A	1		
-A2	B0340A	A0922B	1		
-CLEAR FAULT INTERRUPT	B0340B	C0324B	2		
-CLEAR FAULT INTERRUPT	B0340B	A0912A	1		
-COLUMN 3	B0341A	A0942B	1		
+WRITE FAULT	B0403A	B0212B	1		
+LATCHED SEEK ERROR	B0403B	B0226B	1		
-SIMULATED START SWITCH	B0404A	C0204B	1		
+HEAD SELECT FAULT	B0404B	B0212A	1		
-GATED MPU FAULT	B0405A	B0314B	1		
+POWER ON MASTER CLEAR PULSE	B0407B	B0543A	2		
+POWER ON MASTER CLEAR PULSE	B0407B	C0340A	1		
-BUFFERED WRITE GATE	B0408A	B0408B	1		
-BUFFERED WRITE GATE	B0408A	A0140B	2		
-BUFFERED WRITE GATE	B0408B	B0408A	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				13	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
-READY CLEAR	B0409A	B0416A	1		
+LATCHED RD DR WRT AND NOT ON CY	B0409B	B0214A	1		
-WRITE GATE	B0410A	C0529A	1		
+SEEK ERROR	B0411B	B0843B	2		
+SEEK ERROR	B0411B	B0413B	1		
-READ GATE	B0412A	B0515A	1		
-FAULT BLANKING DELAY	B0412B	B0216A	1		
-POWER ON MASTER CLEAR	B0413A	B0530B	1		
-POWER ON MASTER CLEAR	B0413A	A0127B	2		
+SEEK ERROR	B0413B	B0411B	1		
+SEEK ERROR	B0413B	C0341B	2		
+FAULT	B0414A	B0840A	1		
+FAULT	B0414A	C0334B	2		
-DC MASTER CLEAR	B0414B	B0514B	1		
-GATED CLEAR LATCHES	B0415A	B0325A	1		
-CONTROLLER FAULT CLEAR	B0415B	A0808B	1		
-READY CLEAR	B0416A	B0409A	1		
-WRITE TRANSITIONS	B0416B	C0914A	1		
+T AND D MUX INPUT SELECT 21	B0417B	C0514B	2		
+T AND D MUX INPUT SELECT 21	B0417B	A0143A	1		
+T AND D MUX INPUT SELECT 22	B0418A	C0509B	2		
+T AND D MUX INPUT SELECT 22	B0418A	A0142A	1		
-CLR FAULT	B0418B	C0329A	1		
+LATCHED HEAD SELECT FAULT	B0419B	B0214B	1		
+DC MASTER CLEAR	B0420A	A0531B	2		
+DC MASTER CLEAR	B0420A	B0337B	1		
-READ ERROR	B0420B	B0308A	1		
-READ ERROR	B0420B	C0229B	2		
-MUX J SELECT	B0422A	A0124A	1		
-MUX O SELECT	B0422A	B0210A	2		
-READY	B0422B	A0914B	1		
-CLEAR FAULT LED SWITCH	B0424A	B0438A	1		
+T AND D MUX INPUT SELECT 20	B0425A	A0142B	1		
+T AND D MUX INPUT SELECT 20	B0425A	C0505A	2		
+LATCHED WRITE FAULT	B0425B	B0211B	1		
+INDEX GATE	B0426A	A0440B	2		
+UNIT READY	B0426B	A0129A	2		
+UNIT READY	B0426B	B0841A	1		
-GATED VOLTAGE FAULT	B0427A	B0320A	1		
+MUXED DIAGNOSTIC DATA	B0427B	B0543B	1		
+MUXED DIAGNOSTIC DATA	B0427B	A0138A	2		
+MULTIPLE HEAD SELECT FAULT	B0428B	C0905B	1		
+LATCHED VOLTAGE FAULT	B0430A	B0207A	1		
+SET READY	B0430B	C0310B	1		
+RD DR WRT AND NOT ON CYL FAULT	B0431A	B0217A	1		
+READ AND WRITE FAULT	B0432A	B0221A	1		
+LATCHED READ AND WRITE FAULT	B0432B	B0220B	1		
+FIXED HEAD SEEK ERROR	B0433B	C0504A	1		
-CLEAR FAULT LED SWITCH	B0438A	B0424A	1		
-SECTOR COUNT PULSE	B0441A	A0443A	1		
-SECTOR COUNT PULSE	B0441A	B0224B	2		
+INDEX HIT	B0443B	A0138B	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				14	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
◊WRITE ZONE 0	B0507B	C0908B	1		
◊WRITE ZONE 0	B0507B	B0233B	2		
◊RAW DATA	B0508A	B0309A	2		
◊RAW DATA	B0508A	B0526A	1		
◊DIAGNOSTIC SLOW DOWN CLOCK	B0508B	A0430B	2		
◊DIAGNOSTIC SLOW DOWN CLOCK	B0508B	C0224B	1		
-DIAGNOSTIC MODE	B0509A	A0426A	1		
◊SIMULATED RAW DATA	B0509B	C0205A	1		
◊BIT 7	B0511A	A0538A	2		
◊BIT 7	B0511A	C0537B	1		
-ADDRESS MARK ENABLE	B0512A	C0403B	1		
-ADDRESS MARK ENABLE	B0512A	A0628A	2		
◊BIT 9	B0513B	C0532A	1		
◊BIT 9	B0513B	A0542B	2		
◊BIT 8	B0514A	A0542A	2		
◊BIT 8	B0514A	C0531B	1		
-DC MASTER CLEAR	B0514B	B0817B	2		
-DC MASTER CLEAR	B0514B	B0414B	1		
-READ GATE	B0515A	C0528B	2		
-READ GATE	B0515A	B0412A	1		
-DATA OUT	B0516B	C0829A	1		
-DATA OUT	B0516B	B0221B	2		
◊ON CYLINDER	B0517A	A0532A	1		
-VCO IF CLOCK	B0517B	A0241B	1		
-FAST START	B0518B	C0838B	1		
-PLD FAST START	B0519A	C0830A	1		
◊LOW GAIN SELECT	B0520A	C0942B	1		
-ON CYLINDER	B0521A	C0440A	1		
-FIXED HEAD SELECT	B0521B	C0442A	1		
-FIXED HEAD SELECT	B0521B	B0224A	2		
-RTZ OR POWER ON MASTER CLEAR	B0522A	C0430B	1		
-FIXED HEAD CHIP SELECT 8	B0522B	C0922A	1		
-FIXED HEAD CHIP SELECT 6	B0524A	C0923B	1		
◊ADDRESS MARK FOUND	B0524B	B0841B	1		
-RAW DATA	B0525A	C0832B	1		
◊ON CYL	B0525B	B0836B	1		
◊ON CYL	B0525B	B0329A	2		
◊RAW DATA	B0526A	B0508A	1		
-WRITE ENABLE	B0528B	C0431B	1		
-CYLINDER SELECT	B0529A	A0641A	2		
◊BIT 1	B0529B	C0533B	1		
◊BIT 1	B0529B	A0540A	2		
-RTZ SEEK	B0530A	A0603A	1		
-POWER ON MASTER CLEAR	B0530B	B0413A	1		
◊FWD OR REV OFFSET	B0531A	A0640B	1		
-HEAD SELECT	B0531B	A0630B	1		
◊BIT 2	B0532A	C0527A	1		
◊BIT 2	B0532A	A0540B	2		
◊WRITE ZONE 1	B0533A	C0906A	1		
◊WRITE ZONE 1	B0533A	B0226A	2		
◊BIT 3	B0533B	C0524B	1		
◊BIT 3	B0533B	A0532B	2		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				15	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
+BIT 4	B0534B	C0542A	1		
+BIT 4	B0534B	A0543B	2		
+BIT 5	B0535A	A0543A	2		
+BIT 5	B0535A	C0542B	1		
+BIT 0	B0536A	C0535A	1		
+BIT 0	B0536A	A0541B	2		
-FIXED HEAD CHIP SELECT 13	B0536B	C0927A	1		
-FIXED HEAD CHIP SELECT 14	B0537A	C0925A	1		
-FIXED HEAD CHIP SELECT 16	B0537B	C0928B	1		
-MUX 5 SELECT	B0541A	A0120B	1		
-AGC ACTIVE	B0542A	C0416A	2		
+DC MASTER CLEAR	B0542B	C0418A	1		
+POWER ON MASTER CLEAR PULSE	B0543A	B0407B	2		
+MUXED DIAGNOSTIC DATA	B0543B	C0503B	2		
+MUXED DIAGNOSTIC DATA	B0543B	B0427B	1		
-READ DATA	B0607A	C0842A	1		
+READ DATA	B0608A	C0842B	1		
+CH II SELECT COMPARE	B0810B	A0710B	2		
+CH II SELECT COMPARE	B0810B	B0832A	1		
+CHII SELECT ENAPLE	B0812B	C0204A	1		
+UNIT SELECT SWITCH 21	B0813A	A0813A	2		
+UNIT SELECT SWITCH 21	B0813A	C0409B	1		
+UNIT SELECT SWITCH 20	B0813B	A0813B	2		
+UNIT SELECT SWITCH 20	B0813B	C0407A	1		
+UNIT SELECT SWITCH 22	B0814A	A0814A	2		
+UNIT SELECT SWITCH 22	B0814A	C0408A	1		
-HEAD SELECT TAG	B0815A	A0815A	2		
+UNIT SELECT SWITCH 23	B0815B	C0408B	1		
+UNIT SELECT SWITCH 23	B0815B	A0815B	2		
-CYLINDER SELECT TAG	B0816B	A0816B	2		
-CH II ENARLE	B0817A	B0819B	2		
-CH II ENARLE	B0817A	A0732B	1		
-DC MASTER CLEAR	B0817B	A0817B	1		
-DC MASTER CLEAR	B0817B	B0514B	2		
+BUS BIT 2	B0818A	C0526A	2		
+BUS BIT 2	B0818A	A0818A	1		
-CONTR0L SELECT	B0818B	A0818B	2		
+BUS BIT 1	B0819A	C0534A	2		
+BUS BIT 1	B0819A	A0819A	1		
-CH II ENARLE	B0819B	B0817A	2		
+BUS BIT 3	B0820A	A0820A	1		
+BUS BIT 3	B0820A	C0524A	2		
+BUS BIT 0	B0820B	C0535B	2		
+BUS BIT 0	B0820B	A0820B	1		
+BUS BIT 5	B0821A	A0821A	1		
+BUS BIT 5	B0821A	C0543A	2		
+BUS BIT 6	B0821B	C0538B	2		
+BUS BIT 6	B0821B	A0821B	1		
+BUS BIT 7	B0822A	A0822A	1		
+BUS BIT 7	B0822A	C0537A	2		
+BUS BIT 4	B0822B	C0541B	2		
+BUS BIT 4	B0822B	A0822B	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				16	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
‡BUS BIT 8	B0824A	C0531A	2		
‡BUS BIT 8	B0824A	A0824A	1		
‡BUS BIT 9	B0824B	A0824B	2		
‡BUS BIT 9	B0824B	C0532B	1		
‡CH II WRITE CLOCK	B0828A	A0204A	1		
‡CH II WRITE DATA	B0828B	A0205A	1		
-CH II BIT 9	B0829A	A0703A	1		
‡CH I BUSY	B0831B	A0735B	1		
‡CH II SELECT COMPARE	B0832A	B0838A	2		
‡CH II SELECT COMPARE	B0832A	B0810B	1		
‡WRITE PROTECTED	B0832B	C0438B	1		
‡WRITE PROTECTED	B0832B	A0832B	2		
‡CH II BIT 9	B0833A	A0704B	1		
-SEQUENCE HOLD	B0833B	A0833B	1		
-SEQUENCE HOLD	B0833B	C0316B	2		
-SEQUENCE PICK OUT	B0834B	A0834B	2		
-SEQUENCE PICK OUT	B0834B	C0338B	1		
-SEQUENCE PICK IN	B0835A	C0316A	2		
-SEQUENCE PICK IN	B0835A	A0835A	1		
‡SECTOR	B0836A	A0836A	2		
‡SECTOR	B0836A	C0405B	1		
‡ON CYL	B0836B	A0836B	2		
‡ON CYL	B0836B	B0525B	1		
‡NRZ READ DATA	B0837A	C0834B	1		
‡NRZ READ DATA	B0837A	A0837A	2		
‡READ CLOCK	B0837B	A0837B	2		
‡READ CLOCK	B0837B	C0836B	1		
‡CH II SELECT COMPARE	B0838A	B0832A	2		
‡CH II SEEK FND	B0838B	A0714B	1		
‡FAULT	B0840A	A0840A	2		
‡FAULT	B0840A	B0414A	1		
-CH II DISABLE	B0840B	A0713B	2		
‡UNIT READY	B0841A	B0426B	1		
‡UNIT READY	B0841A	A0841A	2		
‡ADDRESS MARK FOUND	B0841B	A0841B	2		
‡ADDRESS MARK FOUND	B0841B	B0524B	1		
‡INDEX	B0842A	C0409A	2		
‡INDEX	B0842A	A0842A	1		
‡CH II ENABLE MUX	B0842B	A0115A	1		
‡IF 9.67 MHZ CLOCK	B0843A	C0420A	1		
‡IF 9.67 MHZ CLOCK	B0843A	A0843A	2		
‡SEEK ERROR	B0843B	A0843B	1		
‡SEEK ERROR	B0843B	B0411B	2		
‡DATA VALID OR SEEK ERROR INTERR	C0203A	A0518B	1		
‡BUFFERED A?	C0203B	B0337A	1		
‡CH II SELECT ENABLE	C0204A	B0812B	1		
-SIMULATED START SWITCH	C0204B	B0404A	1		
‡SIMULATED RAW DATA	C0205A	B0509B	1		
‡CH I SELECT ENABLE	C0205B	A0812B	1		
‡SIMULATED INDEX GATE	C0207A	A0115B	1		
-DIAGNOSTIC CLEAR COUNTER	C0207B	A0429B	1		
‡MPU SERV0 INTERFACE BIT 7	C0208A	A0517B	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				17	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
+MPU SERVO INTERFACE BIT 5	C0209A	A0516B	1		
+MPU SERVO INTERFACE BIT 6	C0209B	A0517A	1		
+MPU SERVO INTERFACE BIT 3	C0210A	A0515B	1		
+MPU SERVO INTERFACE BIT 4	C0210B	A0516A	1		
+MPU SERVO INTERFACE BIT 1	C0211A	A0514B	1		
+MPU SERVO INTERFACE BIT 2	C0211B	A0515A	1		
+MPU SERVO INTERFACE BIT 0	C0212B	A0514A	1		
+COMPARATOR POSITION	C0213A	A0615B	2		
+DATA ACCEPTED OR COMMUNICATE IN	C0213B	A0518A	1		
-NMI REQUEST	C0214A	B0331B	1		
-D4	C0214B	B0128A	2		
-D4	C0214B	B0315B	1		
-D2	C0216A	B0312B	1		
-D2	C0216A	B0127A	2		
-DC CIRCUIT BREAKERS ON	C0216B	C0321A	2		
-D1	C0217A	B0314A	1		
-D1	C0217A	B0126B	2		
-D3	C0217B	B0127B	2		
-D3	C0217B	B0311A	1		
-D0	C0218A	B0316B	1		
-D0	C0218A	B0126A	2		
+24 VOLT MPU	C0218B	C0333A	1		
-DIAGNOSTIC SERVO OFFSET POSIT	C0219A	A0625B	1		
+BUFFERED A3	C0219B	B0336A	1		
-DIAGNOSTIC DATA STROBE EARLY	C0220A	A0618A	1		
-DIAGNOSTIC SERVO OFFSET NEGAT	C0220B	A0622A	1		
+MUXED DIAGNOSTIC DATA	C0221A	C0526B	2		
-DIAGNOSTIC DATA STROBE LATE	C0221B	A0617B	1		
-LOW FREQUENCY	C0222A	B0310A	1		
-FTU MODE	C0222B	B0303A	2		
-FTU MODE	C0222B	C0540B	1		
+MUX SELECT 20	C0224A	A0124B	1		
+DIAGNOSTIC SLOW DOWN CLOCK	C0224B	B0508B	1		
+MUX SELECT 22	C0225A	A0126A	1		
+MUX SELECT 21	C0225B	A0125B	1		
+T AND D MUX INPUT SELECT 21	C0226A	C0514B	1		
+T AND D MUX INPUT SELECT 20	C0226B	C0505A	1		
-MUX ENABLE	C0227A	A0126B	1		
-DIAGNOSTIC MODE	C0227B	A0113A	1		
+T AND D MUX INPUT SELECT 22	C0228B	C0509B	1		
-READ ERROR	C0229B	B0420B	2		
-INDEX PULSE	C0231A	C0412B	1		
-RESET	C0232A	B0320B	1		
-SECTOR PULSE	C0232B	C0326B	2		
-PIA 9 THRU 12	C0233A	B0326B	1		
+BUFFERED READ OR WRITE NOT	C0233B	B0309B	1		
+DIAGNOSTIC BIT 1	C0234A	C0534B	1		
+BUFFERED E	C0234B	C0312A	1		
+DIAGNOSTIC BIT 3	C0235A	C0522B	1		
+DIAGNOSTIC BIT 2	C0235B	C0525B	1		
+DIAGNOSTIC BIT 5	C0236A	C0543B	1		
+DIAGNOSTIC BIT 4	C0236B	C0541A	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				18	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
†DIAGNOSTIC BIT 7	C0237A	C0536B	1		
†DIAGNOSTIC BIT 6	C0237B	C0540A	1		
-DIAGNOSTIC ADDRESS MARK ENABLE	C0238A	A0627A	1		
†DIAGNOSTIC BIT 0	C0238B	C0536A	1		
-DIAGNOSTIC CYLINDER SELECT	C0240A	A0632A	1		
-DIAGNOSTIC HEAD SELECT	C0240B	A0629B	1		
-DIAGNOSTIC READ GATE	C0241A	C0527B	1		
-DIAGNOSTIC RTZ	C0241B	A0631B	1		
†DIAGNOSTIC BIT 9	C0242A	C0533A	1		
-DIAGNOSTIC WRITE GATE	C0242B	C0530A	1		
†5 VOLT MPU A	C0243A	C0343A	1		
†5 VOLT MPU B	C0243B	C0343B	1		
†1 KHZ CLOCK	C0303A	C0303B	1		
†1 KHZ CLOCK	C0303A	C0325A	2		
†1 KHZ CLOCK	C0303B	C0303A	1		
†1 KHZ CLOCK	C0303B	A0533A	2		
†ENABLE 22	C0304A	A0944A	1		
-ROW 2	C0304B	C0315B	1		
-ROW 2	C0304B	A0940A	2		
†ENABLE 20	C0305A	A0942A	1		
†ENABLE 21	C0305B	A0943A	1		
†BLANK	C0307A	A0937A	1		
-START SWITCH	C0307B	A0915A	1		
†DISPLAY 22	C0308A	A0935A	1		
†DISPLAY 23	C0308B	A0936A	1		
†DISPLAY 20	C0309A	A0938A	1		
†DISPLAY 21	C0309B	A0934A	1		
-A3	C0310A	A0920B	1		
†SET READY	C0310B	B0430B	1		
-COLUMN 1	C0311A	A0941B	1		
-COLUMN 2	C0311B	A0940B	1		
†BUFFERED E	C0312A	A0923B	2		
†BUFFERED E	C0312A	C0234B	1		
-RTZ SEEK MPU	C0312B	A0638A	1		
-ROW 4	C0313A	A0945A	1		
-KEYBOARD INTERRUPT	C0313B	C0315A	1		
-KEYBOARD INTERRUPT	C0313B	B0338B	2		
-ROW 1	C0314A	C0318B	1		
-ROW 1	C0314A	A0941A	2		
-ROW 3	C0314B	B0325B	1		
-KEYBOARD INTERRUPT	C0315A	B0240B	2		
-KEYBOARD INTERRUPT	C0315A	C0313B	1		
-ROW 2	C0315B	C0304B	1		
-SEQUENCE PICK IN	C0316A	B0835A	2		
-SEQUENCE PICK IN	C0316A	C0335A	1		
-SEQUENCE HOLD	C0316B	B0833B	2		
-SEQUENCE PICK OUT	C0317A	C0338B	2		
-MOTOR AT SPEED	C0317B	C0417A	1		
-GO HOME	C0318A	A0530A	1		
-ROW 1	C0318B	C0314A	1		
-DC CIRCUIT BREAKERS ON	C0321A	A0903B	1		
-DC CIRCUIT BREAKERS ON	C0321A	C0216B	2		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				19	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
-AIR SWITCH ON	C0322A	A0911B	1		
-CB 2 STROBE	C0322B	A0933A	1		
-CLEAR FAULT INTERRUPT	C0324B	B0340B	2		
+1 KHZ CLOCK	C0325A	C0340B	1		
+1 KHZ CLOCK	C0325A	C0303A	2		
+PLO LOCKED ON	C0325B	C0443A	1		
-SECTOR PULSE	C0326B	C0232B	2		
-SECTOR PULSE	C0326B	C0419A	1		
+SERVO FAST START	C0327B	A0111A	1		
+SEEK END	C0328A	A0616B	2		
+INDEX	C0328B	C0443B	2		
-CLR FAULT	C0329A	B0410B	1		
+24 VOLT MPU	C0333A	C0210B	1		
+FAULT	C0334B	B0414A	2		
-SEQUENCE PICK IN	C0335A	C0316A	1		
+CH I SELECT COMPARE	C0335B	A0838A	1		
-DC POWER ON	C0336B	A0903A	1		
-PULL MOTOR RELAYS	C0337B	A0902B	1		
-SEQUENCE PICK OUT	C0338B	C0317A	2		
-SEQUENCE PICK OUT	C0338B	B0834B	1		
+POWER ON MASTER CLEAR PULSE	C0340A	B0407B	1		
+1 KHZ CLOCK	C0340B	C0342B	2		
+1 KHZ CLOCK	C0340B	C0325A	1		
+SEEK ERROR	C0341B	C0440B	1		
+SEEK ERROR	C0341B	B0413B	2		
+1 KHZ CLOCK	C0342B	C0340B	2		
+5 VOLT MPU A	C0343A	C0243A	1		
+5 VOLT MPU B	C0343B	C0243B	1		
-ADDRESS MARK ENABLE	C0403B	C0619A	2		
-ADDRESS MARK ENABLE	C0403B	B0512A	1		
+4.83 MHZ CLOCK	C0405A	A0430A	2		
+SECTOR	C0405B	B0836A	1		
+UNIT SELECT SWITCH 20	C0407A	B0213B	2		
+UNIT SELECT SWITCH 20	C0407A	B0813B	1		
+UNIT SELECT SWITCH 22	C0408A	B0814A	1		
+UNIT SELECT SWITCH 22	C0408A	B0205A	2		
+UNIT SELECT SWITCH 23	C0408B	B0204B	2		
+UNIT SELECT SWITCH 23	C0408B	B0815B	1		
+INDEX	C0409A	B0842A	2		
+INDEX	C0409A	C0443B	1		
+UNIT SELECT SWITCH 21	C0409B	B0813A	1		
+UNIT SELECT SWITCH 21	C0409B	B0211A	2		
+VOLTAGE FAULT	C0410B	B0205B	1		
+GATED SERVO CLOCK	C0411A	B0229A	1		
-INDEX PULSE	C0412B	C0231A	1		
+SERVO DATA	C0413A	A0437A	2		
+TIMER GATE	C0415B	A0435A	1		
-AGC ACTIVE	C0416A	B0542A	2		
-AGC ACTIVE	C0416A	A0403A	1		
-MOTOR AT SPEED	C0417A	C0317B	1		
+DC MASTER CLEAR	C0418A	B0337B	2		
+DC MASTER CLEAR	C0418A	B0542B	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				20	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
-SECTOR PULSE	C0419A	C0326B	1		
-GUARDBAND PATTERN 2	C0419B	A0509B	1		
+1F 9.67 MHZ CLOCK	C0420A	B0843A	1		
-GND C04	C0420B	C0423B	1		
+TIE HIGH C04	C0421A	C0441A	1		
-GUARDBAND PATTERN 1	C0421B	A0509A	1		
+GATED CH I ENABLE	C0422A	A0211A	1		
-INNER GUARDBAND	C0422B	A0508B	1		
-GND C04	C0423B	C0420B	1		
-GND C04	C0423B	C0427A	2		
-FTU MODE	C0426A	C0540B	2		
-WRITE CURRENT SENSE	C0426B	C0910A	1		
-GND C04	C0427A	C0423B	2		
+CH I ENABLE	C0429A	A0114A	2		
+GATED CH II ENABLE	C0429B	A0205B	1		
-RTZ OR POWER ON MASTER CLEAR	C0430B	B0522A	1		
+MOVEABLE HEAD SEEK ERROR	C0431A	A0512A	1		
-WRITE ENABLE	C0431B	B0528B	1		
-WRITE ENABLE	C0431B	C0911A	2		
-FAULT	C0436B	A0912B	1		
-FAULT	C0436B	C0910B	2		
+CH II ENABLE	C0437A	A0724B	2		
-WRITE PROTECT	C0437B	A0911A	1		
+WRITE PROTECTED	C0438B	B0832B	1		
+WRITE PROTECTED	C0438B	B0232A	2		
-ON CYLINDER	C0440A	B0521A	1		
+SEEK ERROR	C0440B	C0341B	1		
+TIE HIGH C04	C0441A	C0421A	1		
-FIXED HEAD SELECT	C0442A	B0521B	1		
+PLO LOCKED ON	C0443A	C0325B	1		
+INDEX	C0443B	C0328B	2		
+INDEX	C0443B	C0409A	1		
-LOCK TO DATA	C0503A	C0804B	1		
+MUXED DIAGNOSTIC DATA	C0503B	B0543B	2		
+MUXED DIAGNOSTIC DATA	C0503B	C0508A	1		
+FIXED HEAD SEEK ERROR	C0504A	B0433B	1		
+T AND D MUX INPUT SELECT 20	C0505A	B0425A	2		
+T AND D MUX INPUT SELECT 20	C0505A	C0226B	1		
+BIT 6	C0505B	C0538A	2		
-FIXED HEAD CHIP SELECT 15	C0507A	C0929A	1		
-MOVEABLE HEADS AND CYL SELECT	C0507B	A0531A	1		
+MUXED DIAGNOSTIC DATA	C0508A	C0519A	2		
+MUXED DIAGNOSTIC DATA	C0508A	C0503B	1		
-MUX 4 SELECT	C0508B	A0121A	1		
-FIXED HEAD CHIP SELECT 11	C0509A	C0929B	1		
+T AND D MUX INPUT SELECT 22	C0509B	C0228B	1		
+T AND D MUX INPUT SELECT 22	C0509B	B0418A	2		
-Y SELECT 4	C0510A	C0934A	1		
-FIXED HEAD CHIP SELECT 10	C0510B	C0924A	1		
-FIXED HEAD CHIP SELECT 9	C0511A	C0926A	1		
-FIXED HEAD CHIP SELECT 7	C0511B	C0924B	1		
-Y SELECT 6	C0512B	C0932A	1		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				21	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
+FIXED HEAD SELECT	C0513A	C0940A	1		
-FIXED HEAD CHIP SELECT 5	C0513B	C0925B	1		
-MUX 3 SELECT	C0514A	A0121B	1		
+T AND D MIX INPUT SELECT 21	C0514B	B0417B	2		
+T AND D MUX INPUT SELECT 21	C0514B	C0226A	1		
-FIXED HEAD CHIP SELECT 12	C0515A	C0927B	1		
-Y SELECT 7	C0515B	C0932B	1		
-Y SELECT 5	C0516A	C0933A	1		
-Y SELECT 0	C0516B	C0939A	1		
-Y SELECT 1	C0517A	C0937A	1		
-Y SELECT 2	C0517B	C0936A	1		
-Y SELECT 3	C0518A	C0935A	1		
-MUX 1 SELECT	C0518B	A0122B	1		
+MUXED DIAGNOSTIC DATA	C0519A	C0526B	1		
+MUXED DIAGNOSTIC DATA	C0519A	C0508A	2		
+MOVEABLE HEAD SELECT	C0519B	C0943B	1		
-MOVEABLE HEAD CHIP SELECT 3	C0520A	C0943A	1		
-MOVEABLE HEAD CHIP SELECT 4	C0520B	C0934B	1		
-MOVEABLE HEAD CHIP SELECT 1	C0521A	C0939B	1		
-MOVEABLE HEAD CHIP SELECT 0	C0521B	C0940B	1		
-MOVEABLE HEAD CHIP SELECT 2	C0522A	C0941A	1		
+DIAGNOSTIC BIT 3	C0522B	C0235A	1		
+BUS BIT 3	C0524A	B0820A	2		
+BIT 3	C0524B	B0533B	1		
-MUX 2 SELECT	C0525A	A0122A	1		
+DIAGNOSTIC BIT 2	C0525B	C0235B	1		
+BUS BIT 2	C0526A	B0818A	2		
+MUXED DIAGNOSTIC DATA	C0526B	C0519A	1		
+MUXED DIAGNOSTIC DATA	C0526B	C0221A	2		
+BIT 2	C0527A	B0532A	1		
-DIAGNOSTIC READ GATE	C0527B	C0241A	1		
-READ GATE IO	C0528A	A0804B	1		
-READ GATE	C0528B	B0515A	2		
-WRITE GATE	C0529A	B0410A	1		
-WRITE GATE IO	C0529B	A0804A	1		
-DIAGNOSTIC WRITE GATE	C0530A	C0242B	1		
+DIAGNOSTIC BIT 8	C0530B	B0237A	1		
+BUS BIT 8	C0531A	B0824A	2		
+BIT 8	C0531B	B0514A	1		
+BIT 9	C0532A	B0513B	1		
+BUS BIT 9	C0532B	B0824B	1		
+DIAGNOSTIC BIT 9	C0533A	C0242A	1		
+BIT 1	C0533B	B0529B	1		
+BUS BIT 1	C0534A	B0819A	2		
+DIAGNOSTIC BIT 1	C0534B	C0234A	1		
+BIT 0	C0535A	B0536A	1		
+BUS BIT 0	C0535B	B0820B	2		
+DIAGNOSTIC BIT 0	C0536A	C0238B	1		
+DIAGNOSTIC BIT 7	C0536B	C0237A	1		
+BUS BIT 7	C0537A	B0822A	2		
+BIT 7	C0537B	B0511A	1		
+BIT 6	C0538A	C0505B	2		

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TITLE		WL	DOCUMENT NO.	SHEET NO.	REV.
DEVICE LOGIC WIREWRAP LISTING				22	
SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES	
+BIT 6	C0538A	A0538B	1		
+BUS BIT 6	C0538B	B0821B	2		
+DIAGNOSTIC BIT 6	C0540A	C0237B	1		
-FTU MODE	C0540B	C0426A	2		
-FTU MODE	C0540B	C0222B	1		
+DIAGNOSTIC BIT 4	C0541A	C0236B	1		
+BUS BIT 4	C0541B	B0822B	2		
+BIT 4	C0542A	B0534B	1		
+BIT 5	C0542B	B0535A	1		
+BUS BIT 5	C0543A	B0821A	2		
+DIAGNOSTIC BIT 5	C0543B	C0236A	1		
-ADDRESS MARK ENABLE	C0619A	C0403B	2		
-SQUELCH	C0630A	C0907A	2		
-SQUELCH	C0630A	A0141B	1		
+READ DATA FROM DECK	C0641A	C0912B	1		
-READ DATA FROM DECK	C0642A	C0913B	1		
-24 VOLTS TO DECK	C0801B	C0914B	1		
-1F 9.67 MHZ CLOCK	C0804A	A0236B	2		
-LOCK TO DATA	C0804B	C0503A	1		
-DATA STROBE LATE	C0805A	A0619B	1		
-DATA STROBE EARLY	C0810A	A0617A	1		
-DATA OUT	C0829A	B0516B	1		
-PLO FAST START	C0830A	B0519A	1		
-RAW DATA	C0832B	B0525A	1		
+NRZ READ DATA	C0834B	B0837A	1		
+READ CLOCK	C0836B	B0837B	1		
-FAST START	C0838B	B0518B	1		
-READ DATA	C0842A	B0607A	1		
+READ DATA	C0842B	B0608A	1		
+MULTIPLE HEAD SELECT FAULT	C0905B	B0428B	1		
+WRITE ZONE 1	C0906A	B0533A	1		
+READ GATE TO DECK	C0906B	A0143B	1		
-SQUELCH	C0907A	C0630A	2		
+WRITE ZONE 0	C0908B	B0507B	1		
-MFM WRITE DATA	C0909A	A0220B	1		
+MFM WRITE DATA	C0909B	A0220A	1		
-WRITE CURRENT SENSE	C0910A	C0426B	1		
-FAULT	C0910B	C0436B	2		
-WRITE ENABLE	C0911A	C0431B	2		
+READ DATA FROM DECK	C0912B	C0641A	1		
-READ DATA FROM DECK	C0913B	C0642A	1		
-WRITE TRANSITIONS	C0914A	B0416B	1		
-24 VOLTS TO DECK	C0914B	C0801B	1		
-FIXED HEAD CHIP SELECT 8	C0922A	B0522B	1		
-FIXED HEAD CHIP SELECT 6	C0923B	B0524A	1		
-FIXED HEAD CHIP SELECT 10	C0924A	C0510B	1		
-FIXED HEAD CHIP SELECT 7	C0924B	C0511B	1		
-FIXED HEAD CHIP SELECT 14	C0925A	B0537A	1		
-FIXED HEAD CHIP SELECT 5	C0925B	C0513B	1		
-FIXED HEAD CHIP SELECT 9	C0926A	C0511A	1		
-FIXED HEAD CHIP SELECT 13	C0927A	B0536B	1		
-FIXED HEAD CHIP SELECT 12	C0927B	C0515A	1		

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TITLE DEVICE LOGIC WIREWRAP LISTING	WL	DOCUMENT NO.	SHEET NO. 23	REV.
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SIGNAL NAME OR NUMBER IDENTIFICATION	ORIGIN	DESTINATION	Z LEVEL	NOTES
-FIXED HEAD CHIP SELECT 16	C0928B	B0537B	1	
-FIXED HEAD CHIP SELECT 15	C0929A	C0507A	1	
-FIXED HEAD CHIP SELECT 11	C0929B	C0509A	1	
-Y SELECT 6	C0932A	C0512B	1	
-Y SELECT 7	C0932B	C0515B	1	
-Y SELECT 5	C0933A	C0516A	1	
-Y SELECT 4	C0934A	C0510A	1	
-MOVEABLE HEAD CHIP SELECT 4	C0934B	C0520B	1	
-Y SELECT 3	C0935A	C0518A	1	
-Y SELECT 2	C0936A	C0517B	1	
-Y SELECT 1	C0937A	C0517A	1	
-Y SELECT 0	C0939A	C0516B	1	
-MOVEABLE HEAD CHIP SELECT 1	C0939B	C0521A	1	
+FIXED HEAD SELECT	C0940A	C0513A	1	
-MOVEABLE HEAD CHIP SELECT 0	C0940B	C0521B	1	
-MOVEABLE HEAD CHIP SELECT 2	C0941A	C0522A	1	
+LOW GAIN SELECT	C0942B	B0520A	1	
-MOVEABLE HEAD CHIP SELECT 3	C0943A	C0520A	1	
+MOVEABLE HEAD SELECT	C0943B	C0519B	1	

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**END**