digital

FCO RA81X-I-013

Level of Urgency: I

Page ___ Of ___

FIELD CHANGE ORDER

Number: RA81X-I-013

APPLICABILITY: If your HDA is marked H1 or above, or has a serial number of CX 49250 or above, or KB 6539 or above, THAT HDA IS GOOD AND DOES NOT NEED REPLACEMENT.

RA81 HDAs which are revisions below H1 or which have serial numbers below CX 49250 or KB 6539 are subject to this FCO. There are only two exceptions to this rule. There are 3141 HDAs between serial numbers CX 49250 and 52390 which are free of the adhesive defect, but which were not marked "H1". They were marked "F1". These HDAs are NOT subject to the FCO. There are 1161 HDAs between serial numbers KB 6539 and 7700 which are free from the adhesive defect, but are marked "E1". These HDAs are NOT subject to the FCO either.

Please note that as HDAs are repaired and the adhesive defect removed, the rev of the HDA is bumped to the most current rev, at least H1 presently. The serial number NEVER CHANGES!! Therefore it is possible to have a serial number like CX 2000 which is rev H1, and therefore a GOOD HDA!!

Problem/Symptom: The adhesive used to attach the gaskets to the spindle air filter assembly breaks down at the upper end of the drive operating specification. This causes head to disk interference to occur.

Quick Check: HDA revision level "H1" or with a serial number above CX49250 or KB6539 will have the adhesive removed from the air filter assembly and therefore be a "GOOD" HDA

Compatibility/Prerequisite FCO:
RA81X-R-0009, RA81X-R-012 and RA81X-I-014

Est. Time to Install:
4.0 HOURS WORST CASE
2.5 HOURS BEST CASE

Special Tools or Test Equipment:
VELOSTAT KIT P/N 29-11762-00

FCO Parts Information

Order by FCO Kit#:	Quantity:	Part Number:	Description:
EQ-01373-01	1	70-18491-01	16 BIT RA81 HEAD DISK ASSEMBLY
EQ-01373-02	1	70-18491-02	18 BIT RA81 HEAD DISK ASSEMBLY
FA-04656-01	1		RA81X-I-013 FCO DOCUMENTATION
EQ-01275-01	1	10-13466-22	0.1 MFD 50V CAPACITOR
	1	13-05121-00	38.3 OHM RESISTOR,1/4 WATT, 1%
FA-04544-01	1		RA81X-R-009 FCO DOCUMENTATION
FA-04649-01	1		RA81X-R-012 FCO DOCUMENTATION
EQ-01380-01	1	12-25629-01	GROUNDING STRAP
	3	90-08151-00	WASHER, EXT TOOTH
	4	90-10075-01	SCREW, TAP HEXWW
	3	90-06565-00	NUT,HEX EXT TOOTH LCKWSHR 10-32
	3	90-07651-00	WASHER, LOCK
FA-04662-01	1		FCO DOCUMENTATION

EQ Kit Variation System/Option Applic: THERE ARE SEPERATE EQ KITS FOR LCG SYSTEMS' RA81s.
PLEASE NOTE - IF YOU ORDER EQ-01373-01/02, YOU WILL RECEIVE ALL THE OTHER EQ KITS LISTED ABOVE. IF YOU SHOULD NEED ADDITIONAL KITS, THEY WILL NEED TO BE ORDERED SEPERATELY.

Approvals

CSSE Engineer KEITH BROWN	F.S. Product Safety	F.S. Logistics
CSSE Manager RON MILANO	F.S. Microfiche Libraries	Affected Population:
ESD&P Micropub.		Initial Kitting:
Revision:		Hardcopy Publication:
FCO Release Date		Parts Availability:

HDA REPLACEMENT FCO

**** NOTE ****

HDA'S SHOULD BE HANDLED WITH CARE AT ALL TIMES. DAMAGE WILL OCCUR FROM IMPROPER HANDLING. RETURNED HDA'S WILL BE REFURBISHED AND REISSUED FOR FIELD REPAIRS.

SUBJECT TO C

NOTE

A period of time should be allowed for temperature stabilization to occur when transporting HDA's from colder to warmer environments, or vice versa. The possibility for condensation to form when the HDA has been cooled then heated quickly, is quite high. This causes head disk interference (HDI) to occur. The LED codes that can be expected are as follows.

SERVO	HEAD/MEDIA
25 4B 4D F8 F9	51 52 53 62 63 65 66

Arrangements should be made with the customer to insure that the HDA has time to stabilize. There is a reqirement for a period of thermal stalilization of HDAs before they are spun up in drives. During the winter months, when a large portion of this FCO activity will take place in the Northern Hemisphere, the difference in temperature between an HDA that has just come in from being transported in the cold, and a computer room environment can be quite large. If no time is allotted for this temperature difference to equalize, humidity in the air inside the HDA can actually condense into water inside the HDA and the probability of a head crash is high. The time required for stabilization varies directly with the difference in temperatures.

In storage or shipping, (with the HDA packaged for shipping) the HDA should not be subjected to temperatures outside the range specified by DEC Standard 102, -40C (-40F) to 66C (151F). The maximum temperature gradient must not exceed 22 deg C per hour, or 40 def F per hour. If the ambient temperature in which the HDA was stored was between 10C and 38C (50F and 100F), the HDA may be installed immediately. If the ambient temperature was between 0 deg C and 10C, (30F and 49F) the HDA should be allowed to warm to room temperature 22C, (appox. 70F) in the closed shipping container for three hours minimum and then installed. For temperatures below 0 deg C, (30F), allow 1 1/2 hours more for every 12 C (10 deg F) in addition to the three hour minimum.

A very cold HDA that was stored in a van overnight at -23 C, (-10 deg F) for example, could take as much as 9 hours to thermally stabilize to the point where actual operation would not be risky. A maximum period of 13.5 hours could be required to allow thermal stabilization to take place from the lowest acceptable temperature to a standard computer room temperature.

With this in mind, it may be appropriate to have HDAs delivered to the site which is to be FCO'd the day or evening before the acutal FCO installation is to take place.

HDA HANDLING INFORMATION

A LARGE NUMBER OF THE HDA'S THAT ARE RETURNED FROM THE FIELD HAVE PROBLEMS THAT CAN BE AVOIDED IF THE FOLLOWING RULES ARE OBSERVED.

1) WHEN INSTALLING/DE-INSTALLING HDA'S THE HEADS/POSITIONER SHOULD ALWAYS BE IN THE "LOCKED" POSITION.
2) THE HEAD/POSITIONER SHOULD ALWAYS BE LOCKED PRIOR TO THE DRIVE BEING MOVED.
3) THE HDA SPINDLE/PULLEY SHAFT SHOULD NEVER BE SPUN BY HAND IN EITHER DIRECTION.
4) THE RUBBER SPINDLE/PULLEY SHAFT LOCK SHOULD BE INSTALLED WHEN RETURNING HDA'S FOR REPAIR. THIS LOCK IS BEING SHIPPED WITH ALL FIELD REPLACEMENT HDA'S.
5) WHEN REMOVING HDA'S FROM THE DRIVE, THE HDA SHOULD ALWAYS BE PLACED UPRIGHT ON THE PLASTIC BULKHEAD FEET END. IT SHOULD NEVER BE PLACED ON THE SPINDLE/PULLEY SHAFT.
6) WHEN CLOSING THE LOGIC CHASSIS ASSEMBLY THE HDA/DRIVE SHOULD BE SPUN DOWN PRIOR TO CLOSING. WHEN THIS CHASSIS DOES NOT CLOSE PROPERLY, THE LATCH SHOULD BE ADJUSTED. THE CHASSIS SHOULD NOT NEED TO BE SLAMMED SHUT.
7) WHEN INSTALLING THE DRIVE, ALL HDA SHIPPING BRACKETS SHOULD BE REMOVED, AND HDA HOLD DOWN NUTS SHOULD BE REPLACED. THESE NUTS SHOULD BE VERY FIRMLY TIGHTENED BUT ONLY FINGER TIGHT. DO NOT OVER TIGHTEN THE NUTS, THIS WILL CAUSE THE SHOCK MOUNTS TO BECOME INEFFECTIVE.
8) ESD PROTECTION SHOULD ALWAYS BE OBSERVED WHEN HANDLING HDA'S.
9) ALWAYS USE THE RUN/STOP SWITCH TO SPIN THE DRIVE DOWN. !!NEVER!! USE THE DRIVE CIRCUIT BREAKER TO STOP THE DRIVE.
10) ALWAYS USE THE HDA SHIPPING CONTAINER FOR TRANSPORTATION OF HDA'S TO AND FROM THE SITE. IT IS DESIGNED TO PROTECT THE HDA FROM BEING DAMAGED DUE TO MISHANDLING. HDA'S SHOULD REMAIN IN THE BOX UNTIL REMOVED FOR THEIR ACTUAL INSTALLATION INTO THE DRIVE. !!NEVER!! TRANSPORT AN HDA ON ANY KIND OF WHEELED CART WITHOUT THE HDA BEING IN ITS BOX !!!

*** NOTE ***

THE PREREQUISITE TO THIS FCO IS THE INSTALLATION OF FCO'S RA81X-R-009, RA81X-R-0012 AND RA81X-I-014 (SEE FCO QUICK CHECK'S BELOW). IF INSTALLATION OF THESE FCO'S ARE NECESSARY BUT ARE NOT ALREADY INSTALLED, IT IS RECOMMENDED THAT THEY BE INSTALLED BEFORE INSTALLING A NEW HDA.

QUICK CHECK FOR RA81X-I-009

(SEE ATTACHED RA81X-R-009 FOR COMPLETE FCO OVERVIEW AND INSTRUCTIONS).

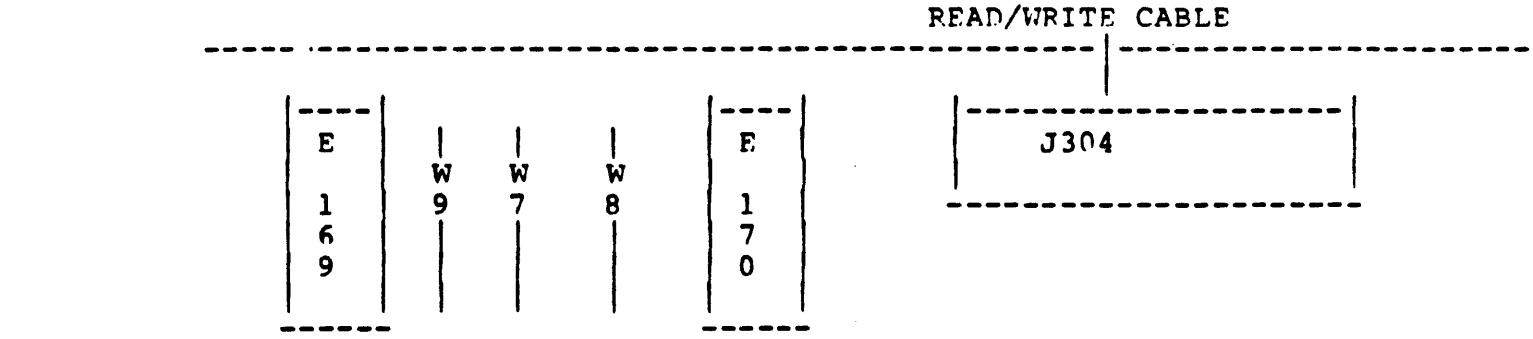
PRESENCE OF 0.1 UFD CAPACITOR AT LOCATION C29 AND 38.3 OHM PRECISION RESISTOR (ORANGE-GRAY-ORANGE) AT LOACATION R64. RA81X-S-004, R/W MODULE (54-15253) MUST BE AT CS REVISION LEVEL "D" BEFORE INSTALLATION OF THIS FCO. PROBLEM - HIGH RATE OF ERROR CODES 62 AND/OR 63. INTERMITTENT, UNEXPLAINED BURSTS OF ECC ERRORS.

QUICK CHECK FOR RA81X-R-012

(SEE ATTACHED RA81X-R-012 FOR COMPLETE FCO OVERVIEW AND INSTRUCTIONS)

MICROPROCESSOR DATA SEPARATOR WINDOW ADJUSTMENT

THE JUMPERS ARE LOCATED BETWEEN E169 AND E170 NEXT TO J304 READ/WRITE CABLE CONNECTOR.



!!!THE FOLLOWING SETTINGS ARE THE ONLY ADJUSTMENTS THAT CAN BE MADE.!!!! IF ANY OTHER ADJUSTMENTS ARE PERFORMED THE DATA SEPARATOR WINDOW WILL BE OUT OF TOLERANCE.!!!

OLD SETTING	CHANGE		RESULT
W9,W8,W7 OUT	ADD W9		W9 IN
W9 IN W7,W8 OUT	ADD W8		W8 W9 IN
W8 IN W7,W9	ADD W7 AND W9	REMOVE W8	W7 W9 IN
W9 AND W8 IN W7 OUT	ADD W7	REMOVE W8	W7 W9 IN

****

* MICROPROCESSOR MODULES WITH AN ETCH "B", C.S. "K1" OR ETCH "C1",C.S. "M1" REVISIONS SHOULD NOT BE ADJUSTED. RA81'S AT HARDWARE REVISION 6 WILL HAVE THE "M1" OR THE "H2" MICROPROCESSOR.

****

QUICK CHECK FOR RA81X-I-014

(SEE FCO RA81X-I-014 FOR COMPLETE FCO OVERVIEW AND INSTRUCTIONS).

HDA CHASSIS AND DRIVE CHASSIS ARE AT DIFFERENT GROUND REFERENCE. DATA ERRORS (ECC) AND OTHER MISC. ERRORS NOT RELATED TO MEDIA DEFECTS.

HDA REMOVAL PROCEDURE

1. Request the RA81 drive from the customer.

```
**********************************************************
* A COMPLETE BACKUP MUST BE PERFORMED BEFORE STARTING    *
* THIS PROCESS. A LOG AND VERIFY OPERATION SHOULD BE     *
* USED DURING THE BACKUP/RESTORE PROCESS.                *
**********************************************************
```

RA81 VAXCLUSTER BACKUP NOTES

Before replacing an RA81 HDA, proper media backup MUST be done, preferably by the site system manager. CX-CSSE recommends using the VMS Backup utility for maximum data integrity.

Although the VMS Backup utility and procedures (to tape) are considerably slower than the HSC50 BACKUP and RESTORE utilities, potentially fewer tapes are used in VMS Backups, and write verifications are done if the /VERIFY qualifier is used with the VMS BACKUP command.

When invoking the VMS BACKUP utility, be sure that your customer uses the /REWIND and /VERIFY qualifiers to assure data integrity. BACKUP generated tape volume headers may become corrupted and render the remainder of the data on that tape volume inaccessible if those 2 qualifiers are not used. This is due to a VMS V4.0, VMS V4.1 and VMS V4.2 tape class driver bug.

The recommended command string for VMS Backup is;

```
$Backup/Image/Verify/Rewind 'source_disk:' 'target_device:'
```

The Backup utility should be run from a hardcopy terminal, and all output messages from this backup should be preserved and reviewed by the field engineer installi g the RA81 HDA FCO and the site system manager. Any abnormal BACKUP messages ie. %BACKUP-E-BADDATA OR -FORCEDERROR should be flagged and any questions regarding the messages and recovery actions should be routed by the field service engineer to the respective support groups OR TSC.

For optimum speed, an HSC50 Backup will utilize 4 2400 foot reels of tape to completely backup an entire RA81 drive. The HSC50 BACKUP utility does a physical backup of a RA series disk and has no knowledge of any type of operating system file structures on a disk. The HSC50 Backup utility uses the tape functionality of read after write, but does not do complete rewind and read verification.

ULTRIX BACKUP NOTES

The best possible way to back up the file systems on RA81's is to do a zero level dump of each file system on the RA81.

THIS SHOULD BE DONE AT THE SINGLE USER LEVEL.

There is no verify pass under the dump program. Due to tape errors it maybe wise to dump each file system tape twice...But that should be up to the customer. After the HDA is replaced the customer will have to make new file systems on the RA81. Details of the "backup" process are available in the software notebooks.

Additional information, or specific instructions, can be provided by the ULTRIX Customer Support personnel at the Customer Support Center.

RSTS/E BACKUP NOTES

For the customer that has multiple RA81's, using the SAVRES program to do an IMAGE copy from one RA81 to another would be the fastest and most effective method. If only using a Mag Tape drive in the backup, SAVRES can be used also. Doing an image SAVE to "tape" can be accomplished, however, in all cases the /VERIFY switch should be used and possibly a second SAVSET for safety sake.

RSTS development feels that SAVRES is easiest, especially for V7.2 and V8.0. They also suggest that 2 backups are better than one.

When possible a BACKUP of the customer data should ALSO be done. V7.2 and V8.0 use the 'old' RSTS backup. V9.0's new backup is easier and more reliable than the 'old'. This backup can be used to selectively restore customer files should the need arise. Save sets cannot be restored selectively.

Since the "new" version 9.X backup is not widely known, the customer should reference the software documentation, if not familiar with it.

SAVRES also has the ability to "halt" on the occurrence of an error during the "copy" of the data. If you wish to have SAVRES halt on the occurrence of an error, the /NOERROR switch can also be used. This way any error can be examined on its occurrence and the "backup" terminate. The error may have to be "repaired" before restarting the SAVRES "backup".

It would also be recommended that customers, "clean-out" any files that are no longer needed, before starting the SAVRES. This way any files that will no longer be needed, can be deleted and not add to the time that SAVRES runs.

Details of the SAVRES, and BACKUP, commands are in the RSTS/E System Managers Guide. Any additional information needed or help in the process can be directed to the customers local DEC Software Support Specialist, or if necessary the Customer Support Center RSTS/E Customer Support Personnel.

RSX11M (+) BACKUP NOTES

DISK TO TAPE

We recommend using online BRU (M-PLUS V2.1 Update E or later/11M V4.1 update E or later) if that is possible. If it is not possible, because the disk to be backed up is the system disk, (i.e. the disk that the system was booted from), standalone BRU (BRUSYS or BRU64K) from the M-PLUS V3.0/11M V4.2 distribution should be used.

UNDER NO CIRCUMSTANCES SHOULD BRU /IMAGE (FROM ANY DISTRIBUTION) BE USED!!!!

The recommended procedure for backing up and restoring an entire disk to tape is:

1) For online BRU

```
>MOU mmn:/FOR          ; mount the tape foreign
>MOU ddn:/FOR          ; mount the disk foreign (to insure exclusive
                       ;   access)
>BRU /VER ddn: mmn:    ; backup with verify (each tape will be
                       ; verified immediately after it is written)
```

After the HDA is replaced:

```
>BAD ddn:              ; run BAD on the NEW disk
>BRU /VER/INI mmn: ddn:  ; restore with verify (the entire disk
                         ; will be restored before the verify
                         ; pass)
```

CONTINUED RSX11M (+) BACKUP NOTES

2) For standalone BRU, boot up BRU64K (on 11M) or BRUSYS (on M-PLUS) then you will be prompted for the devices you are going to use (see p7-23 of the Utilities Manual). You can enter /DEV at this point to see if the vectors and CSR's are correct for the devices you wish to use (they are correct if the device shows online, they are incorrect if the device says offline). You can enter the correct vector and CSR at this point - the example below shows this.

```
Enter first device: DU0:/CSR=172150/VEC=154
Enter second device: mmn:
>RUN BRU
BRU>/VER ddn: mmn:    ; backup with verify (each tape will be
                      ; verified immediately after it is written)
```

After the disk is replaced, you will have to reboot BRU as before, and answer the device questions as before. Then

```
>RUN BAD              ; run BAD on the new disk
BAD>ddn:
    >RUN BRU
BRU>/VER mmn: ddn:    ; restore with verify (the entire disk will
                      ; be restored before the verify pass)
```

Note: Backing up a "full" RA81 to tape at 1600 BPI may require between 13 and 15 2400 ft. tapes. For the purpose of HDA replacement, the tapes used should be the best quality you can find (AT LEAST certified to 6250 BPI)

NOTE

11M V4.2 and M+ V3.0 have not yet gone to the SDC. So for those systems where they must use standalone BRU, A copy of standalone BRU will need to be obtained.
(if it hasn't shipped by then, or if the customer is not under contract).

If the customer isn't running a recent version of RSX, It will be difficult to advise what to do.

DISK TO DISK COPIES

- if the customer has a tape drive - use the tape method
- if they have another RA81, they can use the same method we recommend for tape - just substitute the second disk name for the tape unit
- if they have other disks that are big enough to hold the data from the RA81 assuming it's not full, they can use BRU to copy the data to that other disk -
- the biggest problem with disk to disk copies, is that the /IMAGE mode of BRU which is used to copy a big disk to multiple little disks in BRU format doesn't always work - and you don't know it didn't until you try to restore - a problem we definitely want to avoid.

DSM-11 (MUMPS) BACKUP NOTES

The DSM-11 BACKUP utility is the best way to go. DSM-11's BACKUP utility DOES NOT have a verify option!

It might be wise to do the BACKUP and then do a RESTORE to make sure the BACKUP worked. In this case the BACKUP would have to be done to some other media or a "scratch" RA81, in order to preserve the "master" copy being backed-up, until it can be "verified" that the backup copy is good.

DSM-11 just finished field test, so a new release, V3.1 may well be in the field by the time you start doing any of this. I will mention that 3.0A BACKUP had problems and BACKUP has been rewritten for the new release.

Specific instructions for the use of the BACKUP utility is in the software manuals. Any additional information on the use of this utility can be directed to the appropriate DSM-11 Customer Support Personnel.

IAS BACKUP NOTES

Since IAS is a "type" of RSX, many of the RSX concepts need to be understood. IAS has a backup utility like the RSX "BRU" that can be used.

IAS engineering has suggested that the best way to go is to use BRU with verify enabled. Then re-run BRU with the compare qualifier.

TOPS-20

The best way to proceed is as follows:

1) Run the DLUSER utility to preserve ALL the directory information on a structure. The file containing this information should probably be put in a secure environment such as <OPERATOR> rather than <F-S>. Also, the DLUSER data should be kept in machine readable form and (as silly as it sounds) make sure the DLUSER data does NOT go on the HDA or structure about to be replaced.
2) use DUMPER to do a FULL save of the entire structure. One should probably do this on a 6250 BPI Tape drive (@6250 BPI) at some relatively high blocking factor such as 8 or 10. TU72s or TU78s are probably the best way to do this.
3) REWIND the DUMPER tape.
4) Run the CHECK DUMPER function to verify the data that you've backed up.

Obviously, there should be no users of the structure at the time of the full save. Also, it might be a good idea to run the tape drive reliability diagnostic to be on the safe side.

Once the FCO is complete:

1) run CHECKD to rebuild the structure.
2) use DLUSER to replace all the directories on the structure
3) then do a full restore on the structure using the DUMPER tapes you earlier produced/verified.

The DLUSER steps are probably critical because DUMPER does not preserve all directory attributes in some versions in the field.

This is all covered in one of the following three places - the OPERATOR's guide (vol 10 of the SW notebooks), the System Manager's Guide (vol 9) and the KL Model B Installation guide (also vol 9).

You should also be aware that a structure under TOPS-20 can span up to 4 RA81 spindles. This means that once one spindle/pack is replaced, the ENTIRE structure must be rebuilt. Said another way, to replace one HDA, the entire volume-set must be backed up and reconstructed.

Tight cooperation between the engineer replacing the HDA and the systems programmer/manager is encouraged.

- CONTINUATION OF FCO PROCESS -

2. The RA81 drive must be dismounted and deselected.

3. Depress the "A and B" port switches on the Operator Control Panel to the "OUT" position. See Figure 1.

4. Spin the drive down by pressing the RUN/STOP switch. (Figure 1)

5. Open the back door of the cabinet.

```
**********************************************************
*                    C A U T I O N                       *
*                                                        *
* Before procedding, turn off the AC Circuit Breaker     *
* at the rear of the Drive and disconnect the main       *
* AC power cord from the power supply on the rear of     *
* the Drive. (Figure 2)                                  *
**********************************************************
```

6. If this is a fixed mount drive, proceed to step 11.

7. Pull out the cabinet stabilizer bar. (Figure 3)

```
**********************************************************
*                    C A U T I O N                       *
*                                                        *
*   Never slide a drive out of the cabinet without       *
*   extending the cabinet stabilizer bar.                *
*                                                        *
**********************************************************
```

8. Remove the screw holding the back of the disk drive to the electrostatic discharge bracket. (Figure 4)

9. Slowly pull the Drive out, until the slides lock into place.

10. Push up on the slide lock arm "A" to extend the Drive all the way out. (Fgiure 5)

11. Depress the logic chassis release latch with a standard screwdriver and raise the chassis. (Figure 6)

12. Attach E.S.D. wrist strap to chassis ground stud. (Figure 7)

13. Disconnect cables P501 and P502 from the Read/Write module. (Figure 8)

14. Disconnect cables P601, P602 and P603 from the HDA bulkhead cover. (Figure 8)

15. Remove the Read/Write module from the HDA by removing the four (4) hold down screws.

16. Place the positioner/head locking arm in the locked position. (Figure 8)

17. Remove the four (4) HDA retaining nuts from the shock mounts. (Figure 8)

18. Place the belt tension lever in the released position. (Figure 8)

19. Gently lift the HDA assembly out of the lower chassis and place it on a flat work surface. HDA's should always be placed on the work surface with the plastic bulkhead feet facing down. (Figure 9)

HDA INSTALLATION PROCEDURE

1. Remove the new HDA from the shipping container and place it gently on a flat work surface. HDA's should always be placed on the work surface with the plastic bulkhead feet facing down. (Figure 9)

2. Remove the plastic spindle/pulley lock from the spindle shaft of the new HDA. (Figure 10)

3. Attach the spindle/pulley lock to the old HDA spindle shaft. (Figure 10)

4. Install the new HDA into the lower chassis.

5. Reattach the four (4) HDA hold down nuts to the shock mounts. The nuts should be quite firm and snug, but only be FINGER TIGHTENED. (Figure 8)

****
* NOTE *
* *
* THE INSTALLATION OF FCO RA81X-I-014 SHOULD BE PERFORMED AT *
* THIS TIME. ALSO VERIFY THAT FCO RA81X-R-009 HAS BEEN *
* INSTALLED. IF IT IS NOT INSTALLED, DO SO AT THIS TIME. *
****

6. Once FCO RA81X-R-009 and RA81X-I-014 have been completed, then reattach the Read/Write module using the four (4) hold down screws

7. Reconnect cables P501, and P502 to the Read/Write module. (Figure 8)

8. Reconnect cables P601, P602 and P603 to the bulkhead cover. (Figure 8)

9. Place the belt tension lever in the engaged position. (Figure 8)

10. Place the positioner lock arm in the unlocked position and remove the E.S.D. wrist strap from the ground stud. (Figure 8)

11. Close, but DO NOT SLAM the logic chassis.

NOTE
AT THIS TIME, VERIFY THAT THE INSTALLATION OF FCO RA81X-R-012 HAS BEEN PERFORMED. IF NOT INSTALLED, PERFORM THIS FCO AT THIS TIME.

12. If this is a fixed mount drive, proceed to step 15.

13. Push in on slide arm "B" and slowly slide the Drive back into the cabinet. (Figure 5)

14. Reinstall the screw holding the back of the Drive to the electrostatic discharge bracket. (Figure 4)

```
**********************************************************
*                      C A U T I O N                     *
*                                                        *
*  The screw holding the back of the Drive to the        *
*  electrostatic discharge bracket must be installed.    *
*                                                        *
**********************************************************
```

15. Reconnect the AC power cord, at the rear of drive, to the AC receptacle. (Figure 2)

16. Turn the AC Circuit Breaker, at the rear of the drive, to the "ON" position. (Figure 2)

17. Spin up the Drive by pressing the RUN/STOP switch. (Figure 1)

18. After the Drive has spun up and a ready light is "ON", press the "A" and/or "B" port switches on the Operator Control Panel to the "IN" position. (Figure 1)

19. Run the appropriate RA81 drive diagnostics for at least 30 minutes.

VAX	32 BIT	UDA50, EVRLA or EVRLG HSC50/ILEXER
PDP-11	16 BIT	UDA50, CZUDC or CZUDI
DEC 10/20	36 BIT	HSC50/ILEXER

20. Return the RA81 drive to the customer for software restore/initialization.

21. Enter all FCO activity in the Site Management Guide.

22. Complete the LARS form as shown in APPENDIX A.

23. Lock the Head/Positioner and re-install the spindle locking strap onto the old HDA (Figure 10). Fill out the attached form (Appendix B) and carefully place the old HDA, along with this form, in the shipping container and return it to your Logistics Department.

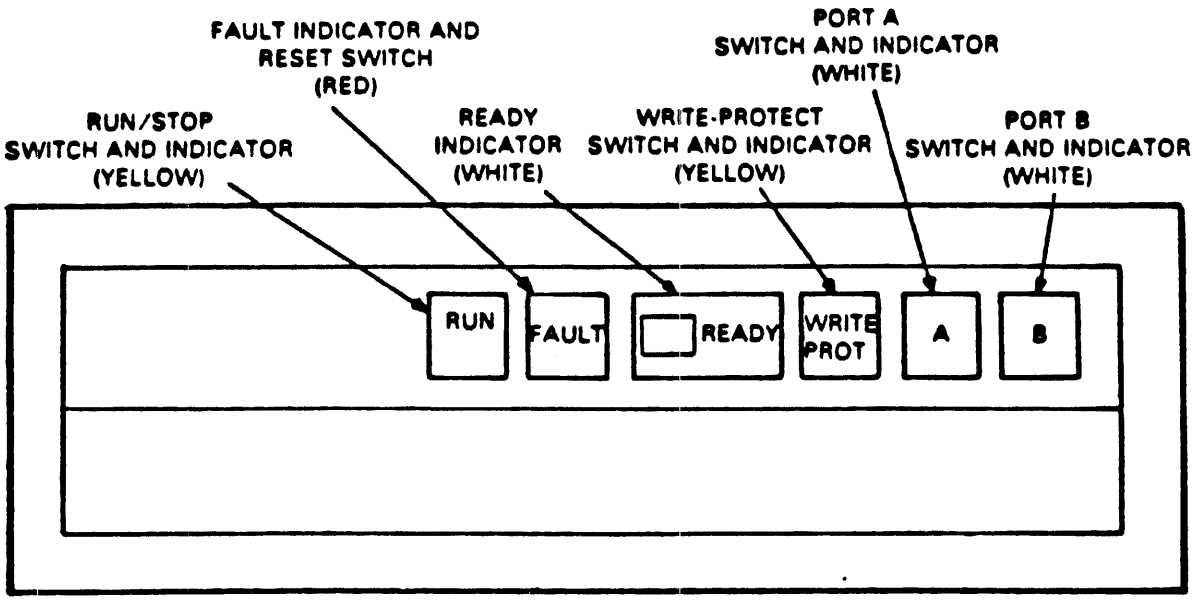


Figure 1 Front-Panel Controls and Indicators

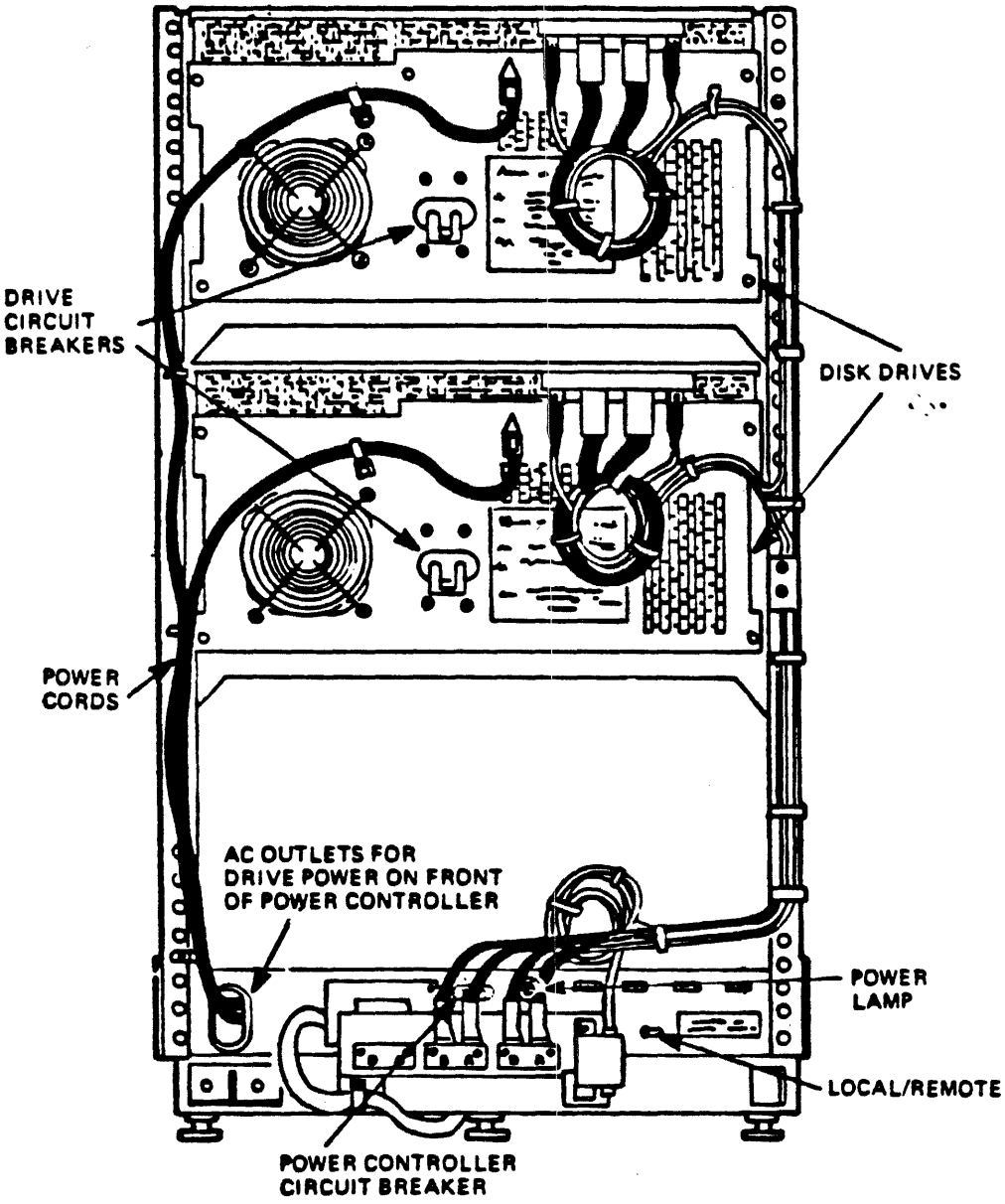


Figure 2 BACK OF AN RA81 DRIVE

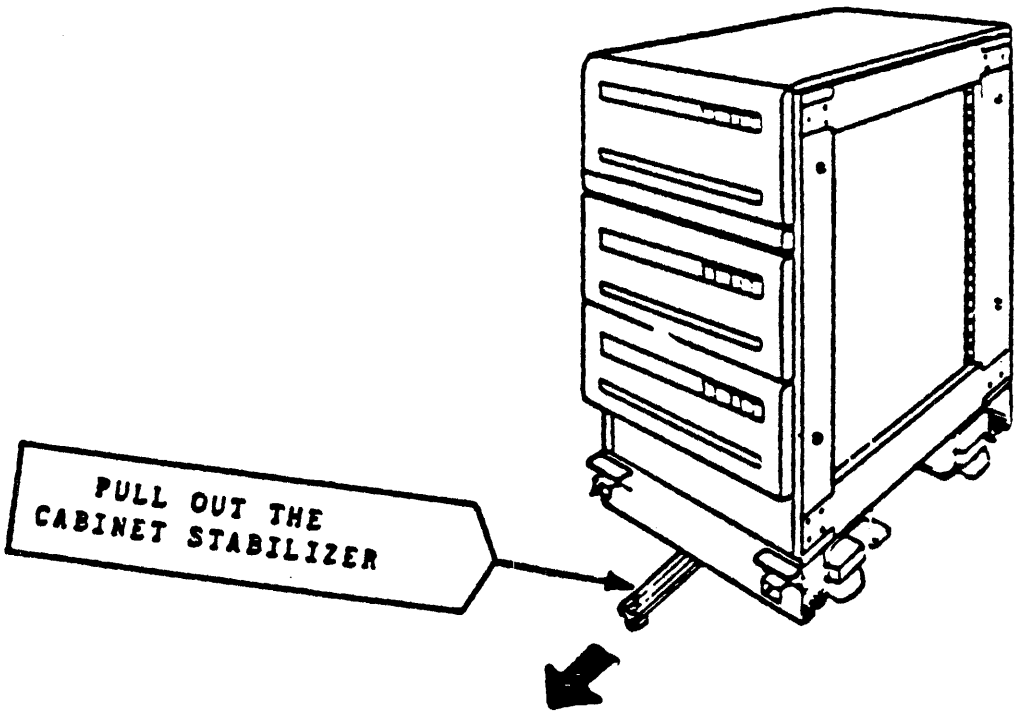


FIGURE 3

STABILIZER BAR

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

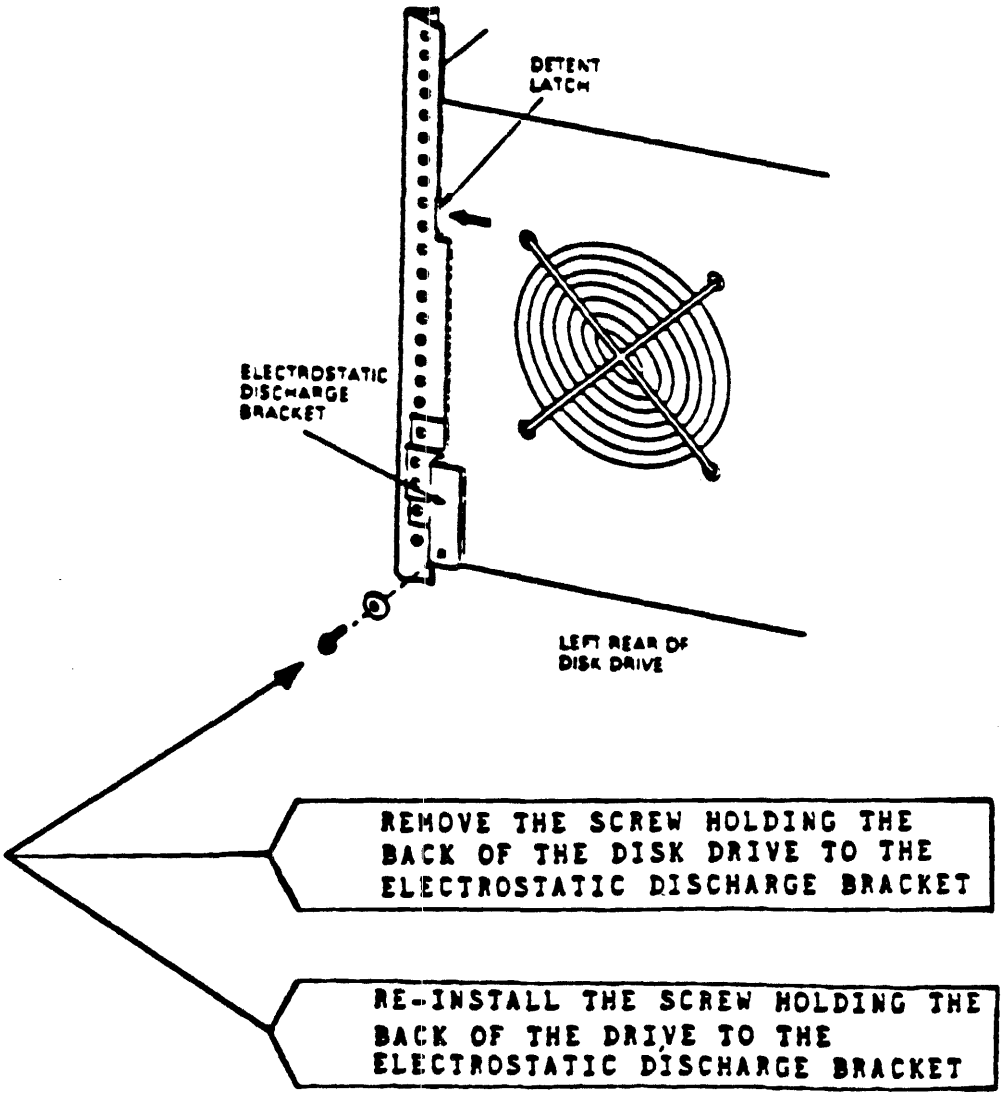


FIGURE 4
ELECTRO DISCHARGE BRACKET

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

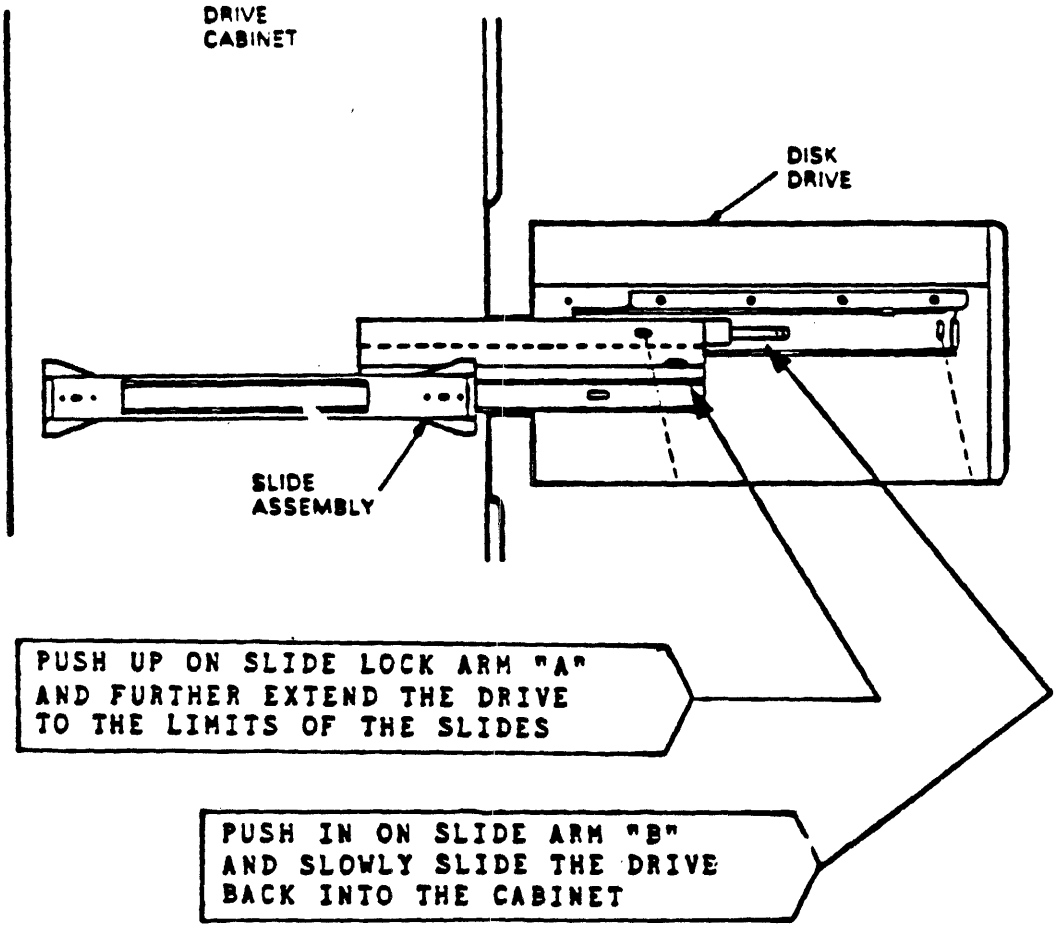


FIGURE 5

DRIVE SLIDE ARMS

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

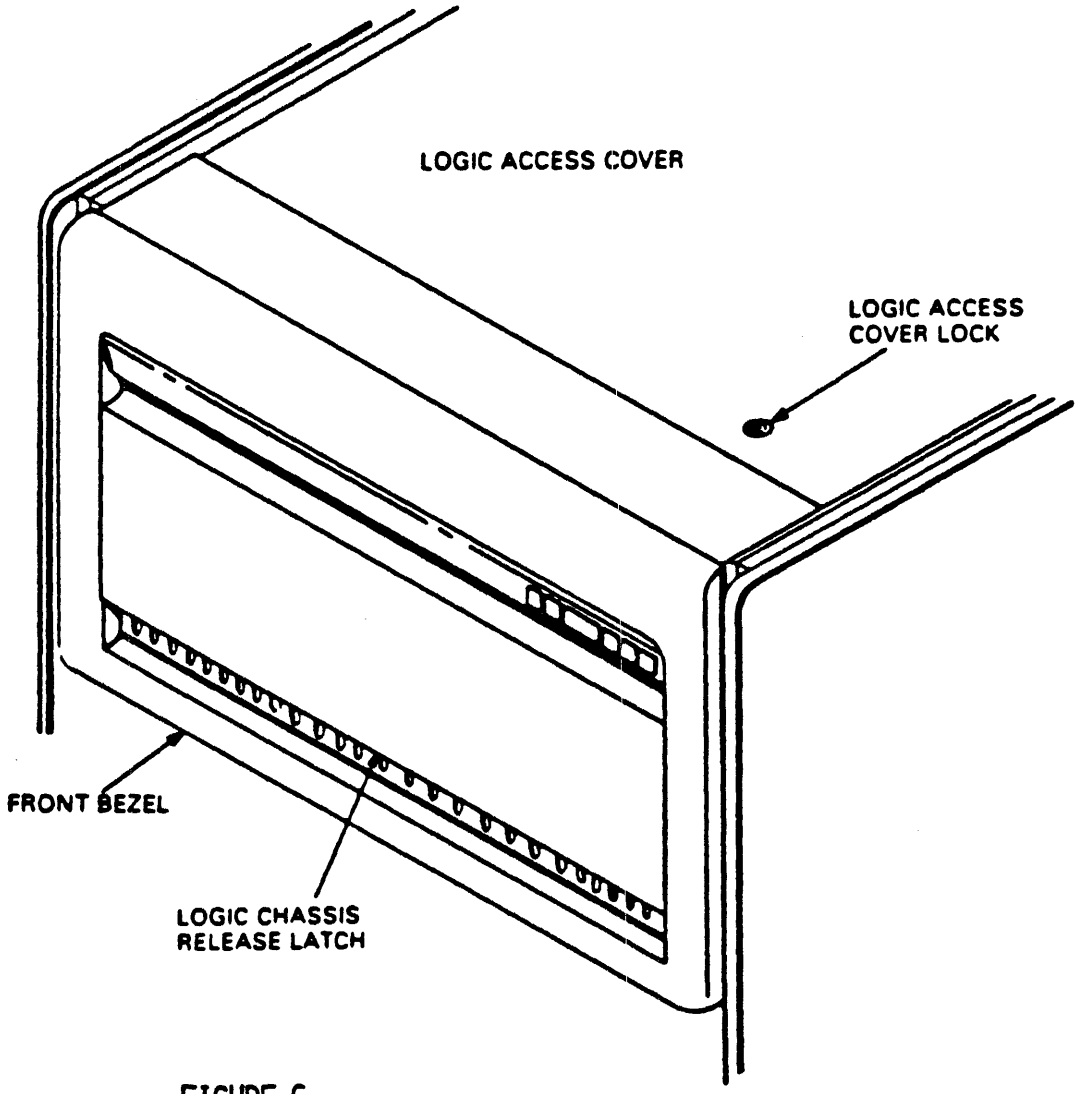


FIGURE 6

LOGIC CHASSIS RELEASE LATCH

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

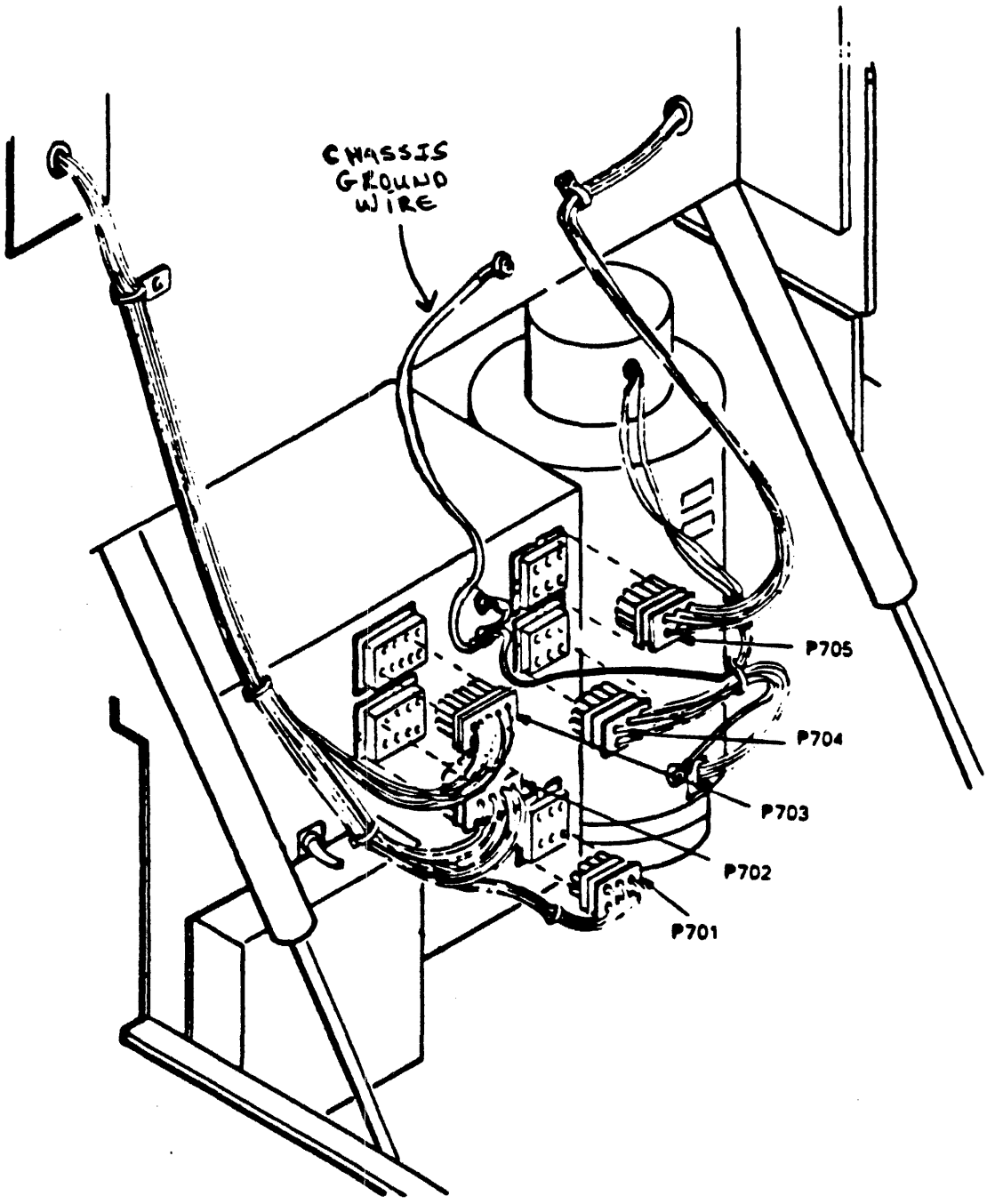


FIGURE 7
GROUND WIRE

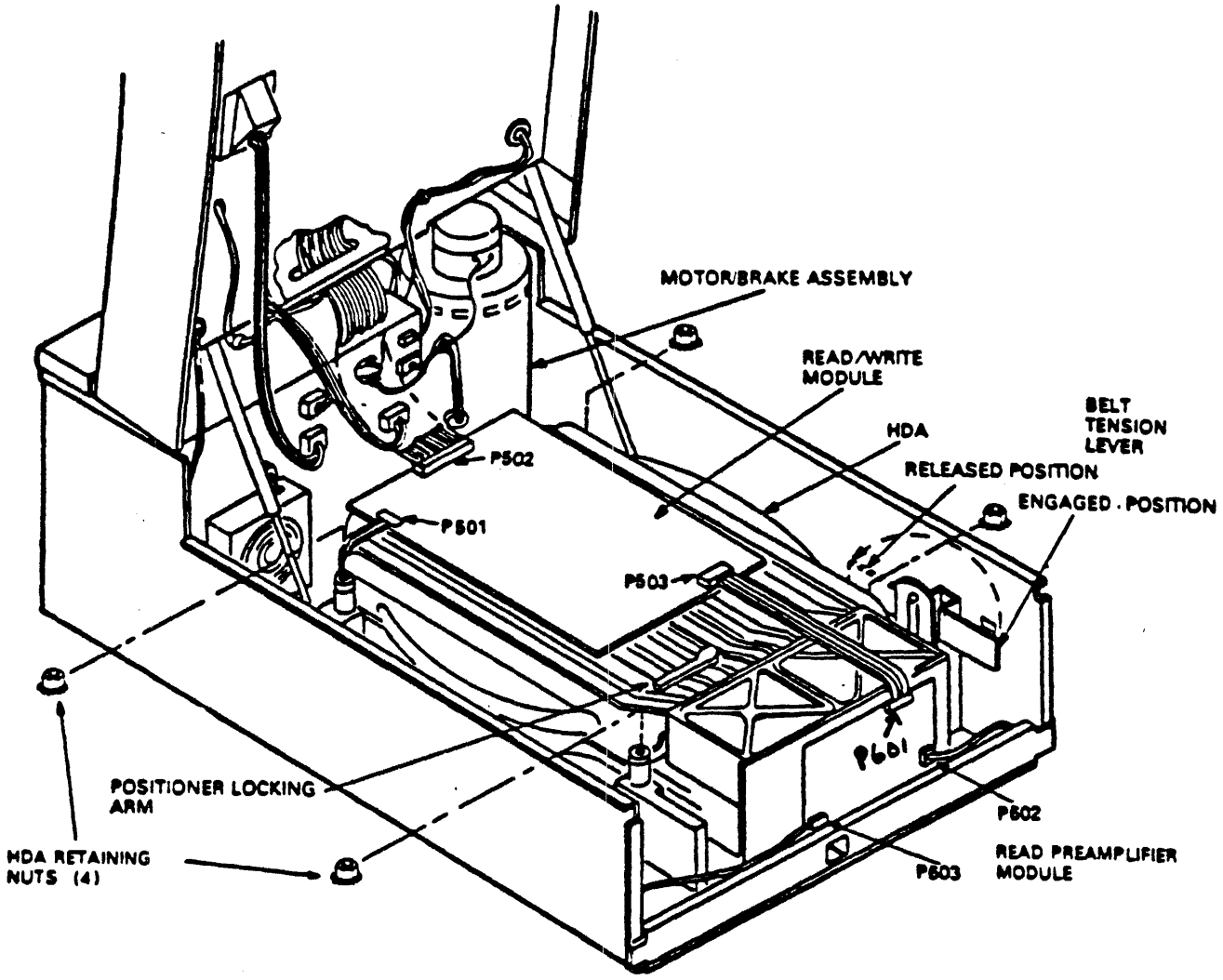


FIGURE 8

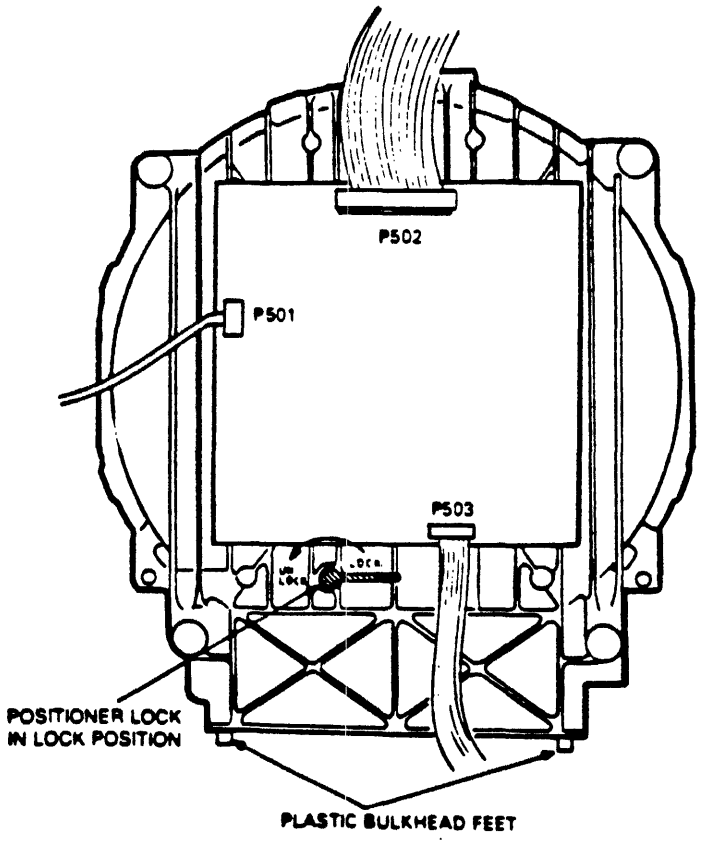


FIGURE 9

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

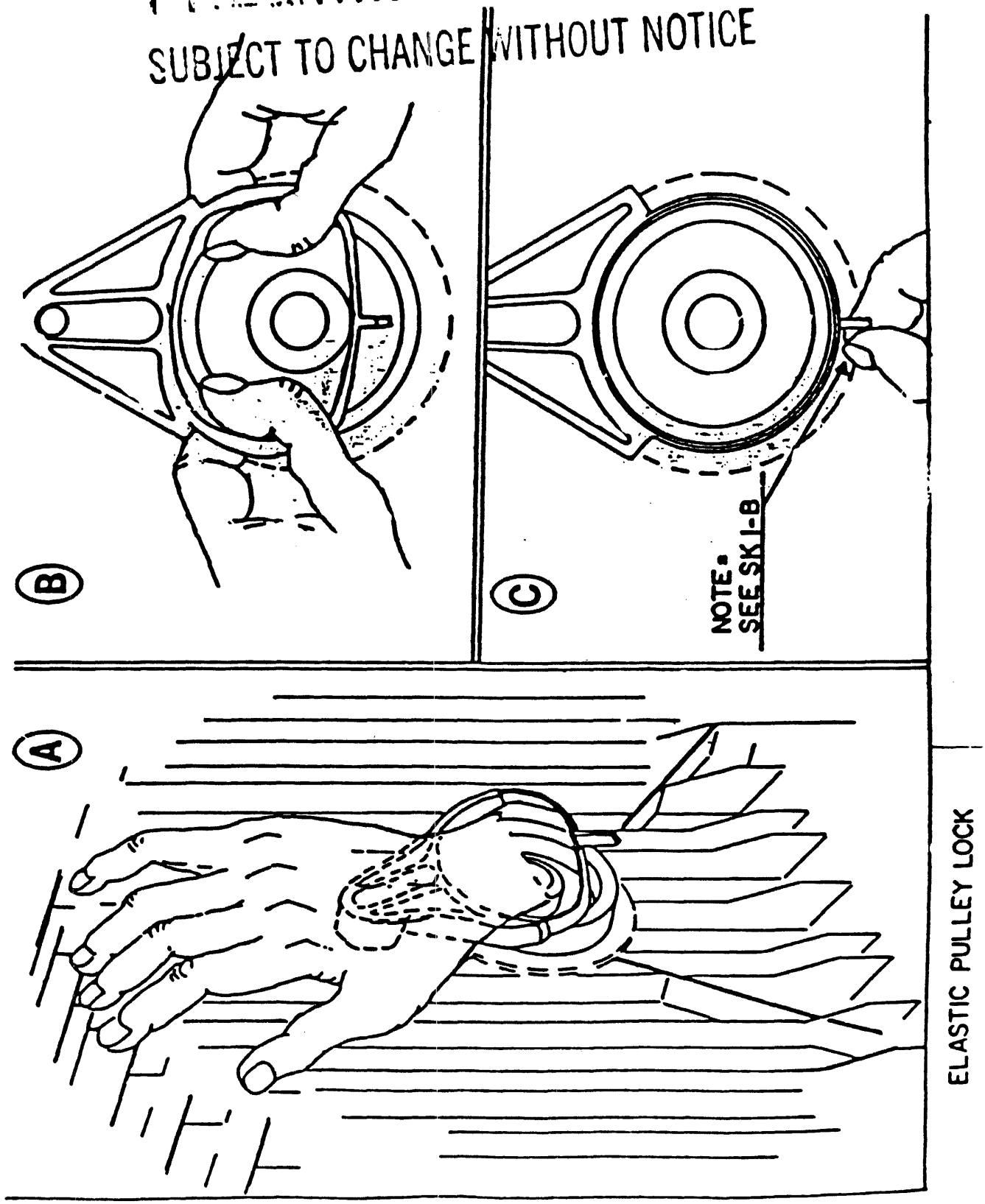


FIGURE 10

digital

LARS REPORT

CUSTOMER NAME FOR EUROPE

EQUIPMENT LOCATION (CITY AND STATE)

REPORT NO. 7978274

PAGE ____ OF ____

EMPLOYEE BADGE NO. | EMPLOYEE C.O. | UNIT | EMPLOYEE LAST NAME | ☐ ARE YOU ASSIGNED PERSON? (Y OR N) | ☐ IS CALL COMPLETE? (Y OR N) | LOG NUMBER

MACHINE S.O. | EXT. | PROD. LINE | SYSTEM/PROCESSOR TYPE | SYSTEM SERIAL NUMBER | DEC NUMBER

TRAVEL HOURS | REQUEST TIME | REQUEST DATE DAY MONTH YEAR | START TIME | START DATE DAY MONTH YEAR | STOP TIME | STOP DATE DAY MONTH YEAR

LINE ITEM	ACTIVITY	REPAIR TIME	DEC OPTION VARIANT	DEC OPTION SER. NO.	TYPE OF CALL		FAIL AREA - MODULE - FCO - COMMENTS	AUTHORIZED TESTS	UNIT COST
A	Y		RA81 -	KB-----0	M	D	RA81-I-013		
B									
C									
D									
E									

TOTAL HOURS

MATERIAL USED

QTY.	CLASS	DEC PART NUMBER BASIC	VARIANT	T/S	PART DESCRIPTION VENDOR PART NO.	AMOUNT
		-	-			$
		-	-			$
		-	-			$
		-	-			$
		-	-			$
		-	-			$

LOGISTICS APPROVAL | TOTAL MATERIAL COST $

PRELIMINARY SUBJECT TO CHANGE WITHOUT NOTICE

LABOR ____ HOURS @ $ ____ PER HOUR	$
LABOR ____ HOURS @ $ ____ PER HOUR	$
TOTAL LABOR COSTS	$
TOTAL MATERIAL COST	$
TRAVEL COST	$
	$
	$
	$
SUB TOTAL (ALL SHADED AREAS)	$
TO BE FILLED IN BY BILLING ONLY	
LABOR TAX ____ %	$
MATERIAL TAX ____ %	$
TOTAL	$

SALES CODE (Circle One)

RENTAL	DEPOT	INSTALL	PER CALL	OTHER
A	DE	G	U	

CUSTOMER CODE | STATE | TAX EXEMPT YES NO

IF YES, EXEMPTION CERTIFICATE MUST BE ON FILE WITH DIGITAL OR SHOULD ACCOMPANY THIS REPORT

TAX EXEMPT NO.

CUSTOMER (BILL TO ADDRESS)

STREET ATTENTION

CITY STATE ZIP

AUTHORIZED CUSTOMER SIGNATURE | PRINT SIGNATURE NAME | CUSTOMER P.O. NO. | BRANCH APPROVAL

EN-10833-12-REV B(7-82)

APPENDIX A

digital

LARS REPORT

CUSTOMER NAME FOR USA/GIA

EQUIPMENT LOCATION (CITY AND STATE)

REPORT NO. 7978274

PAGE ____ OF ____

EMPLOYEE BADGE NO. | EMPLOYEE C.O. | UNIT | EMPLOYEE LAST NAME | ☐ ARE YOU ASSIGNED PERSON? (Y OR N) | ☐ IS CALL COMPLETE? (Y OR N) | LOG NUMBER

MACHINE S/C | EXT. | PROD. LINE | SYSTEM/PROCESSOR TYPE | SYSTEM SERIAL NUMBER | DEC NUMBER

TRAVEL HOURS | REQUEST TIME | REQUEST DATE DAY MONTH YEAR | START TIME | START DATE DAY MONTH YEAR | STOP TIME | STOP DATE DAY MONTH YEAR

LINE ITEM	ACTIVITY	REPAIR TIME	DEC OPTION VARIANT	DEC OPTION SER. NO.	TYPE OF CALL	Subcat Action	FAIL AREA - MODULE - FOO - COMMENTS	AUTHORIZED TESTS	UNIT COST
A	W		RA81 -	EX- - - - - -	W	D	RA81-F-013		
B									
C									
D									

TOTAL HOURS

MATERIAL USED

LINE ITEM	QTY.	CLASS	DEC PART NUMBER BASIC VARIANT	T Y	PART DESCRIPTION-VENDOR PART NO.	AMOUNT
A						$
B						$
C						$
D						$
E						$
F						$

PRICING SUBJECT TO CHANGE WITHOUT NOTICE

LOGISTICS APPROVAL | TOTAL MATERIAL COST $

LABOR ____ HOURS @ $ ____ PER HOUR	$
LABOR ____ HOURS @ $ ____ PER HOUR	$
TOTAL LABOR COST	$
TOTAL MATERIAL COST	$
TRAVEL COST	$
	$
	$
	$
SUB TOTAL (ALL SHADED AREAS)	$
TO BE FILLED IN BY BILLING ONLY	
LABOR TAX ____ %	$
MATERIAL TAX ____ %	$
TOTAL	$

SALES CODE (Circle One)

RENTAL	DEPOT	INSTALL	PER CALL	OTHER
A	DE	G	U	

CUSTOMER CODE | STATE | TAX EXEMPT YES NO

IF YES, EXEMPTION CERTIFICATE MUST BE ON FILE WITH DIGITAL OR SHOULD ACCOMPANY THIS REPORT

TAX EXEMPT NO.

CUSTOMER (BILL TO ADDRESS)

STREET ATTENTION

CITY STATE ZIP

AUTHORIZED CUSTOMER SIGNATURE | PRINT SIGNATURE NAME | CUSTOMER P.O. NO | BRANCH APPROVAL

EN-10931-13-REV B(7/92)

APPENDIX D

APPENDIX B

WAS THIS FCO A RESULT OF A FAILURE OF THE HDA _____ OR REPLACED AS PART OF THE FCO PROGRAM _____?

PLEASE WRITE IN THE SERIAL NUMBER OF THE DRIVE IN WHICH THIS HDA IS BEING PLACED INTO _____ AND THE NEW HDA SERIAL NUMBER _____.

PLEASE INCLUDE THIS FORM WITH THE RETURN OF THE OLD HDA TO YOUR LOGISTICS DEPARTMENT.

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

FCO COVER SHEET FOR RA81X-R-0009

FCO #	RA81X-R0009
HOURS :	1.0
QUICK CHECK :	Presence of 0.1 ufd capacitor at location C29 AND 38.3 ohm resistor at location R64 on the Read/Write Module.
LAST PREVIOUS FCO :	RX81X-R0008
RELATED or PREREQUISITE FCO's :	RA81X-S004, R/W module (54-15253) must be at CS Revision level "D" before installation of this FCO.
APPLICABILITY :	Retrofit drives where problem is evident. Drives affected are Serial Number CX30400 and below for 60hz and Serial Number CX6580 and below for 50hz. The minimum acceptable revision of the 54-15253 in spares stock is ETCH REVISION "B", CS REVISION "F1".
SPECIAL TEST EQUIPMENT, TOOLS, or SUPPLIES :	VELOSTAT KIT (Anti-Static) P/N = 29-11762-00
FIELD INSTALLATION and TEST PROCEDURE	See attached "REWORK PROCEDURES"
NOTE :	This FCO implements the following ECO's: 5415253-CX004 5415253-CX005
COMPATABILITY :	This FCO "MUST" be installed prior to any installation of revision "E1" (or higher) HDA (70-18491-xx) into a drive.
PROBLEM SYMPTOM :	High rate of error codes 62 and/or 63. Intermittent, unexplained bursts of ECC errors Need higher write current with Rev E1 or higher HDA assembly (70-18491-xx)

LOGISTICS :

QTY	PART NUMBER	DESCRIPTION
1	10-13466-22	0.1 mfd 50v Capacitor
1	13-05121-00	38.3 ohm resistor, 1/4 watt, 1%
	EQ-01275-01	Parts + Documentation
	FA-04544-01	Documentation only

REWORK PROCEDURE for FCO # RA81X-R0009

1. Request that the customer release the system and the RA81 drive.

2. Depress the "A" AND the "B" port switches on the operator control panel (on the front of the drive) to the "OUT" position.

3. Spin down the drive by depressing the "RUN/STOP" switch on the operator control panel (on the front of the drive) to the "OUT" position.

4. Open the back door to the cabinet.

5. Press the drive AC circuit breaker "down" to the OFF position.

6. If the drive is fixed mounted (top drive), proceed to rework step 11.

7. Pull out the cabinet stabilizer. (Figure 1)

****
*
* CAUTION
*
* NEVER SLIDE A DRIVE OUT OF THE CABINET
* WITHOUT FIRST EXTENDING THE CABINET STABILIZER
*
****

8. Remove the screw holding the back of the disk drive to the electrostatic discharge bracket. (Figure 2)

9. Slowly pull the drive out on its slides until it locks into place.

10. Push up on slide lock arm "A" and further extend the drive to the limits of the slides. (Figure 3)

11. Push the logic chassis release latch with a screwdriver. (Figure 4)

12. Raise the drive chassis to a completely raised position. (Figure 5)

13. Before proceeding, ensure that the VELOSTAT Anti-static Kit (p/n = 29-11762-00) is being properly utilized during any handling of the R/W module.

14. Remove the Read/Write Module, p/n 54-15253. (Figure 5)

15. Remove C29 (0.01 ufd, 50v capacitor). (Figure 6)

16. Install C29 (0.1 ufd, 50v capacitor, p/n 10-13466-22) supplied in the FCO Kit. (Figure 6)

17. Remove R64 (51.1 ohms, 1/4 watt, 1%, resistor). Refer to Figure 6. This resistor may be identified by the marking "51R1" OR color-coded with the color bands "Green-Brown-Brown-Gold-Brown".

18. Install R64 (38.3 ohms, 1/4 watt, 1% resistor, p/n 13-05121-00) supplied in the FCO Kit. Refer to Figure 6. This resistor may be identified by the marking "38R3" OR color-coded with the color bands "Orange-Grey-Orange-Gold-Brown".

19. When the above rework is complete, mark the module "CS Revision F1".

20. Re-Install the reworked R/W module back into the drive.

21. Lower the drive chassis until the chassis latch engages.

22. If the drive is fixed mounted (top drive), proceed to rework step 25.

23 Push in on Slide Arm "B" and slowly slide the drive back into the cabinet. (Figure 3)

24.

****
*
* CAUTION
*
* RE-INSTALL THE SCREW HOLDING THE BACK OF THE
* DRIVE TO THE ELECTROSTATIC DISCHARGE BRACKET
*
* (Figure 2)
*
****

25. Raise the drive AC Circuit breaker (at the rear of the drive) up to the "ON" position

26. Close the back door of the cabinet.

27. Depress the "WRITE/PROT" switch on the operator control panel to the "OUT" position.

28. Spin up the drive by pressing the RUN/STOP switch on the operator control panel (on the front of the drive) to the "IN" position.

29. Observe the "READY" lamp on the operator console and verify that it illuminates after about 60 seconds.

30. Observe the "READY" lamp on the operator console and verify the following:

    a) The "READY" lamp should extinguish (go out) approximately every 30 seconds.

    b) The "READY" lamp should re-illuminate (go on) approximately every 30 seconds.

    This process allows the drive internal "idle" diagnostics to recycle as long as the "Port Switches" and Write Protect switch are released.

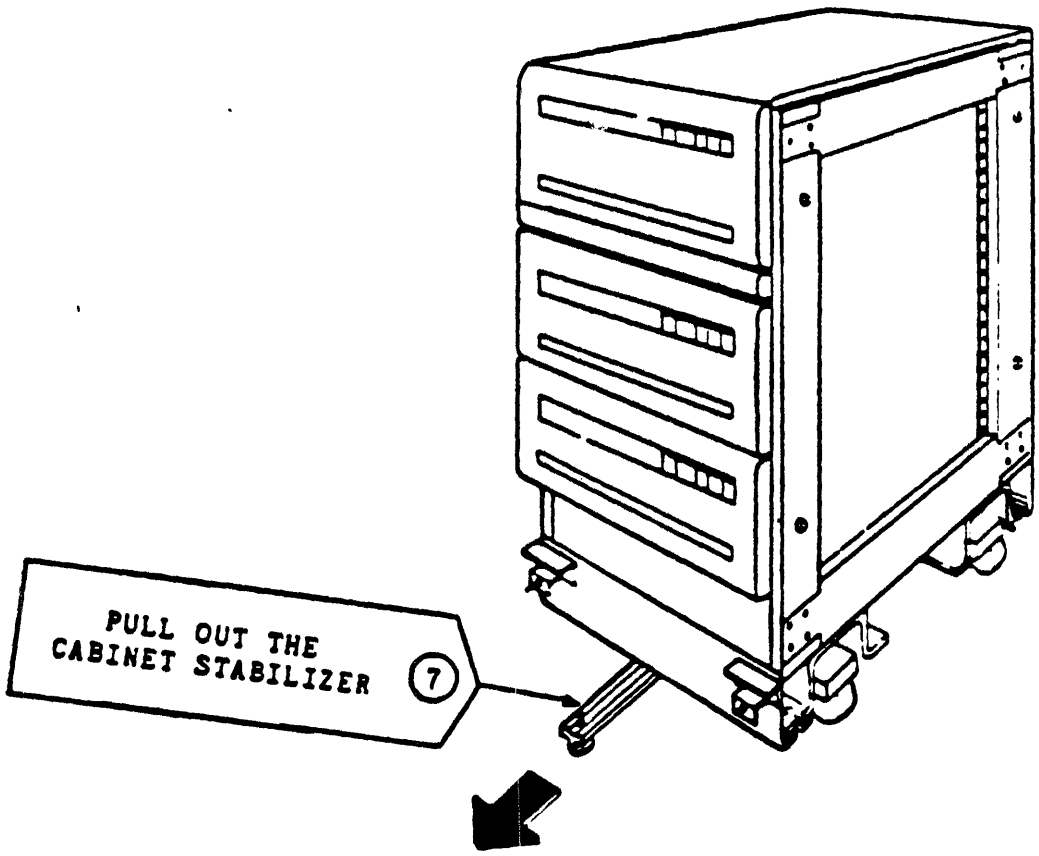
31. Verify that the "FAULT" lamp DOES NOT illuminate during several cycles of the process described in step 30 above.

32. Press the "A" and/or "B" port switches on the operator control panel (on the front of the drive) to the "IN" posi·ion

33. Run EVRLA (VAX diagnostic) or CZUDC (PDP11 diagnostic) to insure proper operation of the drive.

34. Return the drive and system to the customer.

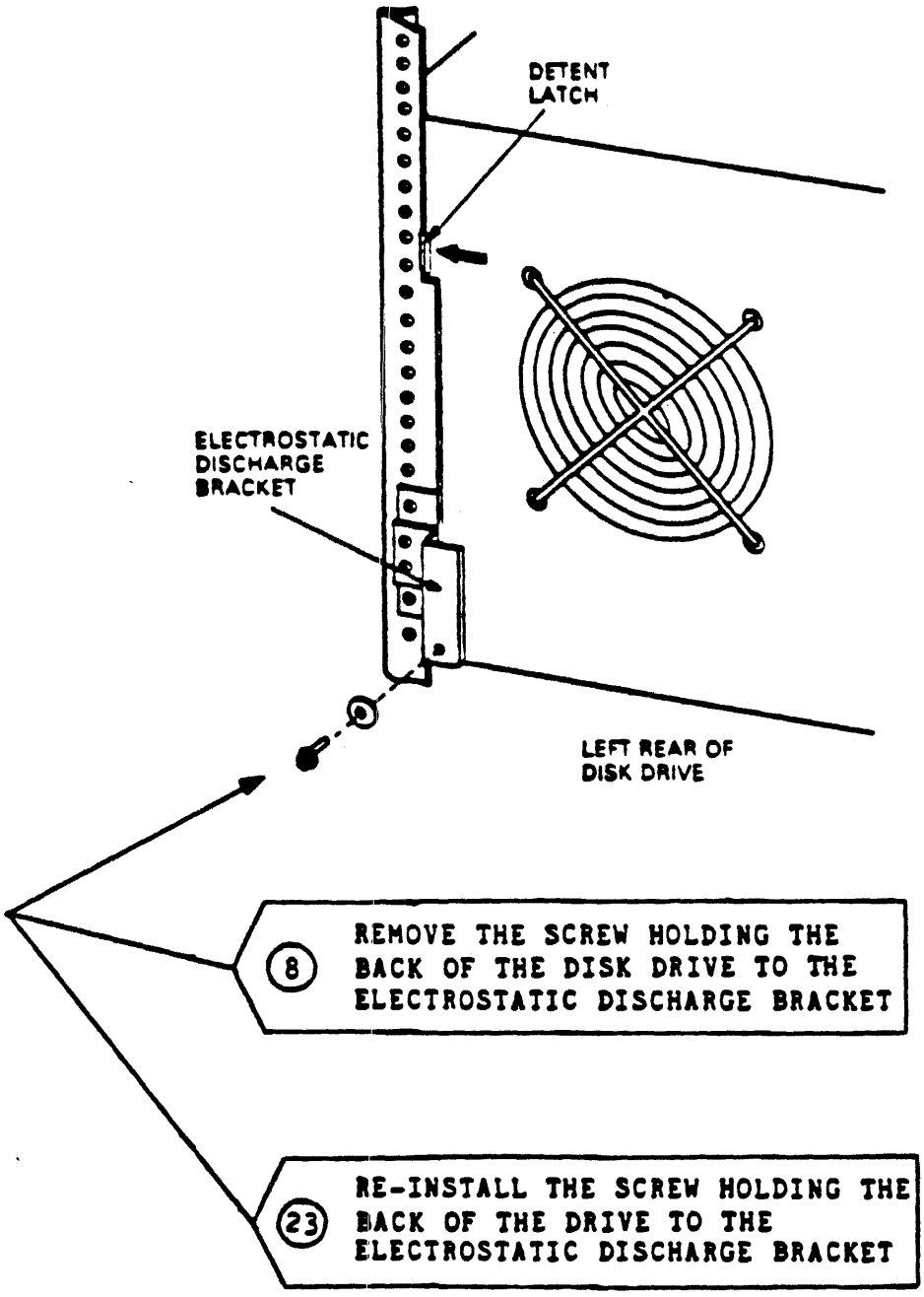
35. Log this FCO activity into the Digital Site Management Guide.



PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

Figure 1



PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

Figure 2

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

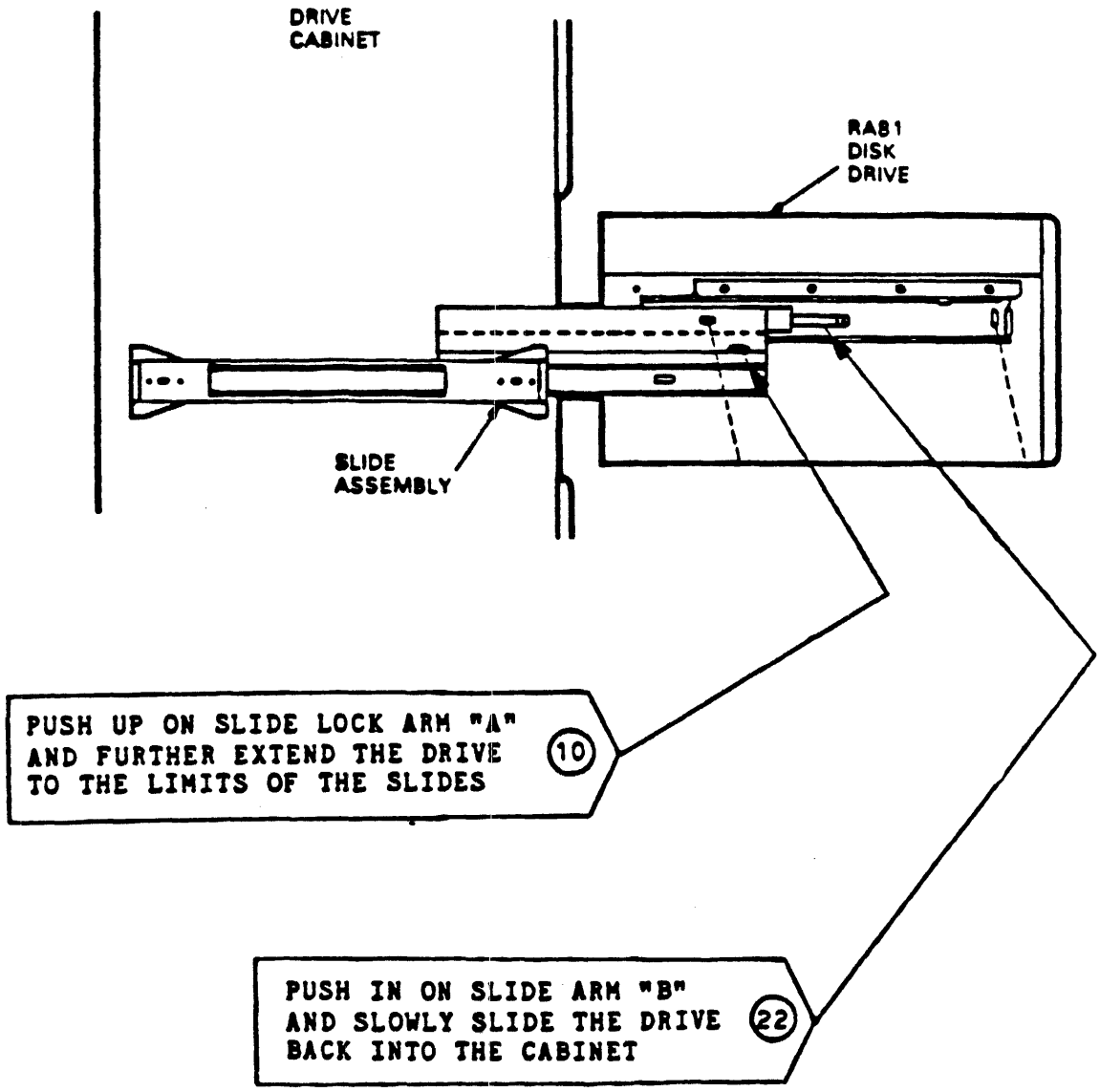


Figure 3

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

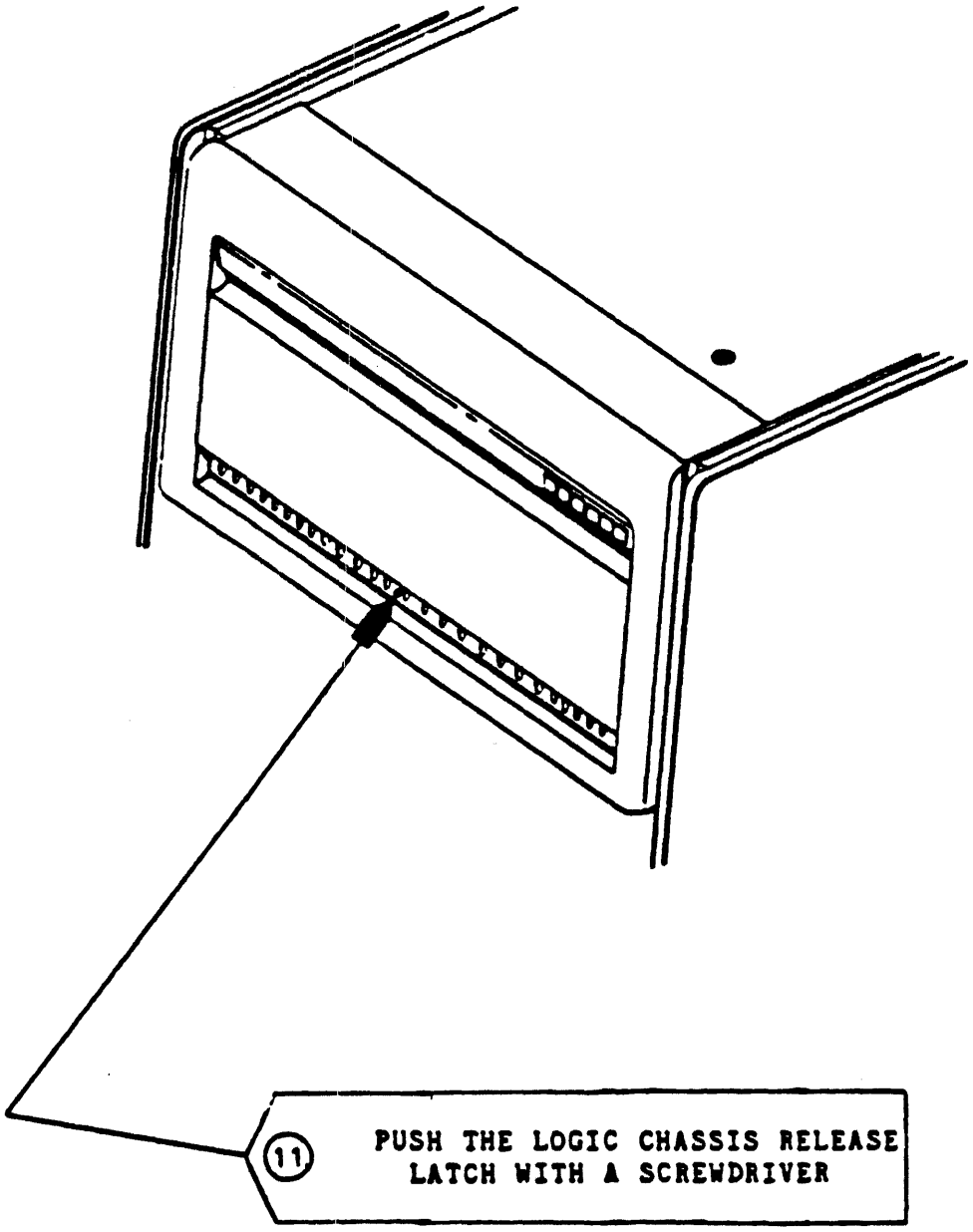


Figure 4

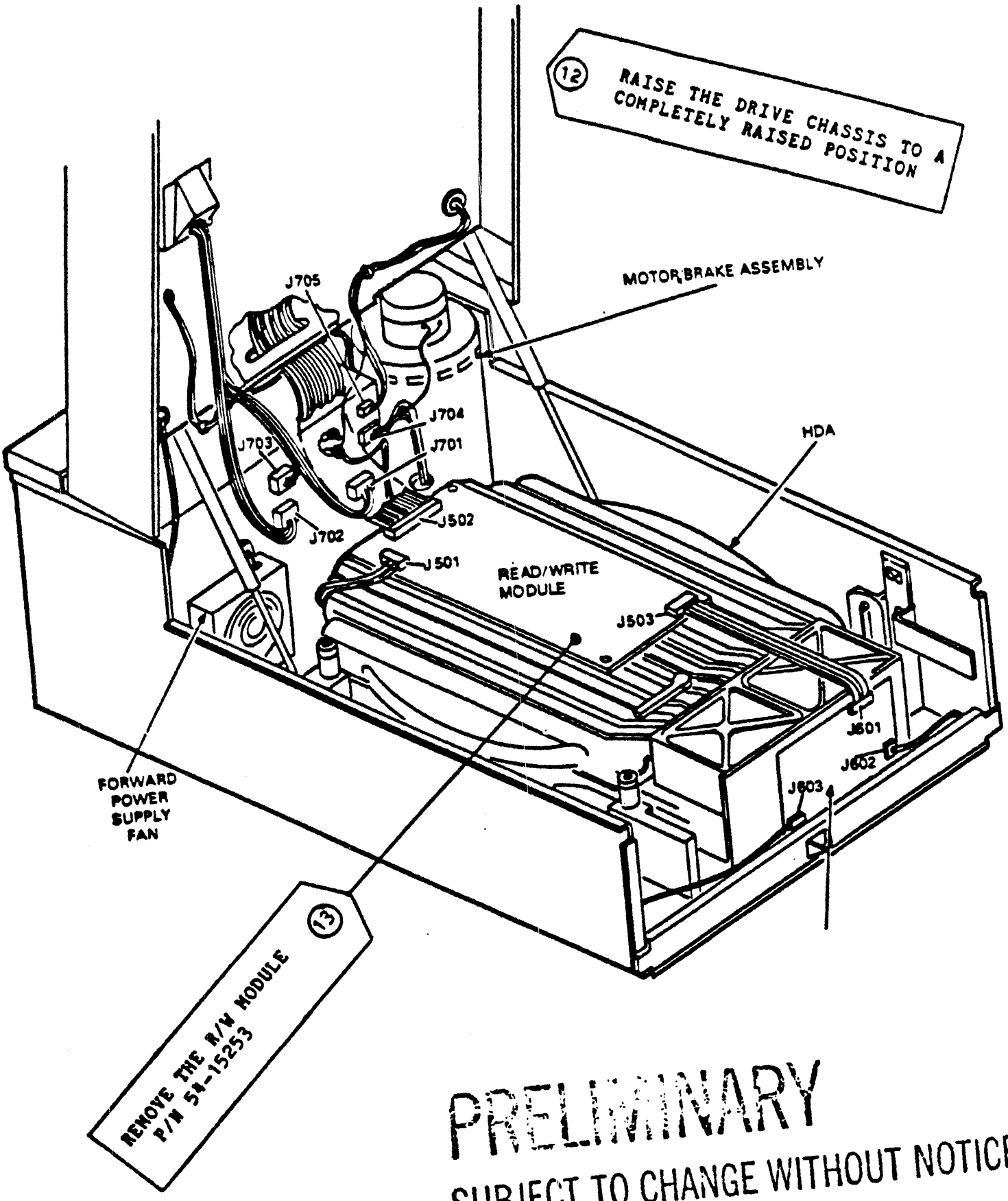


Figure 5

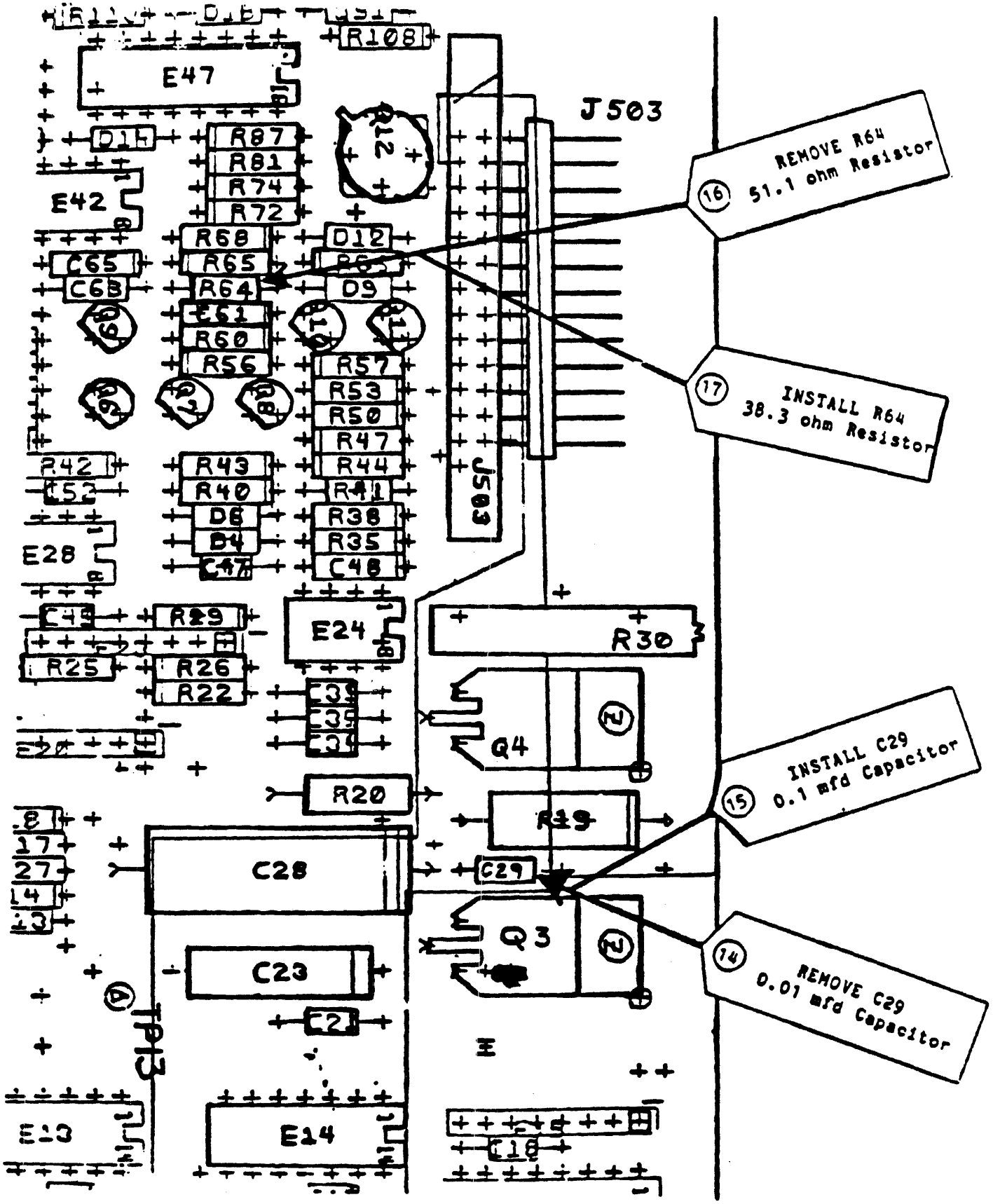


Figure 6

digital

FCO RA81X-R-012

Level of Urgency: R

Page ___ Of ___

FIELD CHANGE ORDER

Number: RA81X-R-012

Applicability: REWORK ALL RA81 MICROPROCESSOR MODULES:
ETCH REVISION "B" CS REVISION "K" OR LOWER
REVISION "C1" CS REVISION "L3" OR LOWER

Problem/Symptom:

POTENTIAL ECC ERRORS ON THE RA81

Quick Check:

SEE PAGE 2 OF THIS FCO

Compatibility/Prerequisite FCO:	Est. Time to Install:
NONE	1.5

Special Tools or Test Equipment: VELOSTAT KIT (ANTI STATIC) PART NUMBER 29-11762-00. ZERO OHM JUMPERS PART NUMBER 90-09185-00

FCO Parts Information

Order by FCO Kit#:	Quantity:	Part Number:	Description:
FA-04649-01	1	FA-04649-01	FCO DOCUMENTATION

EQ Kit Variation System/Option Applic:

Approvals

CSSE Engineer KEITH BROWN	F.S. Product Safety	F.S. Logistics
CSSE Manager RON MILANO	F.S. Microfiche Libraries	Affected Population:
ESD&P Micropub.		Initial Kitting:
Revision:		Hardcopy Publication:
FCO Release Date		Parts Availability:

PRELIMINARY

SUBJECT TO CHANGE

*** PLEASE NOTE ***

THIS ADJUSTMENT SHOULD ONLY BE PERFORMED ON MICROPROCESSOR MODULES WITH A ETCH REV "C1", C.S. REV "L3" OR LOWER, AND ETCH REV "B", C.S. REV "K".

****
*
* MICROPROCESSOR MODULES WITH AN ETCH "B", C.S. "K1" OR ETCH "C1",C.S. "M1"*
* REVISIONS SHOULD NOT BE ADJUSTED. RA81'S AT HARDWARE REVISION 6 WILL HAVE *
* THE "M1" OR THE "K2" MICROPROCESSOR.
****

THE C.S. REVISION MARKING IS LOCATED IN THE UPPER LEFT (COMPONENT SIDE) PORTION OF THE MODULE. THIS MARKING WILL INCLUDE A 2 OR 3 DIGIT DATA CODE AND THE C.S REVISION LEVEL, IE; 452L3 "L3" = C.S.REVISION LEVEL ,REFER TO RA81 TECH TIP #21 SPEED BULLETIN 343 7/30/84 OR DSA RIGHT STUFF ISSUES 1 AND 2 FOR ASSISTANCE IN LOCATING REVISION LEVELS.

BEFORE OR AFTER PERFORMING THIS ADJUSTMENT PROCEDURE, THE SITE MANAGEMENT GUIDE MUST BE VERIFIED OR UPDATED TO REFLECT CHANGE.

STEPS FOR GETTING DRIVE FROM CUSTOMER AND PREPARING FOR THE IMPLEMENTATION OF THIS FCO

1. REQUEST THE RA81 DRIVE FROM THE CUSTOMER.
2. THE RA81 DRIVE MUST BE DISMOUNTED AND DESELECTED.
3. SPIN THE DRIVE DOWN BY PRESSING THE RUN/STOP SWITCH. (Figure 1)
4. AFTER THE DRIVE HAS STOPPED, TURN THE CIRCUIT BREAKER AT THE REAR OF THE RA81 TO THE OFF POSITION. (Figure 2)
5. REMOVE THE AC LINE CORD FROM THE REAR OF THE RA81 DRIVE. (Figure 2)
6. OPEN THE LOGIC ACCESS COVER LID BY TURNING THE ALLEN HEAD LATCH SCREW. (Figure 3)
7. FOLD OUT THE SERVO AND PERSONALITY MODULES. (Figure 4)
8. DISCONNECT ALL CABLES ATTACHED TO THE MICROPROCESSOR MODULE. (Figure 5)
9. REMOVE THE MICROPROCESSOR MODULE FROM THE LOGIC CHASSIS.

MICROPROCESSOR DATA SEPARATOR WINDOW ADJUSTMENT

1. THE JUMPERS ARE LOCATED ON THE MICROPROCESSOR MODULE. (Figure 6)
2. FOR PROPER JUMPER POSITION, LOCATE W7,W8,and W9, see Figure 7.
3. VERIFY THE CURRENT JUMPER SELECTION

   W7__ W8__ W9__

4. ADD OR REMOVE JUMPERS PER TABLE LISTED BELOW USING THE JUMPER REMOVAL PROCEDURES WHICH FOLLOW THIS TABLE.

   !!!THE FOLLOWING SETTINGS ARE THE ONLY ADJUSTMENTS THAT CAN BE MADE.!!!! IF ANY OTHER ADJUSTMENTS ARE PERFORMED THE DATA SEPARATOR WINDOW WILL BE OUT OF TOLERANCE.

CURRENT SETTING	CHANGE	RESULT
W9,W8,W7 OUT	ADD W9	W9 IN
W9 IN / W7,W8 OUT	ADD W8	W8 W9 IN
W8 IN / W7,W9	ADD W7 AND W9 REMOVE W8	W7 W9 IN
W9 AND W8 IN / W7 OUT	ADD W7 REMOVE W8	W7 W9 IN

JUMPER REMOVAL PROCEDURE

THE JUMPERS ARE SOLDERED IN PLACE. THE REMOVAL OF THE OLD JUMPERS WILL REQUIRE EXTREME CARE SO AS NOT TO DAMAGE THE MODULE. THE FOLLOWING STEPS ARE THE EASIEST METHOD FOR JUMPER REMOVAL. E.S.D. PROTECTION MUST BE OBSERVED AT ALL TIMES. USE THE VELOSTAT KIT (ANTI-STATIC) P/N 29-11762

AFTER THE MICROPROCESSOR HAS BEEN REMOVED FROM THE RA81 PERFORM THE FOLLOWING STEPS.

1. USING DIAGONAL CUTTERS REMOVE THE EXCESS LEAD OF PREVIOUSLY REMOVED JUMPER FROM THE JUMPER EYELET ON THE COMPONENT SIDE OF THE MODULE. (FIGURE 8)

2. ADD A SMALL AMOUNT OF SOLDER TO THE COMPONENT SIDE OF JUMPER EYELET.

3. STRAIGHTEN THE JUMPER LEAD ON THE ETCH SIDE. (FIGURE 9)

4. PLACE THE MODULE UPRIGHT , PREFERABLY BETWEEN KNEES WHILE SITTING.

****
* !!! !!! WARNING!!!!!!!!! *
* DO NOT APPLY HEAT TO MODULE FOR EXTENDED PERIOD. OVERHEATING *
* WILL CAUSE DAMAGE TO THE MODULE AND RENDER IT USELESS *
****

5. GRASP THE JUMPER LEAD WITH NEEDLE NOSE PLIERS OR SIDE CUTTERS. HEAT THE COMPONENT SIDE WITH A SOLDERING IRON AND PULL THE JUMPER LEAD OUT OF THE PLATED FEED THROUGH (PFT) HOLE. DO NOT FORCE THE REMOVAL.

6. ADD A SMALL AMOUNT OF SOLDER TO THE JUMPER PFT HOLE.

7. SET THE MODULE UPRIGHT, PLACE A SOLDER SUCKER ON THE ETCH SIDE OF THE JUMPER PFT HOLE. APPLY IRON TO THE SOLDER TAP ON THE COMPONENT SIDE OF THE PFT HOLE.

8. ENGAGE THE SOLDER SUCKER. ENSURE THAT ALL THE SOLDER IS REMOVED. IF NOT, PERFORM STEPS 6 AND 7 AGAIN.

9. SOLDER IN THE REQUIRED ZERO OHM JUMPER (P/N 90-09185) IN THE PFT HOLE.

10. REINSTALL THE MICROPROCESSOR MODULE INTO THE DRIVE.

11. ALLOW ALL INTERNAL DRIVE DIAGNOSTICS TO RUN TO COMPLETION BY DESELECTING BOTH PORT SWITCHES DURING SPIN UP FOR FIVE (5) MINUTES .

12. RUN AT LEAST ONE PASS RA81 DISK DRIVE DIAGNOSTIC

16 BIT PDP-11	UDA50	CZUDC
32 BIT VAX-11	UDA50	EVKAB
	HSC50	ILEXER
36 BIT 10/20	HSC50	ILEXER

13. RETURN RA81 DISK DRIVE TO THE CUSTOMER FOR SOFTWARE USE

14. LOG FCO ACTIVITY IN THE CUSTOMERS SITE MANAGEMENT GUIDE.

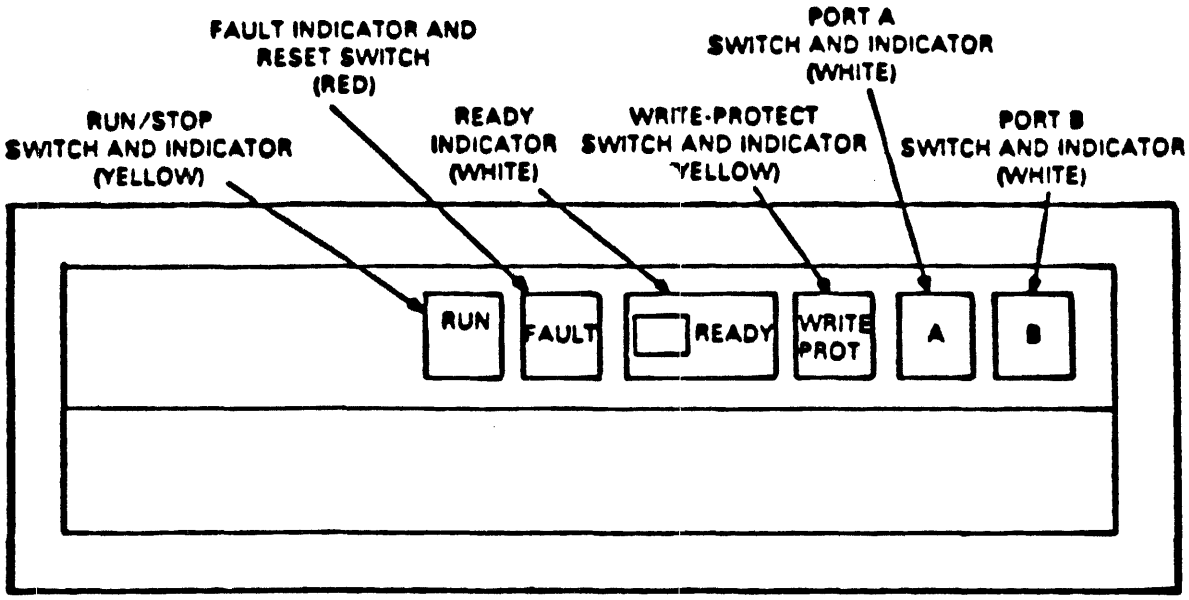


Figure 1 Front-Panel Controls and Indicators

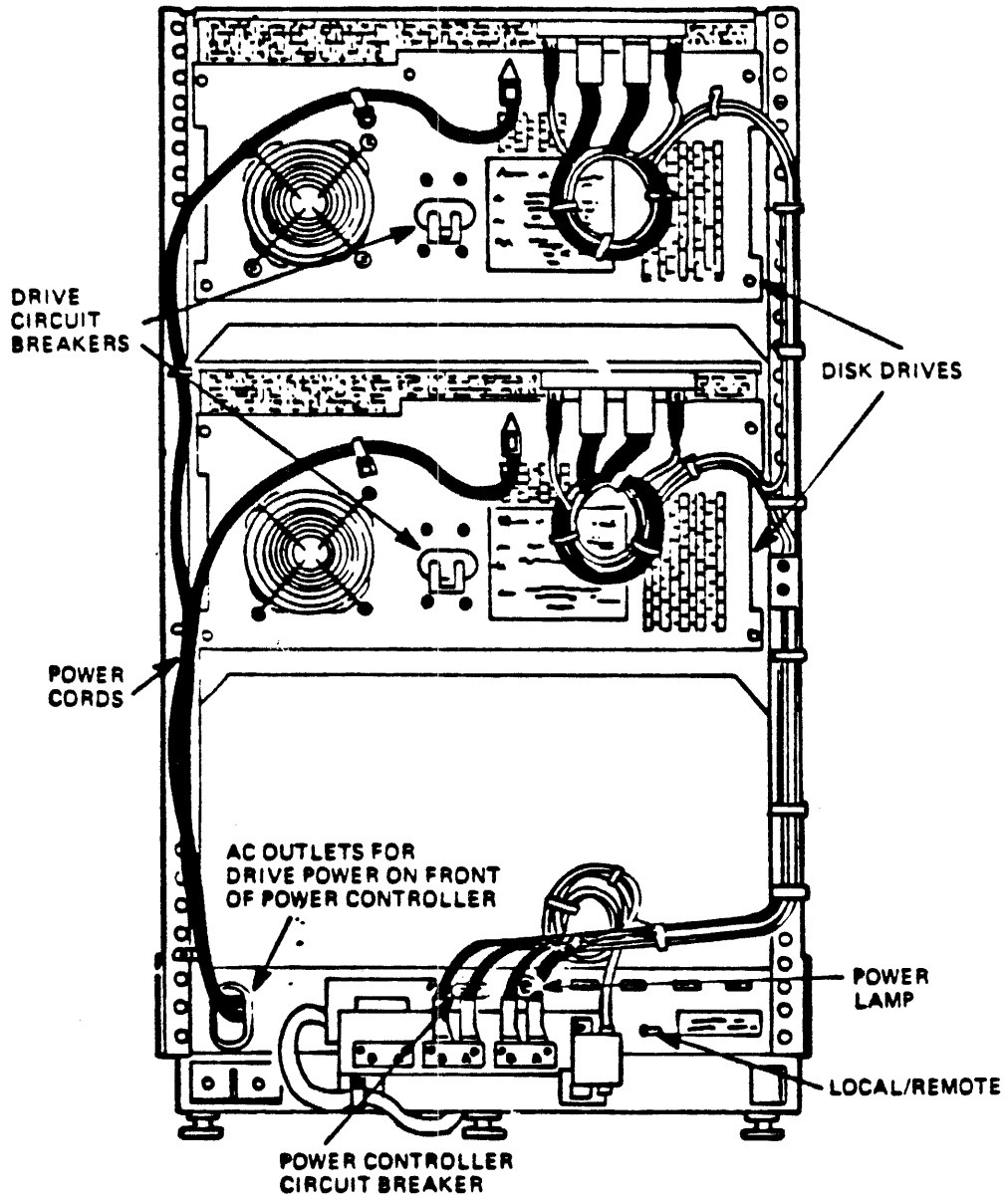


Figure 2 Review of Drive

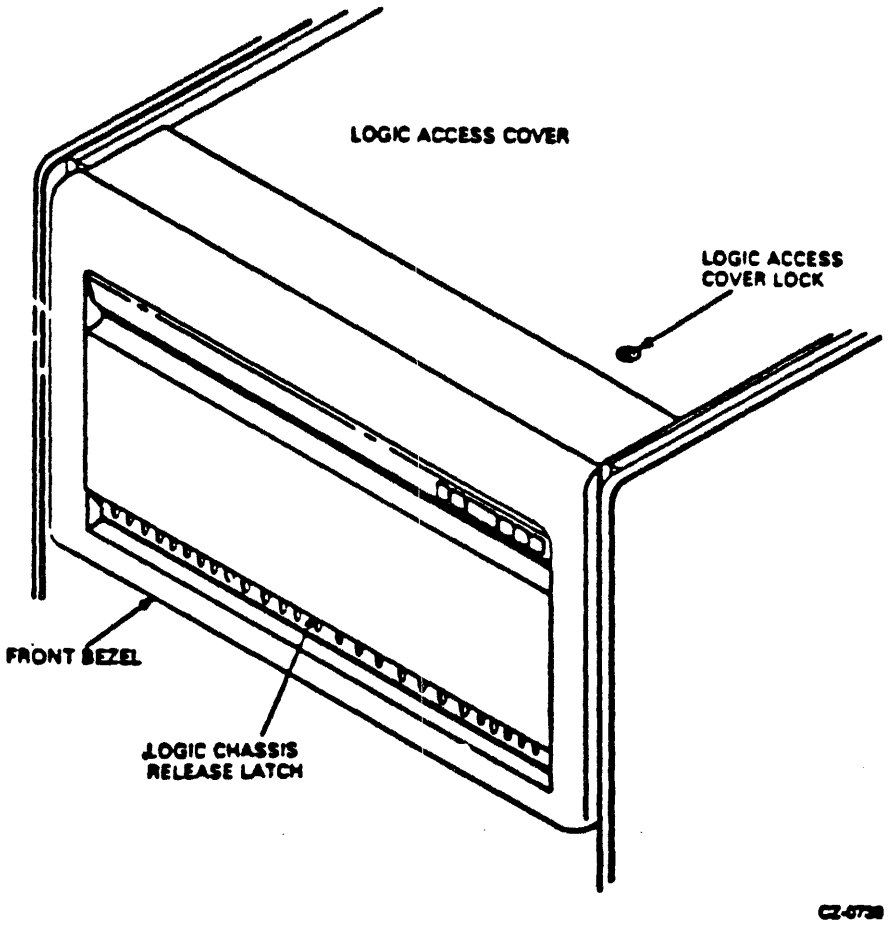


Figure 3 Access to the Inside of the Drive

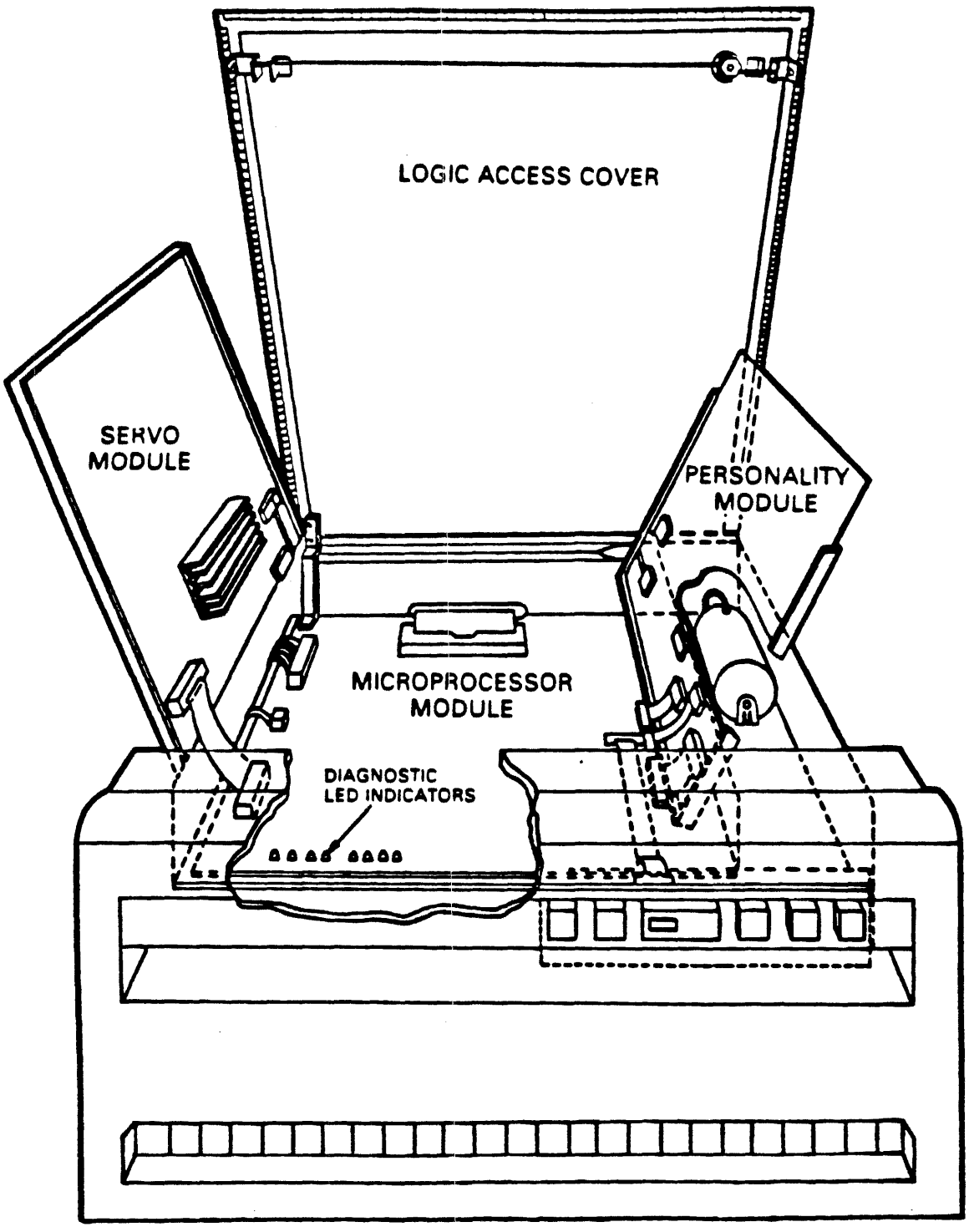


Figure 4 Upper Logic Assembly

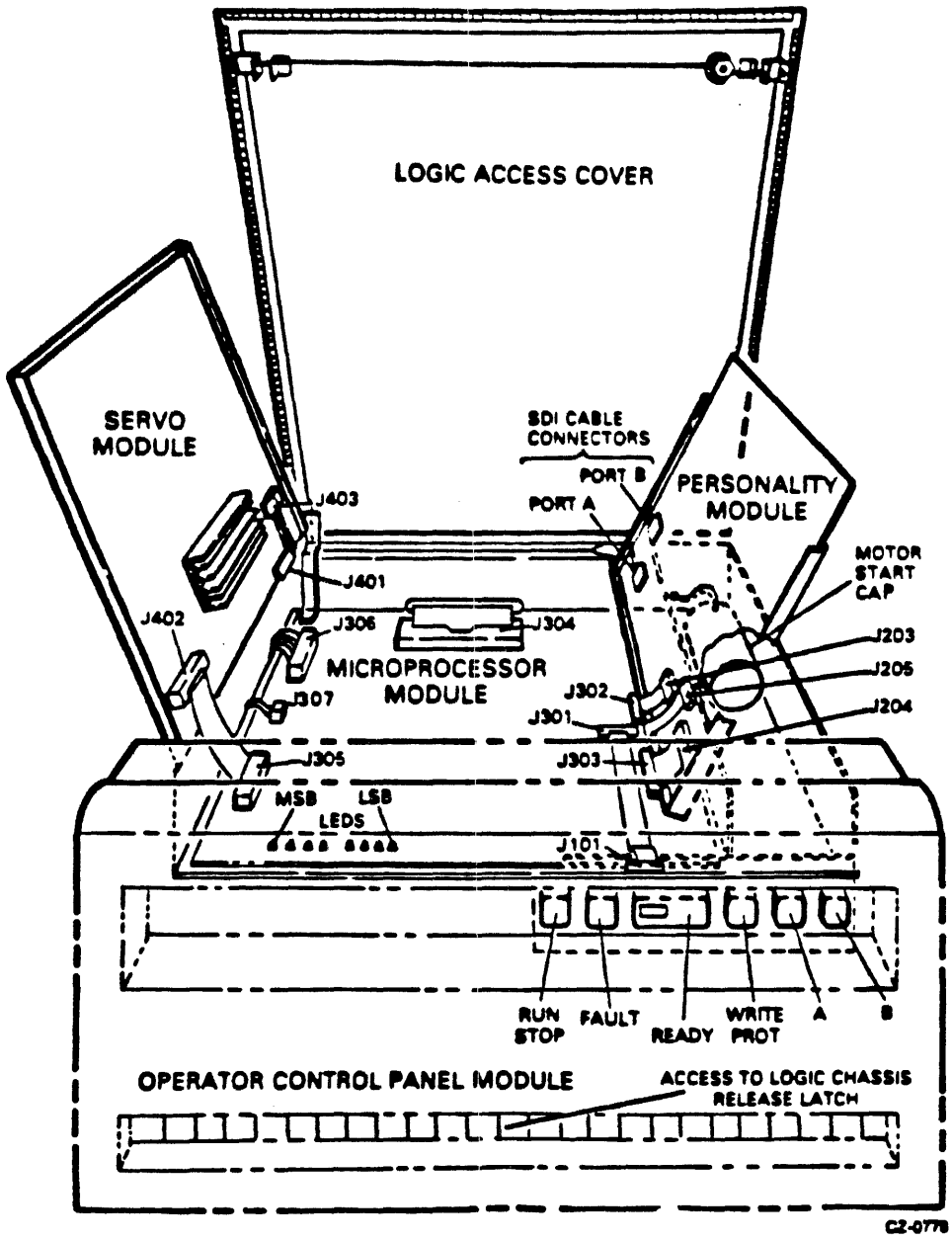


Figure 5 Upper Logic Assembly

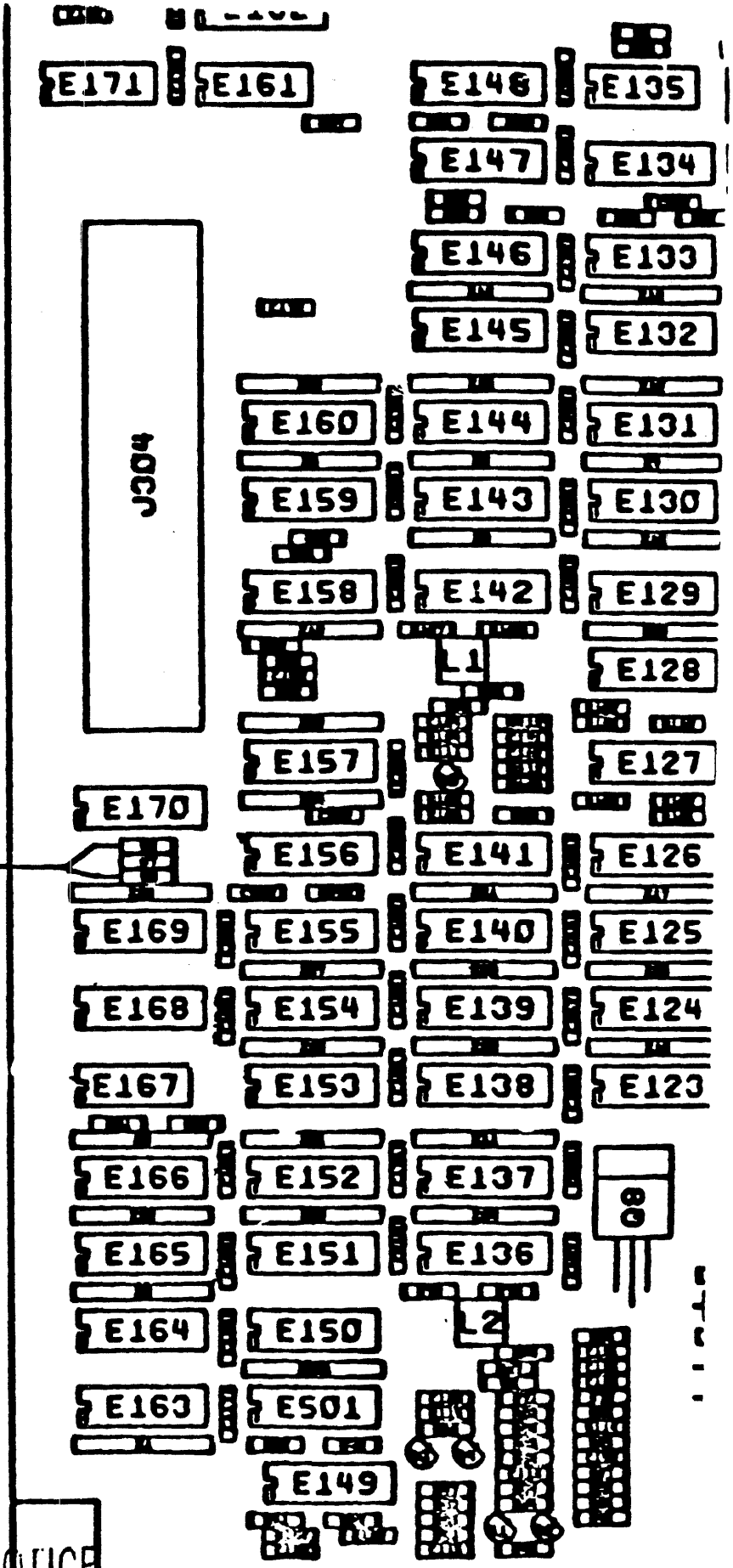


Figure 6
JUMPER LOCATIONS

Figure 7
Jumper Location

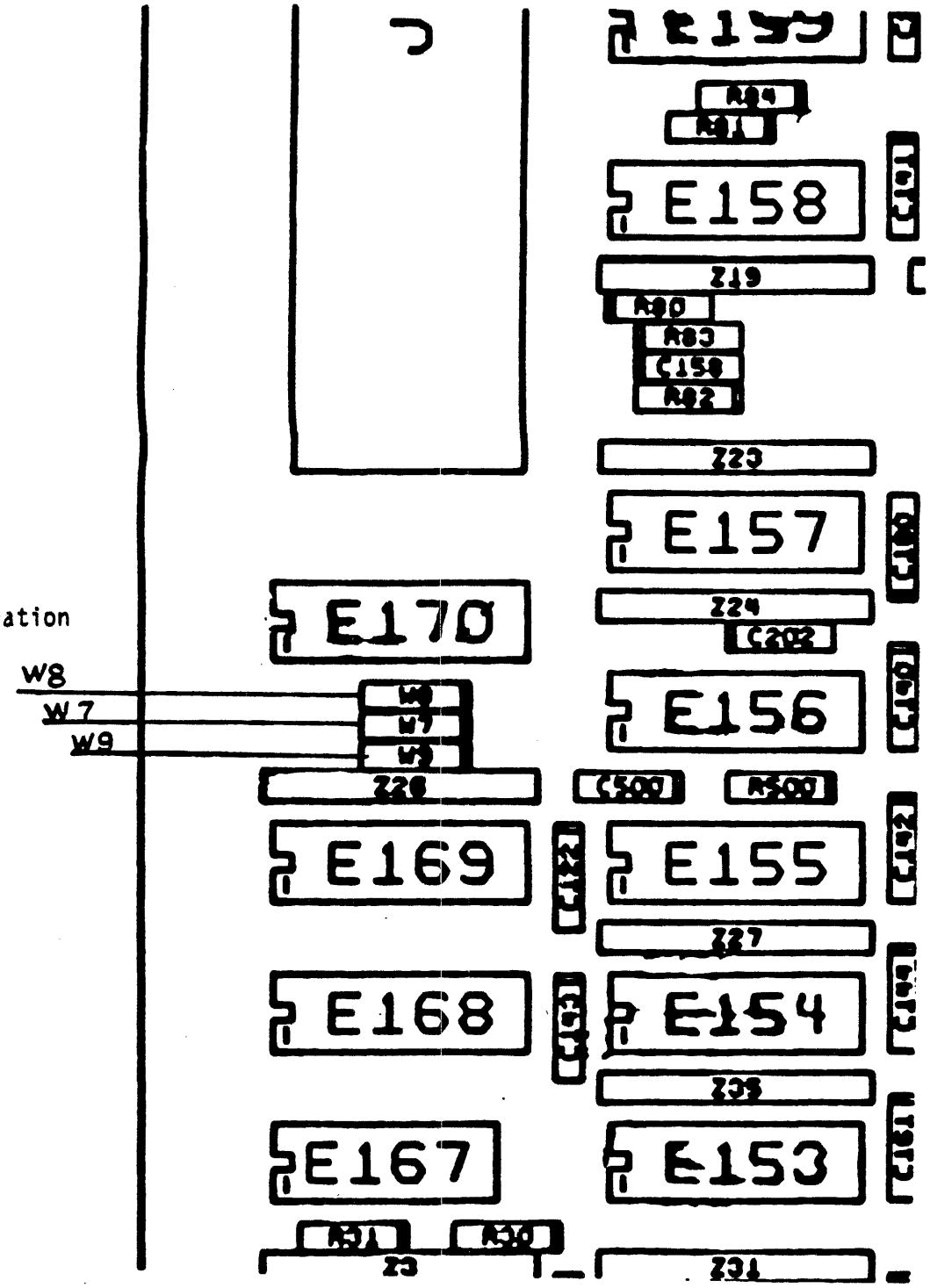
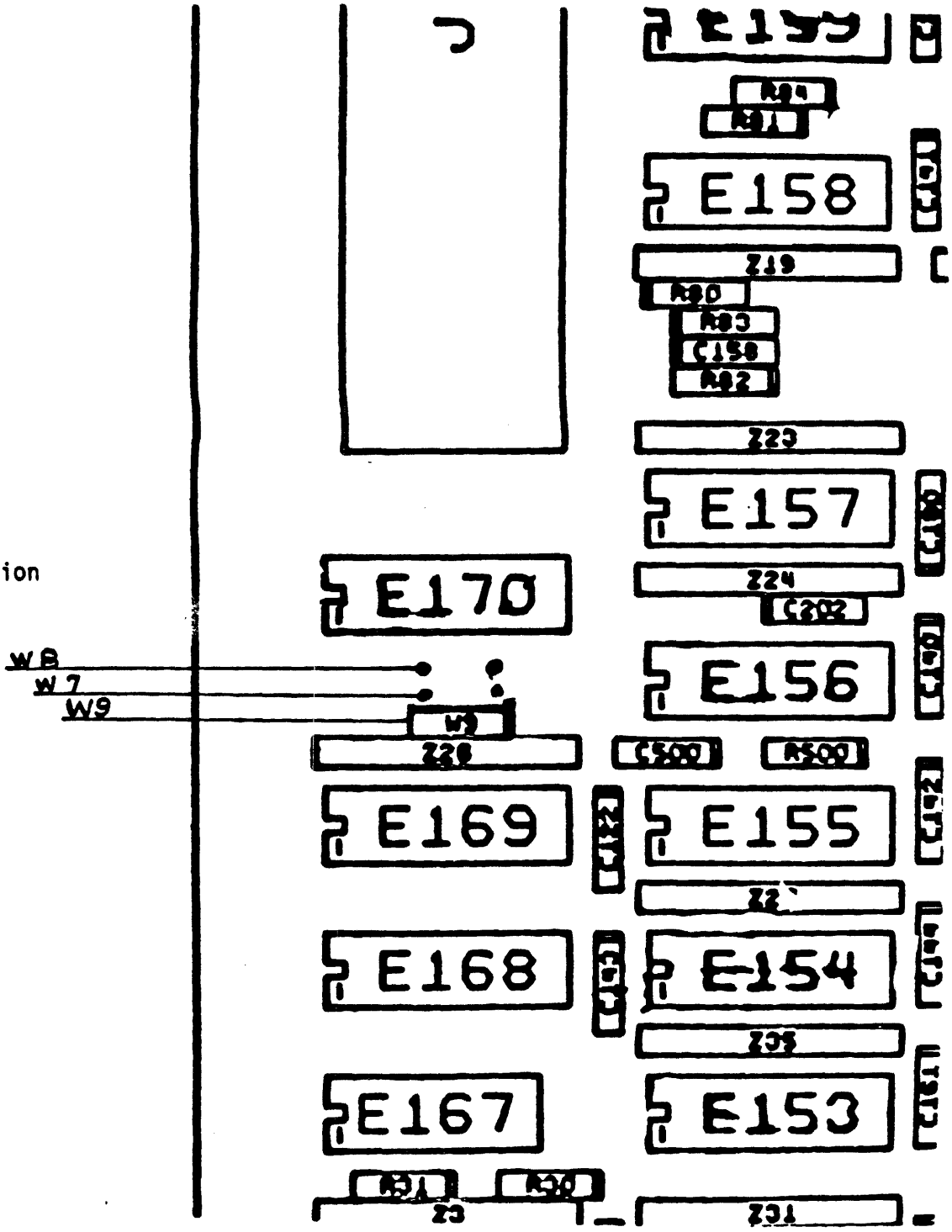


Figure 8
Jumper Location



PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

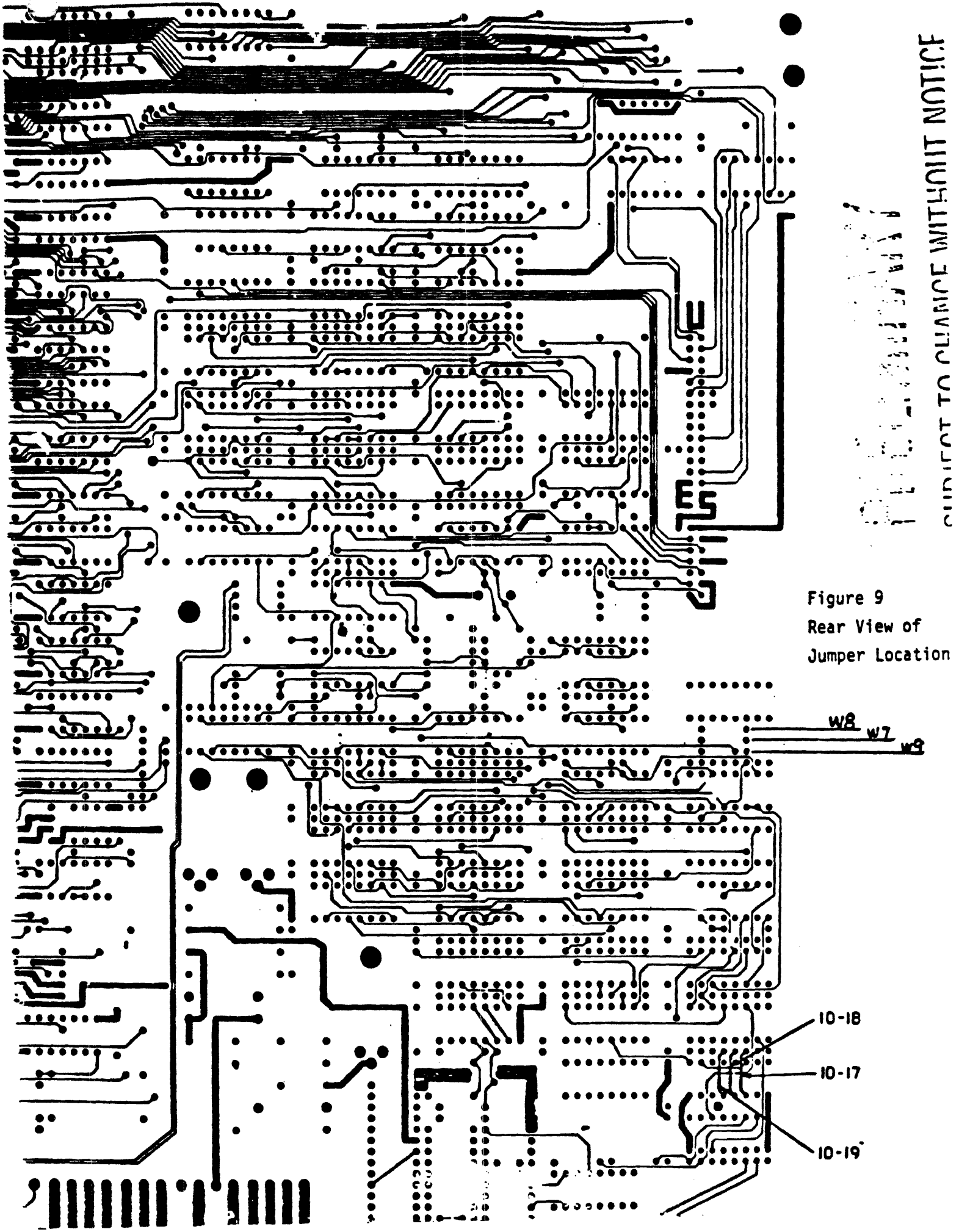


Figure 9
Rear View of
Jumper Location

digital

FCO RA81X-I-014

Level of Urgency: J

Page ___ Of ___

FIELD CHANGE ORDER

Number: RA81X-I-014

Applicability: ALL RA81 DISK DRIVES

Problem/Symptom: HDA CHASSIS AND DRIVE CHASSIS ARE AT DIFFERENT GROUND REFERENCE. DATA ERRORS (ECC) NOT RELATED TO MEDIA DEFECTS.

Quick Check: GROUND STRAP ATTACHED BETWEEN HDA AND POWER SUPPLY CHASSIS GROUND STUD.

Compatibility/Prerequisite FCO:
RA81X-R-0009 AND RA81X-R-0012

Est. Time to Install:
.5

Special Tools or Test Equipment:

FCO Parts Information

Order by FCO Kit#:	Quantity:	Part Number:	Description:
EQ-01380-01	1	12-25629-01	GROUNDING STRAP
	3	90-08151-00	WASHER, EXT TOOTH
	4	90-10075-01	SCREW, TAP HEXWW
	3	90-06565-00	NUT, HEX EXT TOOTH LCKWSHR 10-32
	3	90-07651-00	WASHER, LOCK
FA-04662-01	1		FCO DOCUMENTATION

EQ Kit Variation System/Option Applic:

Approvals

CSSE Engineer KEITH BROWN	F.S. Product Safety	F.S. Logistics
CSSE Manager RON MILANO	F.S. Microfiche Libraries	Affected Population:
ESD&P Micropub.	PRELIMINARY SUBJECT TO CHANGE WITHOUT NOTICE	Initial Kitting:
Revision:		Hardcopy Publication:
FCO Release Date		Parts Availability:

HDA GROUND STRAP INSTALLATION

1. Request the RA81 drive from the customer.

2. Depress the "A" and the "B" port switches on the Operator Control Panel to the "OUT" position (FIGURE 1).

3. The RA81 drive must be dismounted and deselected.

4. Spin down the drive by depressing the RUN/STOP switch on the Operator Control Panel to the "OUT" position (FIGURE 1).

5. Open the back door to the cabinet.

```
**********************************************************
*                    C A U T I O N                       *
*                                                        *
* BEFORE PROCEEDING, TURN OFF THE AC CIRCUIT BREAKER     *
  AT THE REAR OF THE DRIVE AND DISCONNECT THE MAIN       *
* AC POWER CORD FROM THE POWER SUPPLY ON THE REAR OF     *
* THE DRIVE (FIGURE 2).                                  *
*                                                        *
**********************************************************
```

6. If the drive is fixed mounted (top drive), proceed to rework step 11.

7. Pull out the cabinet stabilizer bar (FIGURE 3).

```
**********************************************************
*                    C A U T I O N                       *
*                                                        *
*  NEVER SLIDE A DRIVE OUT OF THE CABINET WITHOUT        *
*  EXTENDING THE CABINET STABILIZER BAR.                 *
*                                                        *
**********************************************************
```

8. Remove the screw holding the back of the disk drive to the electrostatic discharge bracket (FIGURE 4).

9. Slowly pull the drive out on it's slides until it locks into place.

10. Push up on the slide lock arm "A" to further extend the drive all the way out (FIGURE 5).

11. Raise the drive logic chassis by pushing the release latch with a standard screwdriver (FIGURE 6).

12. Attach E.S.D. wrist strap to chassis ground stud (FIGURE 7).

13. Remove all four (4) of the Read/Write Module (54-15253) hold down screws. Save the shorter screws and return to stock (FIGURE 8).

14 Lift the rear portion of the Read/Write module up to expose the HDA mounting standoff.

15. Place one Star Washer (90-08151-00) under the left and right mounting standoff (FIGURE 8).

16. Lay the Read/Write back in place, and attach the two front hold down screws using the Longer Screws (90-10075-01) supplied in the F.C.O. EQ Kit.

17. Insert the Longer Screw through one end of the HDA Ground Strap (12-25629-01) (FIGURE 8).

18. Place one Star Washer (90-08151-00) on top of the left rear Read/Write module grounding pad (FIGURE 8).

19. Attach Ground Strap, Longer Screw, and Star Washer to the left rear Read/Write module hold down. Insure that the lower Star Washer is still in place (FIGURE 8).

20. Attach the other end of the Ground Strap to the Power Supply ground stud using the Kept Nut and Star Washer supplied in the EQ Kit (SEE DETAIL A and B of FIGURE 7).

21. Close the logic chassis, DO NOT SLAM SHUT - HDA DAMAGE MAY OCCUR.

22. The Hardware Revison level switches are to be changed to seven (7). Remove the front bezel by removing the upper and lower mounting screws from each side of the drive (FIGURE 10).

23. Remove the Operator Control Panel from the Bezel (FIGURE 11) and change the switches to reflect a hexidecimal seven (7) (FIGURE 9).

24. Replace the front bezel cover.

26. If this is a fixed mount drive, proceed to step 28.

27. Push in on slide arm "B" and slowly slide the drive back into the cabinet (FIGURE 5).

28. Reinstall the screw holding the back of the drive to the electrostatic discharge bracket (FIGURE 4).

```
**********************************************************
*                    C A U T I O N                       *
*                                                        *
*  THE SCREW HOLDING THE BACK OF THE DRIVE TO THE        *
*  ELECTROSTATIC DISCHARGE BRACKET MUST BE INSTALLED     *
*                                                        *
**********************************************************
```

29. Reconnect the AC power cord at the rear of drive, to the AC receptacle (FIGURE 2).

30. Turn the AC Circuit Breaker, at the rear of the drive, to the "ON" position (FIGURE 2`.

31. Spin up the drive by pressing the RUN/STOP switch (FIGURE 1).

32. After the drive has spun up and a ready light is "ON", press the "A" and/or "B" port switches on the Operator Control Panel to the "IN" position (FIGURE 1).

33. Run at least one (1) pass of RA81 drive diagnostics.

VAX	32 BIT	UDA50, EVRLA or EVRLG HSC50/ILEXER
PDP-11	16 BIT	UDA50,CZUDC or CZUDI
DEC 10/20	36 BIT	HSC50/ILEXER

34. Return the RA81 drive to the customer for software initilization.

35. Enter the FCO activity in the Site Management Guide and complete the LARS form for FCO reporting.

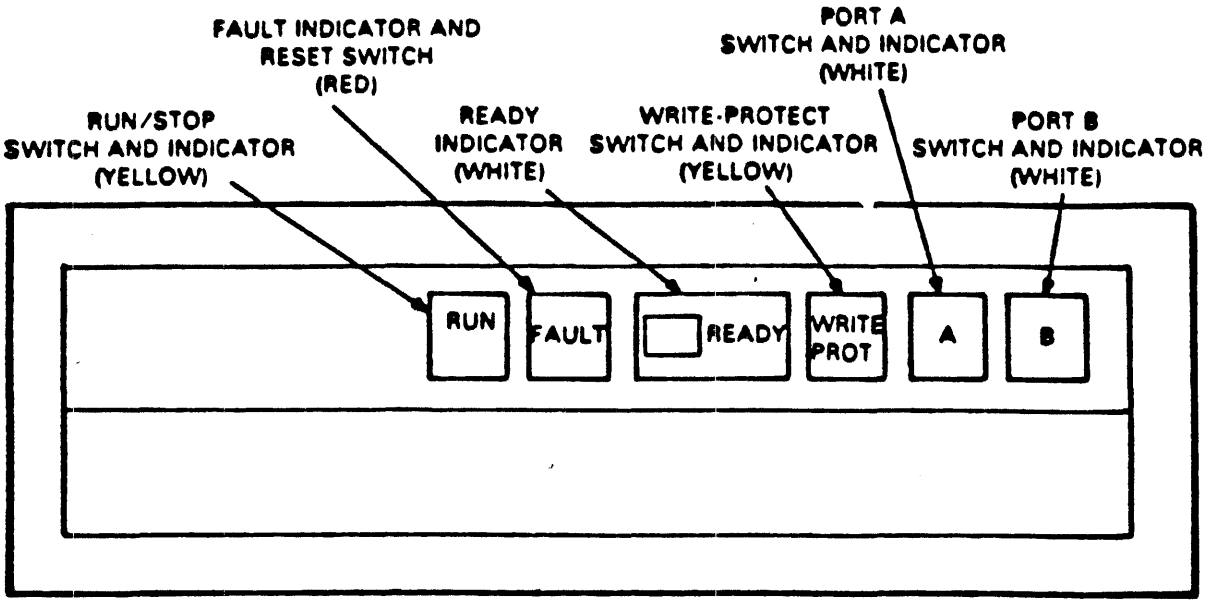


Figure 1 Front-Panel Controls and Indicators

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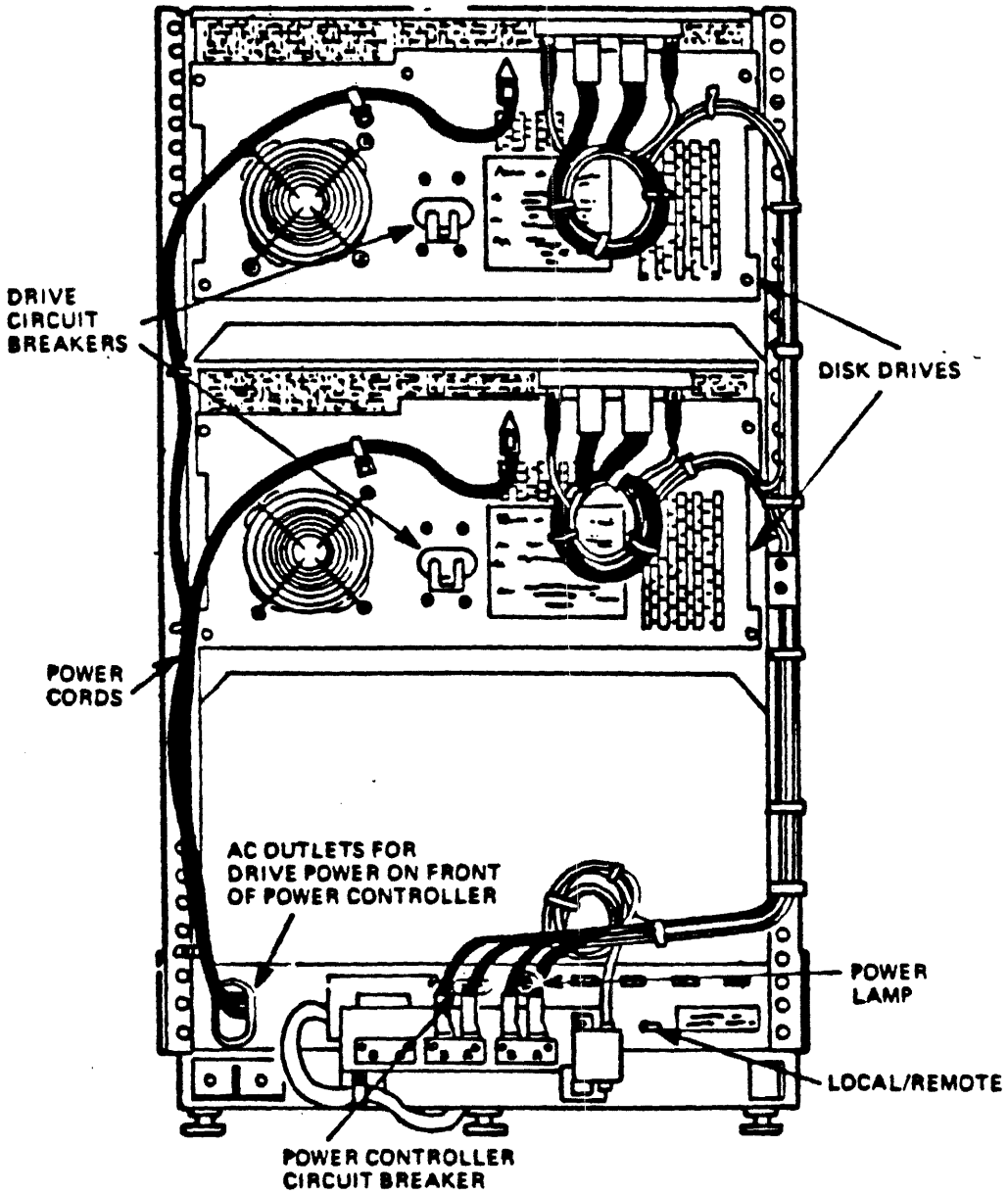

Figure 2 BACK OF AN RA81 DRIVE

PRELIMINARY

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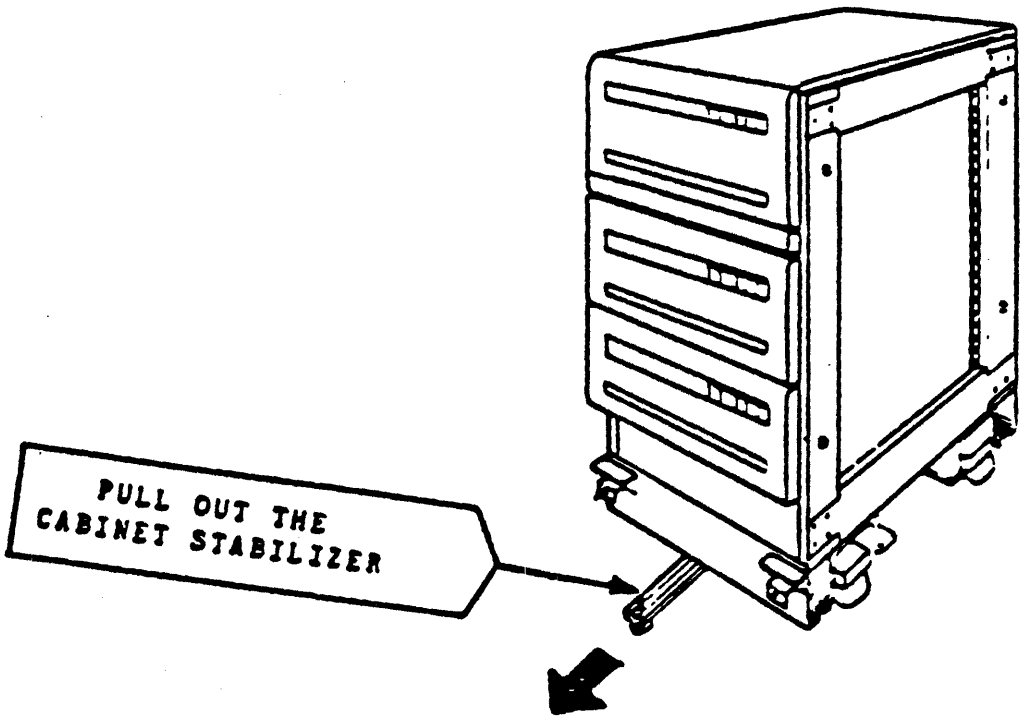

FIGURE 3

STABILIZER BAR

PRELIMINARY

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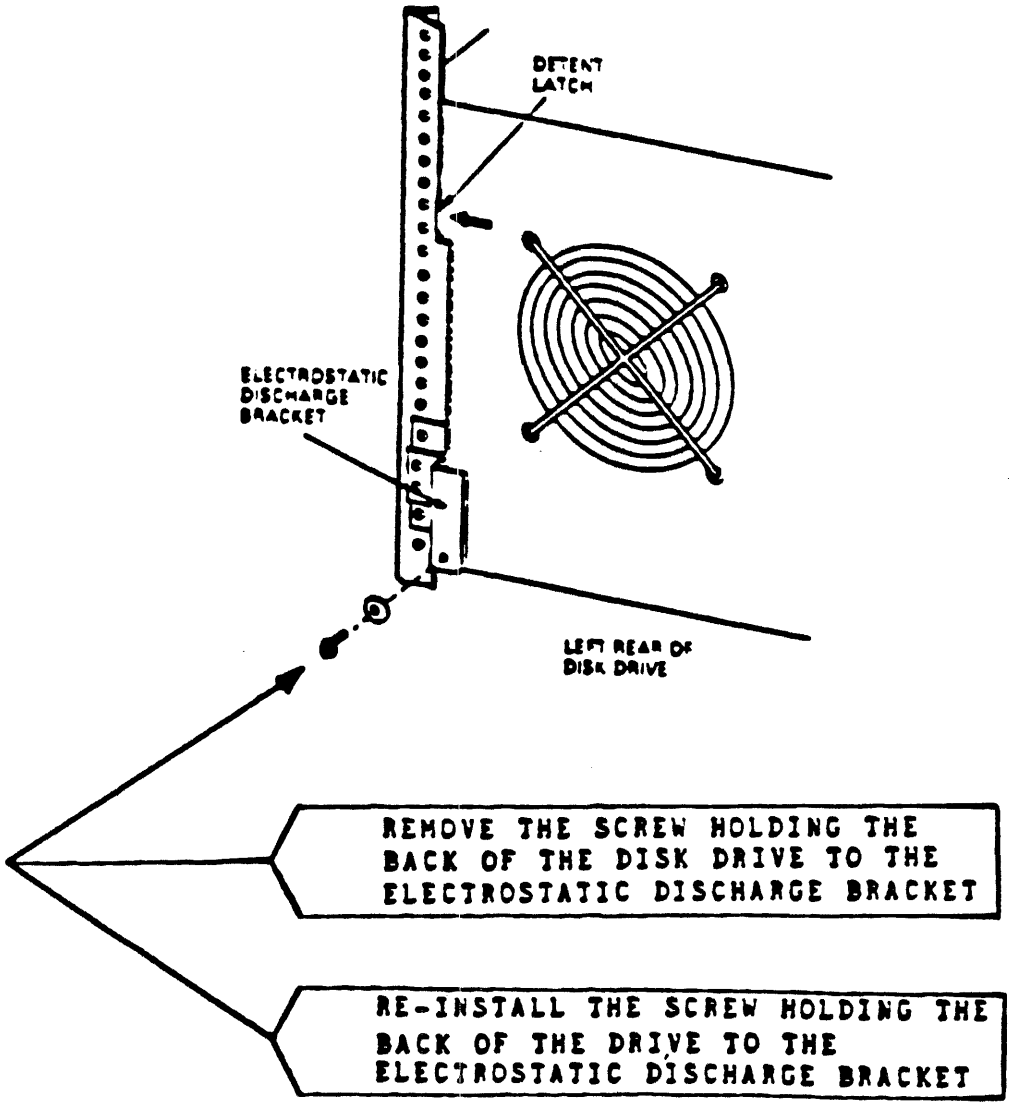

FIGURE 4
ELECTRO DISCHARGE BRACKET

PRELIMINARY

SUBJECT TO CHANGE WITHOUT NOTICE

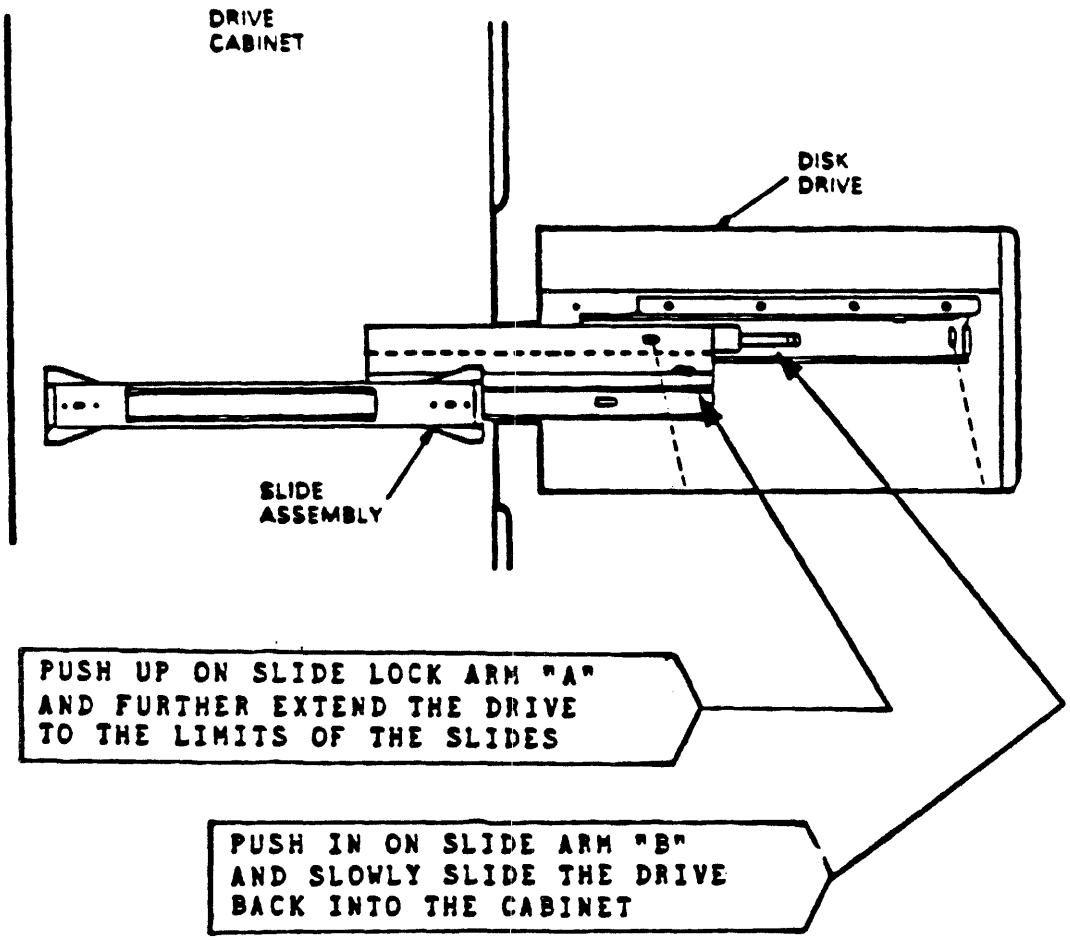

FIGURE 5

DRIVE SLIDE ARMS

PRELIMINARY

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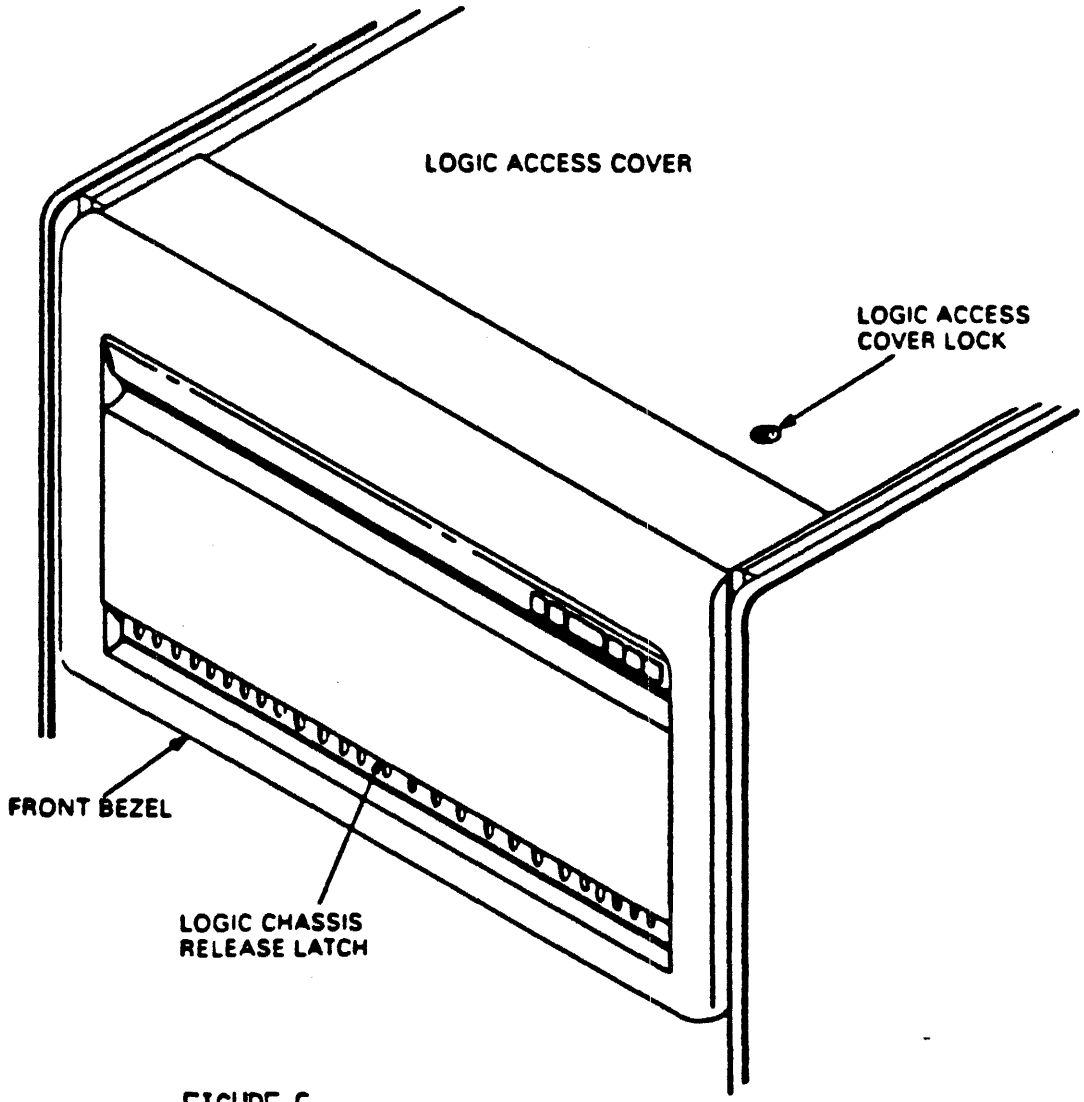

FIGURE 6

LOGIC CHASSIS RELEASE LATCH

PRELIMINARY

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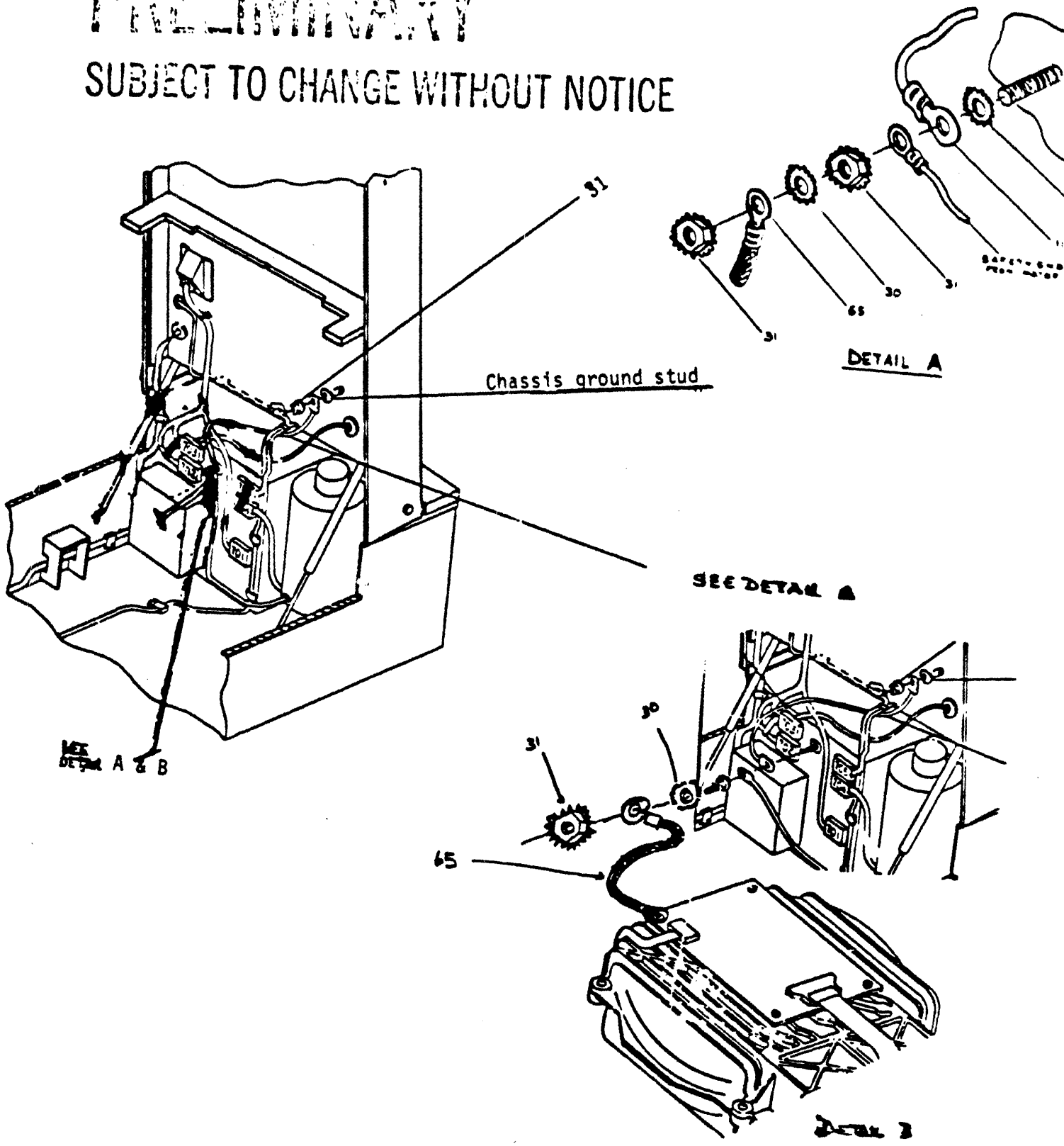

FIGURE 7

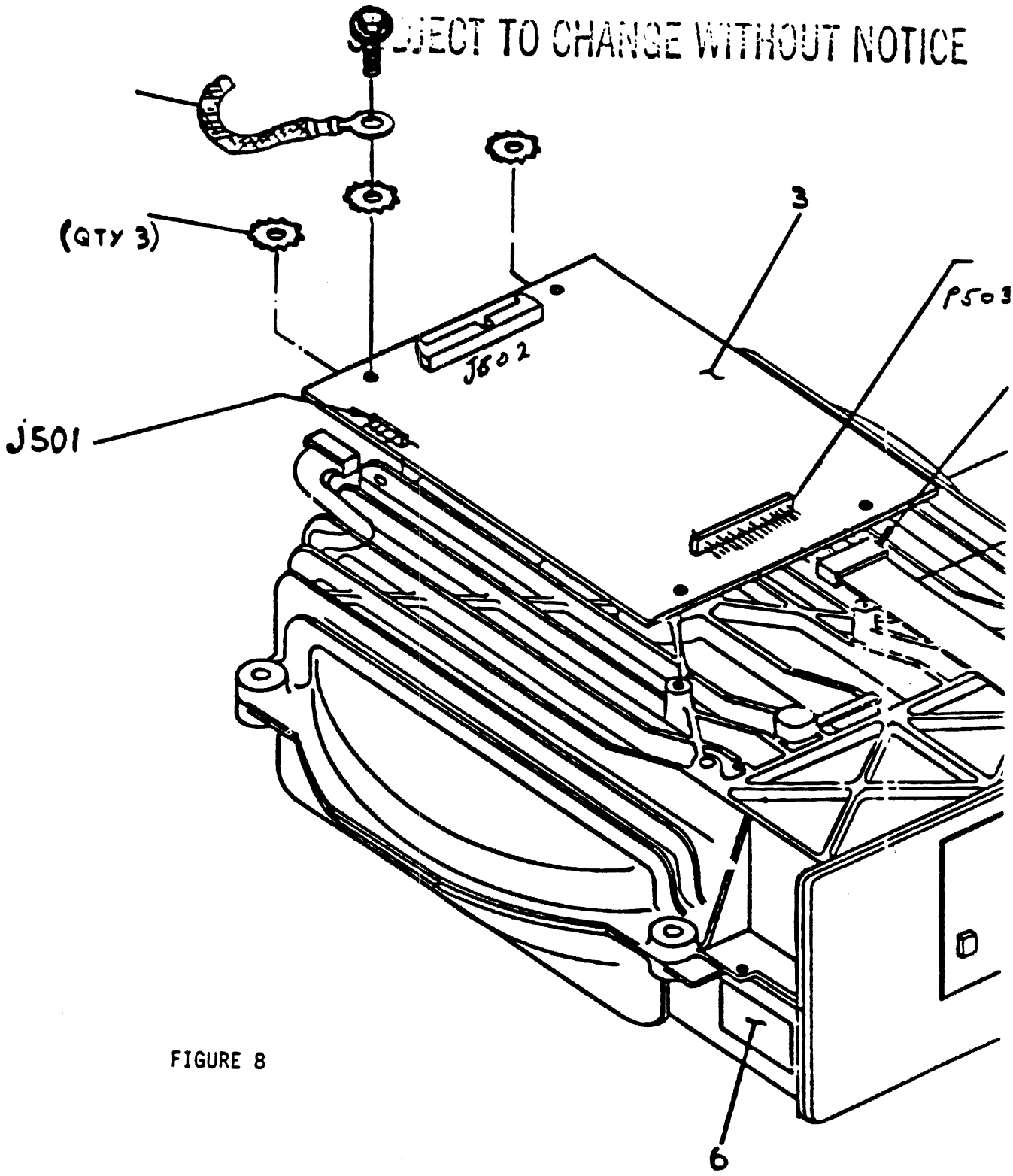

FIGURE 8

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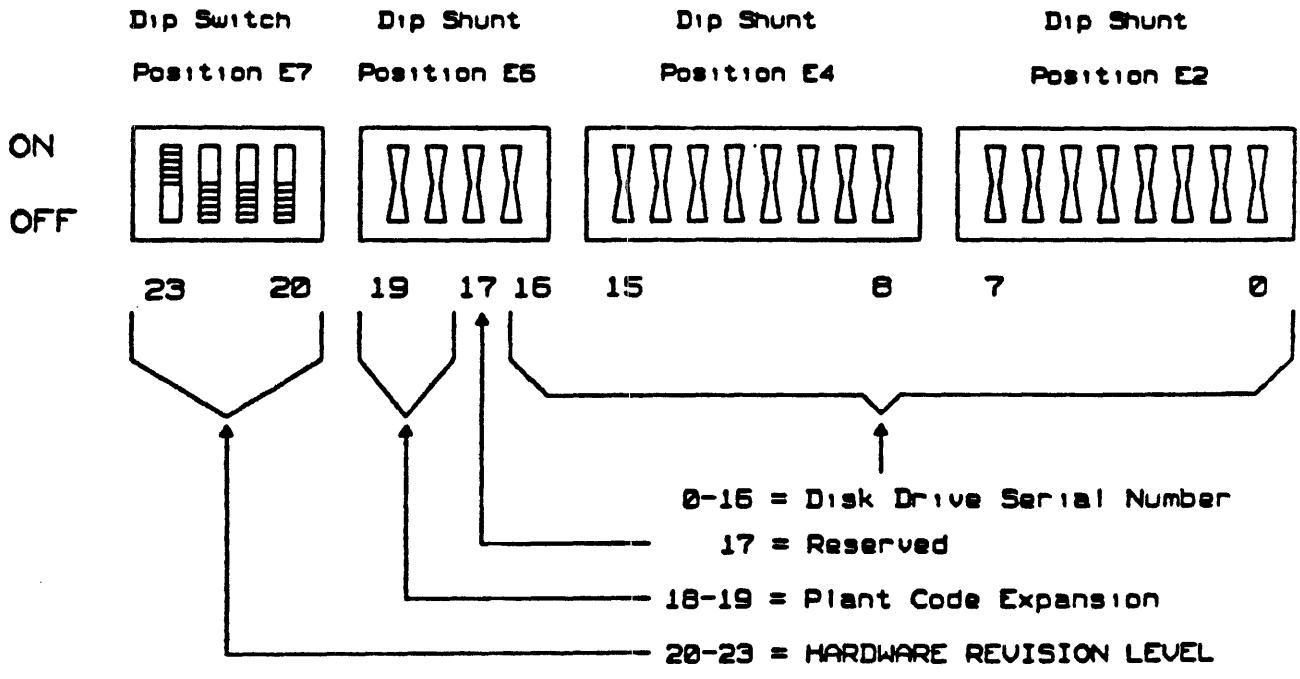
Set the DIP SWITCHES for the Hardware Revision Level
on the Operator Control Panel (54-14927)
to the indicated positions:

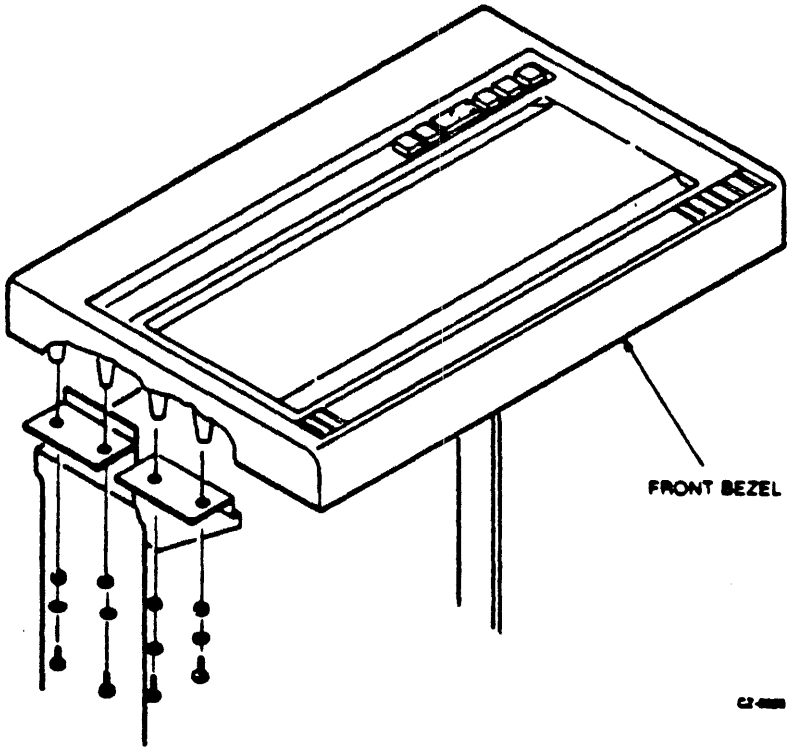
20 = OFF
21 = OFF
22 = OFF
23 = ON

This will indicate RA81 HARDWARE REVISION '7'

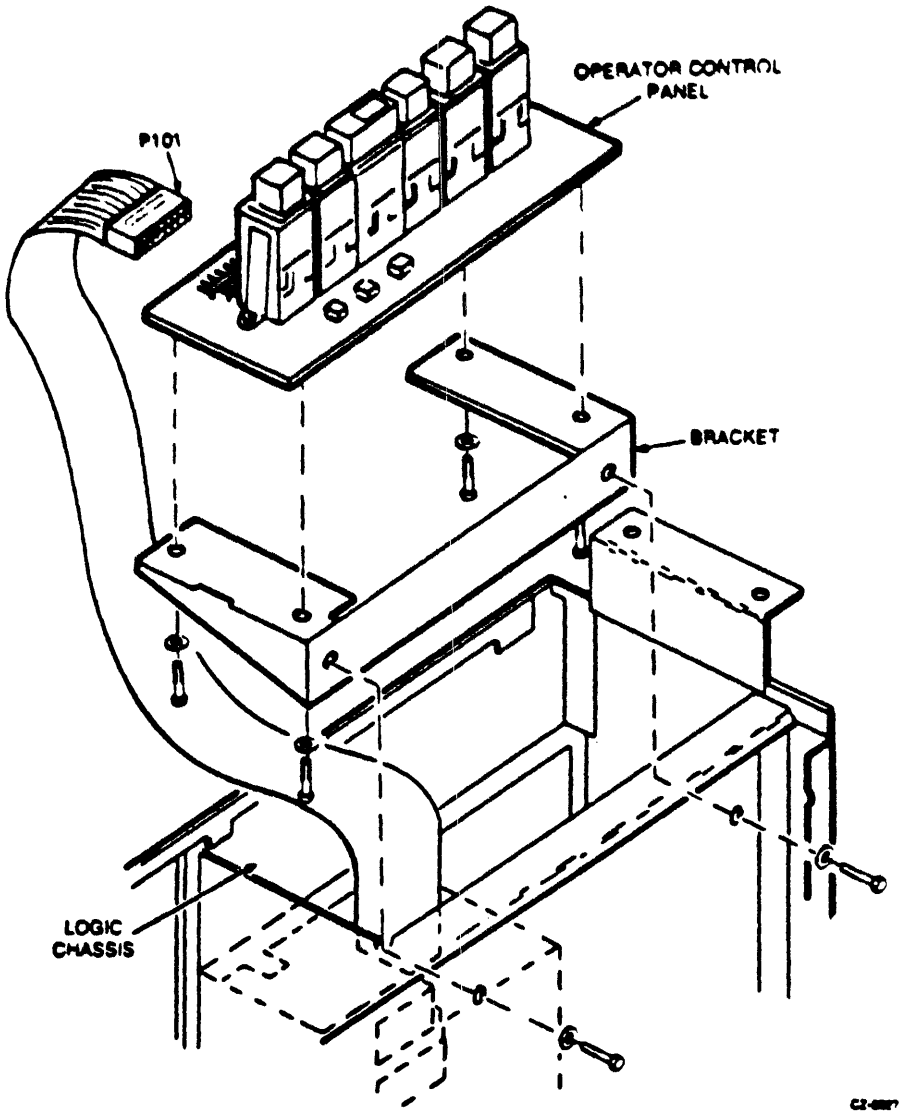
NOTE: ON = Binary 0
OFF = Binary 1



HARDWARE REVISION LEVEL SWITCHES FIGURE 9



FRONT BEZEL REMOVAL FIGURE 10



OPERATOR CONTROL PANEL REMOVAL FIGURE 11